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Relationship between knowledge of academic content and pedagogical knowledge in the profile of the English university teacher

Relación entre el conocimiento del contenido académico y el conocimiento pedagógico en el perfil del docente universitario de ingles

Relação entre conhecimento de conteúdo acadêmico e conhecimento pedagógico no perfil do professor universitário de inglês

Jacqueline Jeaneen Veliz Blacio[1]

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1. Licenciada en Lengua Inglesa, Graduada en la Universidad Católica de Guayaquil; Certificada Academia Internacional en la Niveles C1 y B2; Graduada y Titulada en Academias de Inglés Centro Ecuatoriano Norteamericano (C.E.N) y Centro Politécnico de Inglés (COPEI) Universidad de Guayaquil; Docente de la Universidad de Guayaquil; Guayaquil, Ecuador; jeaneenveliz94@hotmail.com; https://orcid.org/0000-0002-0071-3399

CORRESPONDENCIA
Jacqueline Jeaneen Veliz Blacio
jeaneenveliz94@hotmail.com

Guayaquil, Ecuador

RESUMEN

Es ampliamente conocido que uno de los proyectos investigativos que ha representado un considerable impacto sobre el tema en cuestión estuvo patrocinado por la Universidad de Stanford y la Fundación Carnegie entre 1986-1987, en el que se destacó como autor Lee Shulman, al concluir su estudio titulado: Knowledge development in teaching (Desarrollo del conocimiento en la enseñanza, en español), con el cual propuso más cuatro categorías de conocimiento que sustentaban la toma de decisiones del educador en su actividad pedagógica. Con el presente estudio se pretende efectuar una revisión bibliográfica que de una manera práctica arroje resultados alusivos a algunas de las fuentes formales que describan parte de los aspectos más importantes respecto a esta interesante corriente de investigación en el ámbito socioeducativo. Los resultados obtenidos alcanzaron para exponer, en base al criterio de expertos en la materia, sobre las dimensiones fundamentales que componen el desarrollo investigativo de Shulman, ý adicionalmente, para describir lo relativo a otros aspectos que se consideraron significativamente trascendente dentro de los contenidos analizados, o sea, se hacen referencias argumentativas respecto a: las etapas del proceso pedagógico; la practica pedagógica y gestión del aula e impacto del conocimiento pedagógico del contenido en la formación docente inicial. En conclusión, es posible atreverse a deducir que, lo que permitirá materializar el desarrollo del PCK en los maestros, serán todas aquellas oportunidades que estos tengan (en el contexto de su formación inicial) de articular el conocimiento disciplinar y el conocimiento pedagógico. Igualmente fue posible percatarse de que la constante interaCKión entre pares del ámbito de la educación científica ha seguido enriqueciendo dicho procedimiento (TPACK) en cualquiera de sus distintas instancias de discusión que se generan durante el curso de la preparación docente. Y finalmente que, el objetivo en todo momento es que los maestros sean cada vez más independientes en cuanto a su forma de producir representaciones del contenido disciplinar adquirido a fines de que termine escogiendo aquellas que consideren más acordes respecto a criterios didácticos (pedagógicos), curriculares, contextuales, disciplinares, explícitos y basados en su noción teórico y práctica.

Palabras clave: Conocimiento, enseñanza, actividad pedagógica, pedagógico del contenido, TPACK.

ABSTRACT

It is widely known that one of the research projects that has had a considerable impact on the subject in question was sponsored by Stanford University and the Carnegie Foundation between 1986-1987, in which Lee Shulman stood out as the author, at the conclusion of his study entitled: Knowledge development in teaching, where he proposed four more categories of knowledge that supported the decision-making of educator in his pedagogical activity. This study aims to carry out a bibliographic review that in a practical way yields allusive results to some of the formal sources that describe part of the most important aspects regarding this interesting current of research in the socio-educational field. The results obtained were able to expose, based on the criteria of experts in the field, on the fundamental dimensions that make up Shulman's research development, and additionally, to describe what is related to other aspects that were considered significantly transcendent within the content analyzed, that is, argumentative references are made regarding: the stages of the pedagogical process; the pedagogical practice and classroom management and impact of the pedagogical knowledge of content in the initial teacher training. In conclusion, it is possible to dare to deduce that what will allow the development of the PCK in teachers will be all those opportunities they have (in the context of their initial training) to articulate disciplinary knowledge and pedagogical knowledge. It was also possible to realize that the constant interaction between peers in the field of science education has continued to enrich this procedure (TPACK) in any of its different discussion instances that are generated during the course of teacher preparation. And finally, the objective at all times is for teachers to be increasingly independent in their way of producing representations of the disciplinary content acquired so that they end up choosing those that they consider most consistent with didactic (pedagogical), curricular criteria, contextual, disciplinary, explicit and based on his theoretical and practical notion.

Keywords: Knowledge¸ teaching, pedagogical activity, pedagogical content, TPACK.

RESUMO

É sabido que um dos projetos de pesquisa que teve um impacto considerável sobre o assunto em questão foi patrocinado pela Universidade de Stanford e pela Fundação Carnegie entre 1986-1987, no qual Lee Shulman se destacou como autor, na conclusão de seu trabalho. estudo intitulado: Desenvolvimento do conhecimento no ensino, onde propôs mais quatro categorias de conhecimento que apoiavam a tomada de decisão do educador em sua atividade pedagógica. Este estudo tem como objetivo realizar uma revisão bibliográfica que, de maneira prática, produz resultados alusivos a algumas das fontes formais que descrevem parte dos aspectos mais importantes em relação a essa interessante corrente de pesquisa na área socioeducativa. Os resultados obtidos foram capazes de expor, com base nos critérios de especialistas da área, as dimensões fundamentais que compõem o desenvolvimento da pesquisa de Shulman e, adicionalmente, descrever o que está relacionado a outros aspectos considerados significativamente transcendentes no conteúdo analisado, ou seja, são feitas referências argumentativas sobre: as etapas do processo pedagógico; a prática pedagógica e gestão da sala de aula e o impacto do conhecimento pedagógico do conteúdo na formação inicial de professores. Concluindo, é possível ousar deduzir que o que permitirá o desenvolvimento do PCK nos professores serão todas as oportunidades que eles têm (no contexto de sua formação inicial) para articular conhecimento disciplinar e pedagógico. Também foi possível perceber que a interação constante entre colegas no campo da educação em ciências continuou a enriquecer esse procedimento (TPACK) em qualquer uma de suas diferentes instâncias de discussão geradas durante o curso de formação de professores. E, finalmente, o objetivo é sempre que os professores sejam cada vez mais independentes em sua maneira de produzir representações do conteúdo disciplinar adquirido, para que acabem escolhendo aqueles que consideram mais consistentes com critérios didáticos (pedagógicos), curriculares, contextuais, disciplinares. , explícito e baseado em sua noção teórica e prática.

Palavras-chave: Ensino, conhecimento, atividade pedagógica, conteúdo pedagógico, TPACK.

Introducción

It is interesting that even in Latin America there is still evidence of an increase in interest in studying the pedagogical function of the teacher; in perspective considering its interrelation with the actors that comprise it.

Castejon & Giménez (2017) have pointed out that, aCKording to Wilson, Shulman, & Richert (1987), it has been estimated that the educational effectiveness will derive from the academic preparation of the individual responsible for teaching. However, the former add that there are also other types of knowledge who are equally important to consider. Among these are the specific contents of the chair itself, that is, content knowledge (CK) or disciplinary or academic knowledge and pedagogical content knowledge, PCK (also known as didactic content knowledge - DCK), referred to learning that is acquired to transmit them.

Likewise, they refer to the work of Shulman (1987) because he ensured that at a time when a teacher decides his teaching method, he adopts different types of knowledge, such as: CK, PCK, knowledge of other objectives, knowledge of educational objectives, curricular knowledge, general pedagogical knowledge and knowledge of apprentices. He continued citing (Bolívar) who detailed that:

Shulman's work (1987) derived in a set of approaches to teaching, where CK and PCK have been developed, on the one hand, about teacher thinking; on the other hand, on practical knowledge. (p. 146)

They also noted that, in another work in which Shulman collaborates with Grossman and Wilson, it was pointed out that a good teacher knows not only its content, but also knows things about it that materialize effective instruction. In fact, based on other sources, they implied that, in both basic and continuing education for the educator, the CK and the PCK constitute transcendent capacities by representing key components of teaching competences (See Table 1). . They also alluded to the recent studies by (Gitomer & Zisk) and (Kleickmann et al.) In which the marked importance of these aspects has been evidenced and which are still in force "precisely because of the need to obtain a good education in the what to teach and how to teach, whatever the educational level "(p. 146)

Tabla 1. Years in which some countries of Latin America and the Caribe regulate and guidelines of continuous training

Country	Year of: National / General Education Law	Year of: Law / Statute / Norm of Teaching Career	Year of: Law / Specific Standard for Continuing Education
Argentina	2006	1958	2007 - 2008
Chile	2009	1991 - 1996	2016
Colombia	1994	1979 - 2002	2013
Costa Rica	1957	1972 - 1996	---
Cuba	1959 - 1961	No information	---
Ecuador	2011	In the Law of Education ◊	2010
The Savior	2012	2006	---
Guatemala	1991	1961	---
Panama	nineteen ninety five	In the Law of Education ◊	2004 - 2008
Paraguay	1998	2001 - 2016	---
Peru	2003	2012	2017 (V. Preliminary)
Dominican R.	1997	2003	2013
Uruguay	2008	1993	2015

Recovered and Adapted from:" Continuing Teacher Education policies in Latin America. Exploratory mapping in 13 countries ". Vezub*(2019)*. Ed. UNESCO / IIPE-SITEAL. Recovered from: www.buenosaires.iiep.unesco.org/es/portal/analisis-comparativas-politicas-docentes

◊ *The norms / articles that govern the teaching career are part of the General / National Law of Education*

In contributions like those of Tourón (2016) it can easily be deduced that the present theme, that is, the observation and definition of the particularities of content knowledge and pedagogical knowledge, apparently begins with the results obtained in Shulman's study in 1986, since he defined a model that was shaped based on three forms of primary knowledge: technological, pedagogical and content. For this expert, this three sectorial knowledge interrelated and gave rise to specific knowledge.

Next, with the present bibliographic review we intend to cover some of the most outstanding aspects related to the meanings of CK and PCK of teachers. Specifically, references will be made to the various criteria that some writers expose in their works regarding the theme raised, so that in a practical way they help in understanding the importance of each of these dimensions of knowledge.

Educational Methods and Tools

This documentary research has been defined in the context of a review methodology, so, in summary, the strategy responded to the search, selection, analysis and interpretation of various bibliographic sources that were accessible through consultations ca-

rried out in: databases of full text, such as SciELO, Dialnet, Redalyc, Alicia, Base, Redib, among others; and web portals of public and private organizations with content repositories linked to the topic.

The selected bibliographic resources were mainly represented by original and review scientific articles, digital and digitized books, electronic documents and other types of information material of scientific and academic interest.

The expressions "Content Knowledge" and "Pedagogical Knowledge" were used independently but consecutively in each database and website search engine consulted, resulting in a certain number of titles that, as a link, redirected to a text in particular. Of the total content explored, it was necessary to discard those that, additionally, did not respond to other criteria of interest assumed with preference, such as: Spanish language, published in the last 10 years (with some exceptions, as they are content that was not questioned). by more recent meanings), higher degree of thematic correlation and specialty in education and social sciences; in short, they selected ten resources as bibliographic sources for this research.

Results

For more than two decades there has been a concern for the teaching work that manifests itself in different ways. Many of these are accompanied by a high component of criticism based on the idea that teachers must make important changes in their work. It is possible that many of these speeches are somewhat right, however, it is also true that education is a highly complex process and, therefore, those who commit to it, realize and experience this complexity, thereby noting how difficult it is to find a single route that effectively answers all possible problems they face. (Salazar, 2012)

From the above it is possible to deduce that, even nowadays, interest in the teaching function is considered, believing this is due to the fact that, despite the advances in the multiple influential aspects, teacher and academic training is a task that, On the one hand, it does not change in its essence of transmitting knowledge through various educational methods and tools, but on the other hand, it is constantly adapting to new scenarios that, in particular, are also requiring adaptations of their modes and content in order to achieve the greatest benefit of this praiseworthy profession, because as it is referred there, it is a very complex process that only those actors truly committed to education experience, and find solutions to the associated problems that arise in the course, they are not found after following a single direction.

Another reference to Salazar's work is considered valuable (2012), because the idea is shared with it (because in fact it is believed that it is currently largely sustainable) that:

Today, teaching work is recognized for its high human content; Teaching exists in itself because it is the mechanism that human beings have found to support the growth of the youngest. Its role is significant for the development of societies. This connotation clearly surpasses the reduced idea of instruction and transcends towards the task of training, which implies a new consideration of the work of teachers. Hence the important development that educational research has had in the field of teacher professional development. […] This thematic development has generated various theories and methodologies associated with the different dimensions that explain the teaching work, including pedagogical mediation. […] Research developments regarding teacher training and professional development.

Fuhr, Rocha, & Marchisio (2017), when starting their study, they make it clear that, in general, it has been conceived that a teacher is a thinking subject, who puts into practice the logic, who decides, has criteria and notions about how to teach and how to learn, among other skills. Additionally, it explains

that:

The teacher is daily involved in an informed decision-making process where their professional knowledge intervenes both when designing a teaching proposal and when carrying it out. Professional knowledge involves: current curriculum design, interaction with students, educational intentions, strategies for teaching the content being taught, how it is learned and, therefore, how it should be taught - both in general as in relation to a particular content. (p. 55-56)

Now, bearing in mind that the above context has been widely described and, to a greater extent, shared by various writers on this topic, it seems appropriate then to begin to differentiate by different criteria or meanings what should be understood by Knowledge of content (CK) and the Pedagogical Knowledge of Content (PCK), as they are the two dimensions that succinctly interest in this study, however, the review itself leads to that, even before that, it is consistent to make at least a brief mention regarding the emergence of the distinctions between these types of knowledge, and for this, inescapably, the study of Lee Shulman carried out in the second half of the 1980s should be cited.

Turns out, according to Tourón (2016) Lee Shulman realized that:

… The professor's knowledge of the scientific field or specialty subject and his / her pedagogical knowledge were, or could be, separated and should be united. Thus, content knowledge refers to what to teach and pedagogical knowledge to how to do it. Thus the expression: Pedagogical knowledge of Content is different from Pedagogical Knowledge on how to teach in general, while it is different from knowing in a certain area, from being an expert in a certain content, which does not ensure that you know how to teach it. The expression tries to combine, or better intersect, both dimensions, thus becoming a: Practical knowledge on how to teach what is supposed to be taught in a given area.

In addition, Tourón explains that the origin of the PCK (in English with the acronym PCK, which summarizes Shulman's expression: Pedagogical Content Knowledge,) was later adapted to Technology, Pedagogy And Content Knowledge (TPACK), which is how this model has been disclosed, which in Spanish it is: Technology, Pedagogy and Content Knowledge. This archetype, as referred to at the beginning of this work, is constituted by three forms of primary knowledge or sector knowledge: Knowledge of Technology (CT) [Technology Knowledge - TK], Knowledge of Pedagogy (CP) [Pedagogy Knowledge - PK] and Content Knowledge (CK) [Content Knowledge - CK]; which are interrelated with each other (see Figure 1) giving rise to specific knowledge.

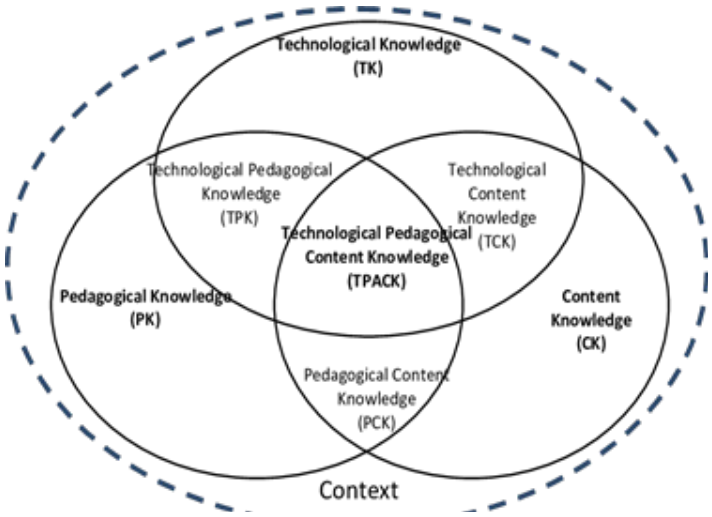

Figure 1. Translation and summary of the Lee Shulman TPACK model

Fuente: "Flipped ICT". Sanchez(2013).

Then, in the same work, the treatise writer leans on another work (Koehler & Mishra) to briefly and conceptually expose the three main dimensions (knowledge) that make up the TPACK model, as well as the other four magnitudes (knowledge) that are generated after the interaction between the first, that is, it refers to a total of seven constituent elements of the aforementioned model, which we then consider equally valuable to refer for a better understanding and contextualization of this topic.

Regarding the CK, he says that it is about what a teacher knows about the subject that he learns or about which he must teach, since, even when it is the same subject, there are clear differences between the contents that must be taken from it Keep in mind, when planning for what level of study this teaching will be directed. In this sense, the author reported that Shulman (cited in Tourón, 2016) states that:

… This knowledge could include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and evidence, as well as established practices and approaches towards the development of such knowledge. It is what is taught.

Garritz & Trinidad (2006) For his part, he explained that:

... refers to the amount and organization of knowledge of the subject per se in the teacher's mind. To think properly about knowledge of content requires going beyond knowledge of the facts or concepts of a domain, it requires understanding the structures of the topic. (p. 237)

The CP refers to the depth of knowledge that the teacher obtains "about the teaching and learning processes and practices or methods" that, among other aspects, brings together (in general) the educational objectives, values and ideals. Generically, this type of knowledge is applicable to the discernment of how students learn, general classroom management skills, their planning, and student assessment. It's about how you educate yourself. In relation to the TC, it states that it consists of understanding certain ways of thinking and working with technology, resources and tools. Applying with technology can be associated with all technological tools and resources.

This includes understanding information technology broadly enough to apply it productively at work and in everyday life, being able to recognize when information technology can help or hinder the achievement of a goal, and being able to continuously adapt to changes in it. (Tourón, 2016)

Regarding the PCK, the expert indicates that (Shulman) is a process of transformation that occurs at times when "the teacher interprets the subject, finds various ways to represent it, and adapts and adapts the instructional materials to the conceptions alternatives and previous knowledge of the students "(Tourón, 2016). This dimension encompasses: learning, curriculum, assessment, and reporting; that it would be a fundamental task of education; as well as the scenarios that drive the study and the links between the training plans, the evaluation and the pedagogy. Content Technological Knowledge (CTK) should be understood as the way in which technology and content cooperate and define each other. The teacher is due to an understanding that transcends the subject they teach and require understanding "what specific technologies are the most appropriate to address the object learning in their domains and how the content dictates or perhaps even changes the technology, or vice versa"(Tourón, 2016). Technological-Pedagogical Knowledge (TPK) assumes that the teacher knows how teaching and learning can be modified when certain technologies are used in a particular way, and in turn, this also includes knowing the opportunities and qualifications of a series of technological and pedagogical instruments that are linked with suitable schemes for progress and pedagogical skills. Last but not least, the connoisseur mentions

the TPACK model (Technology, Pedagogy and Knowledge of Content), in this regard affirming that said process precedes a revealing teaching because it is widely linked to technology, that is, it is the effective teaching platform through the use of technology, which requires that:

- The teacher understands the meaning of the concepts that mediate technologies;
- The pedagogical methods take advantage of the technologies in a productive way to teach the contents;
- To know what facilitates or hinders the concepts to be learned and how technology could solve some of the complications that students face;
- Advance understandings of students' epistemological knowledge and theories, and;
- It is known how technologies can be used to build existing knowledge for the development of new epistemologies or the strengthening of existing ones. (Tourón, 2016)

Now, considering that with the above it is clarified in a practical way what would be the moment in which the debate resurfaces due to the distinction between the knowledge that truly ends up interacting in the training process in general, it is considered appropriate to expose on other important aspects that are also associated with the fundamental activity of the teacher.

Stages of the Pedagogical Process

Herrera & Fraga (2009) six explained, among which are:

1°. Motivational stage. The motivational stage, although it is located for its analysis as the first, this in no way means that it will only be at the beginning of the process; This refers to the assurance that the teacher performs together with the student of the positive predisposition for the approach to the new content. Motivation refers to the developed interest, to the positive expectation that the student manages to put into play to understand what the new content is about. […]

2°. Appropriation of new content. When starting this stage of the pedagogical process, it is necessary to have students prepared for the effort to modify their content system by inserting new ones. It will not be possible for this highly complex task to be addressed only by the teacher, on the contrary, he must prepare the conditions for this incorporation to take place. […]

This is a stage of great importance for the student and for the process in general, each student will have their own way of modifying their cognitive structure and the teacher must carefully control this process, without trying to force the situation.

3rd. Fixing the new content. Once the appropriation of the new content has been achieved, it is necessary to guarantee that it is focused on the student, this is achieved by preparing tasks of a different nature. Some will have an interpretation base, others will be oriented to the use of algorithms that help in the automation of certain actions and fixing of processes, others will allow the student to test the theoretical and practical mastery of the study content and, of course, There will be tasks where the creativity of the student is shown.

This stage could be called training in the use of new content, which is highly relevant if relevant learning outcomes are to be achieved.

4°. Content application stage. This phase corresponds to the implementation of the new content in a variety of situations and contexts, to achieve the distinction between invariant aspects and the variants that can be presented with the new content set. […]

5th. Content deepening stage. Subsequent to the application stage corresponds another that is closely related to the deep domain of the content. The deepening of the

content does not refer to a certain level of appropriation (familiarization, reproduction, production, application, creation ...), but to the wealth that is in its domain.

Deepening is the period that deals with how the student enriches his understanding through the search, discussion and analysis of scientific or technological findings related to the object of study. Therefore, the orientation of independent study is necessary, as well as the use of organizational forms such as the seminar and the workshop, where the student presents new ideas, interpretations, discoveries related to the subject under study.

In general, this stage is made up of individual intervention and collective construction in the learning group, the fundamental role of the teacher is that of animator, organizer, moderator and experimental guide. […]

6th. Content systematization stage. Regardless that it is presented as a necessary stage in the pedagogical process, it does not refer to a specific moment within the class or the subject, its behavior is immanent to the entire teaching-learning process.

It could be said that it behaves more as a principle than as a period of the pedagogical process.

It consists of the student being aware of how he understands, appreciates, and interrelates the different contents that are the object of learning. How is the new content related to the rest of the content, whether from one or from several disciplines? What are the relationships of hierarchy and coordination that you discover? How is it used in practice? In short, the systematization will ensure that the new content is subject within a web of relationships that the student has been building throughout his life experience, and thus constitutes a structured body, complex of relationships that reflect learning from each person. (pp. 15-18)

Pedagogical practice and classroom management

In this sense Alvarado (2013), among several of his affirmations, assures that:

It is considered of vital importance that teachers in training and practicing begin and deepen in processes of permanent reflection on their work in the classroom to generate pedagogical praxis, as a daily act of construction and reconstruction of educational work, which allows expanding the experiences of the moment , understand the contexts and establish a critical analysis to structure, rework and organize new knowledge, which in turn validates, consolidates and transforms it in its pedagogical practice. […] It is observed that the theoretical curriculum and the practical curriculum must be closely articulated, the two complement each other, and the classroom is the practical field, where a variety of strategies, didactics and elements that help the social construction of knowledge are developed , complement that is consolidated through the permanent training of teachers, the construction of educational policies and their questioning, and continuous reflection on the very meaning of the educational task. […] Currently, education has very precise objectives; Among them is the interest in achieving harmonious relationships between what is written and what is done, that is, an integration of the fields of knowledge and experiences that facilitate an understanding, reflection and criticism of reality; emphasizing cultural, financial, political, environmental and scientific dimensions to achieve concrete knowledge and mastery of processes in accordance with the innovations of science and technology, that respond to the demands of a globalized world. […] In summary, pedagogical practice has to do with the development of the curriculum and with the processes of educational reform and innovation; they are transformed along with the changes and advances in society. The teacher's role is to adapt to the context and teaching systems of the time. The pedagogical practice will be successful, when there is clarity about the

teaching processes and the social dynamics in which the teachers and students are inserted, when it shows coherence with the educational proposal adopted in an institution (pages 100, 102, 104)

Impact of pedagogical knowledge of content on initial teacher training

In this sense Guerra & Montenegro (2017) They begin by affirming that "A widely discussed topic is related to identifying the knowledge that teachers must have when they face teaching" and on this matter he recognizes that one of the precursor papers was that of Shulman himself, who contributes with the premise of that "the identification of knowledge at the teaching base is a fundamental step to strengthen teaching performance". (p. 668)

Then it refers based on its sources that:

The contribution of pedagogical knowledge of content to the educational field lies in the fact that this type of knowledge is the fundamental and key aspect of initial and continuous teacher training for teachers. Indeed (Shulman) argues that classroom teachers, to become good educators, need a strong command of this type of knowledge, since it allows them to teach content in the most appropriate and relevant way to their students. Similarly, various studies have shown that teachers with a more sophisticated pedagogical knowledge of content tend to design better classes and articulate better instructional practices, which have a positive effect on the learning of their students. (p. 669)

As an example, in the work of Marzábala, Moreira, Delgado, Moreno, & Contreras(2016)a practical exposition on application linked to the theoretical model referred to here is achieved, since they focused on distinguishing how the process of integrating disciplinary and pedagogical knowledge has been in the Chilean context; previously describing certain aspects around the development of pedagogical knowledge of the content in the initial training of chemistry teachers; They highlighted, based on one of the sources, that an important and dynamic movement of change and transformation has been evidenced worldwide, after the analyzes of the initial training programs for science teachers, and in this sense an attempt is being made to resignify the training of science teachers, directing them towards the progress of "an autonomous professional, thoughtful and investigator of his own work". (p. 244)

Later they added that before the Chilean challenge, started in 2012; which was focused on achieving the integration of the aforementioned knowledge through "a transformation process activated by the Performance Agreements in the field of initial teacher training"; The contribution of Chung Wei and his collaborators was taken into account, who two years before concluded that:

1. The impact of professional development during training is relevant and contributes to the increase in learning achievements;

2. Professional development content contributes more by focusing on how to use pedagogical skills and how to teach specific content to students than on abstract discussions of education;

3. When comparing the effect of various training orientations on student learning, the greatest achievements are obtained when teachers have participated in training focused on deepening their disciplinary knowledge integrated into teaching practice in an environment of continuous professional collaboration. (p. 245)

In the same way they alluded that in said process "the concept of Pedagogical Knowledge of Content (PCK) was introduced, as an articulator of pedagogical and disciplinary knowledge" concept that, as most of the authors refer, is due to the work of Lee Shulman, who at that time referred to this as "the

lost paradigm of teaching". (Marzábala et al., 2016, p. 245)

Conclusion

After analyzing and discussing the different contributions that have served as a reference in this research, it is possible to dare to deduce which will allow the development of PCK in teachers to materialize, will be all those opportunities that they have (in the context of their training initial) to articulate disciplinary knowledge and pedagogical knowledge. And this is believed to be because, it allows to clarify even more the criteria for teaching trainers who have not yet started the exercise of their profession, and also, it facilitates the admission of other components that emerge in the work with different resources (specialized literature, curriculum, computer technology, among others) and with the support of pedagogical and disciplinary specialists.

It is considered that the objective at all times is that teachers be more and more independent in terms of their way of producing representations of the disciplinary content acquired so that they end up choosing those that they consider most consistent with respect to didactic (pedagogical), curricular, contextual, disciplinary, explicit criteria based on their theoretical and practical notion.

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