



Teacher training and professional development located for the teaching of language and mathematics in Colombia

TEACHER TRAINING AND PLACED PROFESSIONAL DEVELOPMENT FOR LANGUAGE AND MATHEMATICS TEACHING IN COLOMBIA

Formación docente y desarrollo profesional situado para la enseñanza del lenguaje y matemáticas en Colombia

Formação de professores e desenvolvimento profissional localizados para o ensino da linguagem e matemática na Colômbia

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ABSTRACT

The purpose of this article is to present a bibliographic survey of the current trends in Colombia regarding teacher training and professional development located for the teaching of Language and Mathematics at primary and secondary academic education levels. The aim is to focus on three categories of analysis: learning communities, situated professional development and pedagogical practice, demonstrating in a concrete way how the quality of education in the country has been impacted, from the official sector, by analyzing the results obtained in the research carried out in this educational field. These categories develop some dimensions that allow to solve the question of what are the changes that occur in the pedagogical practice of the teachers after applying a training in the methodology of the study of classes. The analysis of this system of categories and dimensions has been carried out under the process of teaching Language and Mathematics, and how it contributes significantly in improving the processes of reading comprehension and solving mathematical problems. The studies

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RESUMEN

Este artículo tiene como propósito presentar un rastreo bibliográfico de las tendencias actuales en Colombia acerca de la formación docente y desarrollo profesional situado para la enseñanza del Lenguaje y Matemáticas en los niveles de educación básica primaria y media académica. Se pretende focalizar en tres categorías de análisis: comunidades de aprendizaje, desarrollo profesional situado y práctica pedagógica, demostrando de manera concreta cómo se ha impactado en la calidad de la educación del país, desde el sector oficial, mediante el análisis de los resultados obtenidos en las investigaciones realizadas en este campo educativo. Estas categorías desarrollan algunas dimensiones que permiten resolver el interrogante de cuáles son los cambios que se dan en la práctica pedagógica de los docentes luego de aplicar un entrenamiento en la metodología del estudio de clases. El análisis de este sistema de categorías y dimensiones se ha realizado bajo el proceso de la enseñanza del Lenguaje y Matemáticas, y de cómo este contribuye significativamente en el mejoramiento de los procesos de comprensión de lectura y

por

RESUMO

O objetivo deste artigo é apresentar um levantamento bibliográfico sobre as tendências atuais da Colômbia no que se refere à formação de professores e desenvolvimento profissional localizado para o ensino de Língua e Matemática nos níveis de ensino acadêmico primário e secundário. Destina-se a concentrar-se em três categorias de análise: comunidades de aprendizagem, situado desenvolvimento profissional e prática de ensino, demonstrando concretamente como isso tem impactado a qualidade da educação no país, o setor oficial, através da análise dos resultados a pesquisa realizada nesse campo educacional. Essas categorias desenvolvem algumas dimensões que permitem resolver a questão de quais são as mudanças que ocorrem na prática pedagógica dos professores após a aplicação de um treinamento na metodologia do estudo das aulas. A análise deste sistema de categorias e dimensões tem sido realizada no processo de ensino de Linguagem e Matemática, e como contribui significativamente na melhoria dos processos de compreensão de leitura e resolução de problemas matemáticos. Os

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addressed demonstrate a positive effect on teaching and instruction oriented by teachers, especially in their methodologies, didactic strategies, situated professional development and evaluative practices, as well as in student learning.

resolución de problemas matemáticos. Los estudios abordados demuestran un efecto positivo sobre la enseñanza e instrucción orientada por los docentes, especialmente en sus metodologías, estrategias didácticas, desarrollo profesional situado y las prácticas evaluativas, así como en el aprendizaje de los estudiantes. Esto se materializa en la consolidación de comunidades de aprendizaje conformadas por los docentes de lenguaje y matemáticas del país –teniendo en cuenta áreas de conocimiento y perfil de cada uno de ellos-, donde se realizan constantemente procesos de planeación, ejecución, observación y retroalimentación de las clases, por medio de equipos de estudio.

estudios abordados demonstram um efeito positivo no ensino e na instrução orientados pelos professores, especialmente em suas metodologias, estratégias didáticas, desenvolvimento profissional situado e práticas avaliativas, bem como na aprendizagem dos alunos.

Keywords: Community of learning, educational quality, evaluation, teacher training, professional development located.

Palabras clave: Comunidad de aprendizaje, calidad educativa, evaluación, formación.

Palavras chave: Comunidade de aprendizagem, qualidade educacional, avaliação, formação de professores, desenvolvimento profissional localizado.

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INTRODUCTION

In recent years, public policies concerning education in Colombia have implemented multiple institutional and governmental actions aimed at solving the problems of coverage, permanence and grade repetition, this fact has isolated the topic of educational quality, as low students' performance levels in the areas of language and mathematics at national level reflect. Results of the 2014 Saber tests for the 3rd, 5th and 9th grades show that a high percentage of the students have low or poor performance levels in language and mathematics (ICFES, 2018). Consequently, one of the goals of the Colombian government is to reach educational quality¹ by 2025, however, this goal can only be achieved through pertinent, efficient and meaningful classroom practices. The educational system must guarantee basic, universally-defined learning, such as effective learning of language and mathematical skills, which constitute the essential foundation of knowledge seeing as these two areas are the pillars of elementary, secondary and higher education.

In line with the aforementioned, today's society demands an education in which our teens learn to be competent citizens amidst an environment that is more and more challenging, that evolves following quality criteria and requires the capacity to adapt to new circumstances. This implies using language as a means to create, process information and establish multiple interactions. Therefore, it is necessary to encourage students to develop the

skills and competences needed to acquire mathematical thinking and language functioning to foster the creation of meaning and fulfill the educational process' communicative purpose and scientific competence. In that sense, many educational systems have recently focused on measuring learning results in an attempt to assess education quality, and on using the results of said measurements to guide educational policy decisions (UNESCO, 2014).

Accordingly, classroom practices are a key tool to contribute reaching the goal of educational quality proposed by the State. One of the strategies proposed to improve teachers' classroom practices and teaching processes is the implementation of a teacher training development model. This model needs to be aimed at the teacher collectivity and must develop context-based training connected to classroom practice and its specific problems. Based on this, it is necessary to reconsider teachers' work and its consequent actions in classrooms, since teacher training must conceptually examine the nature of the discipline and its appropriate representation and teaching forms for different types of students (Shulman, 1987, cited by Avalos, 2006). So, teachers' professional development must be considered a process that implies continuous learning and transformation of the practice, with the purpose of strengthening the capacity to face new challenges, to identify those that arise and those that require relearning.

proposed strategic lines to steer the course of education for the years to follow: Teacher's Excellence, Full School Day, Bilingual Colombia, Analphabeticism-Free Colombia and More Access to Quality Higher Education. MEN (2015).

¹ In 2015, Law 1753 was issued in Colombia, also known as 2014-2018 National Development Plan Law "*Todos por un nuevo país*". This regulation was the basis for an ambitious plan to materialize the purpose of making Colombia the most well-educated country in Latin America by 2025. This framework

This demands education to guarantee children and teens acquire the knowledge, capacities, dexterities and attitudes needed to perform in adult life. Hence, quality and learning improvement will have a more decisive role worldwide in the following years, which is why strategy design is a key factor to improve the education possibilities of millions of children that can't read and write or fail to have basic arithmetic competences². In that regard, our students evince a learning crisis that needs to be taken care of to succeed in the goal to train them in areas such as language and mathematics, since these are necessary for dignified jobs leading to a fulfilled life. This explains the importance of having trained teachers that are dedicated enough and that can discover and pay special attention to students with learning difficulties, teachers who are supported by correctly managed educational systems that unlock their potential and contribute to the quality improvement of students' learning.

However, there is a void in training excellent educational professionals, since a professionalization process of teachers is needed to attain more knowledge on teaching. Countries such as Finland or Korea have teachers with top qualities, facing competitive and rigorous selection processes and that enjoy an important social position. Teaching in a systematic and effective way is a highly-specialized professional activity that requires training, as in any other profession (Ball and Forzani, 2009). Teacher professional training process (regarded as a key factor for educational quality) requires considering that the improvement

of educational actions will lead to higher levels of quality in the operation of educational institutions (Marchesi, 2011). This suggests that the quality of education improves when teachers receive support and when the proposals to better their situation are based on contextual and comprehensive approaches that take into account all of the factors that ease a teachers' job, since they can't be held accountable for all of the problems associated with the quality of education. However, education of quality is defined nowadays in Colombia as that which trains better human beings, citizens with ethical values, respectful of the public aspect, who practice human rights and coexist in peace. The proposed education drives legitimate progress and prosperity opportunities, is competitive and contributes to closing inequality gaps (MEN, 2011).

The following is a bibliographic revision and background check about the importance of teaching learning communities³ in educational systems, according to Poehner's definition: "Inciting teachers to be in charge of their own learning by constantly reflecting and questioning their classroom practices collectively, becoming researchers and not just knowledge providers" (2011). Which is to say that teachers that belong to a TLC are observers, interrogators and apprentices, and become more complete teachers with notions from academic peers, according to Sergiovanni and Starratt (1998, p. 259). This kind of training drives group work competition among teachers, strengthening collaborative and cooperative learning in their educational praxis, which leads to

² UNESCO (2014) published its eleventh Education For All Monitoring Report. It shows the progress achieved by different countries regarding the world's educational objectives of 2000. It also exposes convincing arguments for education to have a core place in the world's development agenda after 2015.

³ Hereinafter, teaching learning communities will be referred to using the acronym TLC.

gaining experience from both roles: as teachers and researchers. Also, Allen and Blythe (2004) explain that collaborative research requires teachers to meet in the TLC to discuss individual teaching and learning topics arising from each member's own experiences, which enables constant problem-solving in the educational context that encourages this type of training.

Subsequently, Sergiovanni and Starratt (1998, cited by Beachum and Dentith, 2004) discovered that it is more likely for teachers to seek help and advice from other teachers than other sources to develop and enhance their classroom practices. Also, teachers in TLC tend to seek systematic processes to involve their peers in problem-solving to address their practice (Keenan, 1974), be it by reviewing students' development, analyzing lesson plans from multiple perspectives, sharing management practices or researching and implementing curricular initiatives in the classroom. Additionally, Glatthorn (1987) states that "teacher learning is also achieved through peer supervision, which takes place through a social and cognitive interaction of teaching and not just by knowledge transmission". Likewise, the author mentioned that it may encompass professional dialogue, peer supervision and training and curricular development.

with the TLC. Therefore, a training structure requires creating an environment of exchange and mastery for knowledge, attitudes and good practices in each teacher collective to reach the objective of training learning communities that are committed with improvement processes (with appropriate technical aid). The aforementioned leads to the conclusion that creating a TLC will imply getting past the frequent barrier of teacher isolation; peer work becomes a frequently used and applied methodology with students in the development of classes inside and outside the classroom.

Another study related to TLC conducted by MEN (2011) allows inferring that transformations in the educational field are sustained in time based on permanent innovation regarding teaching processes. In that sense, TLC are knowledge and hands-on communities; their reflection leads to specific solutions for problems in the classroom concerning students' learning processes; and by sharing concerns, they collectively identify pedagogical alternatives. Hence, it is possible to distinguish some characteristics of TLC, to the extent that they research, document experiences, share practices and are nurtured by school context problems.

The experience 'Pedagogic and Methodological Strategies for Teacher Qualification', a process led by Cadavid (2013) with the purpose of implementing innovative pedagogical and methodological strategies to improve teachers' pedagogical practices in educational institutions in the municipality of Manizales, provided insight on the implementation of the TLC in diverse institutions. The methodology selected for this

In the Colombian context the study of TLC has been developed in an institutional sphere by the Ministry of National Education (MEN). For MEN (2012) teachers' effective learning takes place in their own classroom practice, which is why strategies aimed at training revolve around classroom practices or using workshops in which teachers develop their classroom problems jointly

educational experience focused on seven educational institutions in the official sector in Manizales, where the processes of planning, observation and assessment of a TLC took place, the TLC was made up by 35 teachers of different areas and levels of education. The results and projections obtained were based on participants' real contact with a Japanese methodology⁴ that had been adapted to our environment, strengthening teacher-to-teacher training, collaborative work and handling of ICT. Likewise, the advantages of this system were analyzed in the overall improvement of learning environments; the strategies proposed by the project were institutionalized and articulated with the PEO, giving continuity to teacher training in the strategies proposed by the research project.

The implementation experience of Learning Community developed by Calvache and Escobar (2007) focused on analyzing teachers' classes from the points of view of planning, didactic and methodological references applied and execution, with the intention of identifying problems in teaching the topic and of suggesting new strategies that would improve class execution. A methodological design that included case studies, reflection and assessment led to the conclusion that the benefits of the improvement course were abundant because it reawakened concerns and needs of changing the old pedagogical practices that are heavily instilled in the country's institutions, regardless of its official or private nature, and spanning the rural and urban areas. The course opened a space for official sector teachers to rethink their teaching performance,

reflect on their educator's trajectory and take a glimpse into new horizons, routes and paths.

Lastly, this TLC-related documentary search has allowed to establish that there is a constant longing to investigate on this strategy's impact over elementary and secondary students, mostly focusing on elementary, in Colombia and in other countries. Internationally, the findings expressed herein allow teachers to participate in professional development activities adapted to their needs and personal interest, providing them with the possibility of using their classrooms as a place to develop their own learning. According to Shulman, this is known as Didactic Knowledge of Contents: the transformation of good scholar knowledge into content related to learning requires reasoning and action.

"The teacher must interpret content and structure its presentation digging into a collection of his/her own representations composed by analogies, metaphors and examples. This implies selecting the appropriate ones for the content and the students, adapting them into the instructions, assess their effect, reflect and develop a new understanding of the entire pedagogical process based on the process". (Shulman, 2005).

This professional development creates new opportunities to reinforce the school bonds between teachers, given that, to the extent that their work becomes public, they seek answers to problems that they can't solve on their own. In the national context, the research: "Teacher invite me to your class. Teachers learning form teachers, using didactic and pedagogical strategies to

foundations to improve teaching methodology of natural sciences and mathematics in the country's educational institutions..

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⁴ On October 15th, 2004 the Colombian Ministry of National Education and the Japan International Cooperation Agency – JICA signed a cooperation agreement aimed at establishing the

improve teaching processes' allows reflecting on teachers' professional development, learning communities and pedagogical practice (which could help improve reading and text genre comprehension) shows the need and pertinence of conducting intervention works in this line, as well as the design of new resources to innovate in the classroom and solve problems in it, with the aim of driving interest towards reading and to the improvement of reading comprehension and production of diverse text genres.

It has been mentioned that it is necessary to transform classroom practices, meaning, everything the teacher and students do in the classroom and outside to enhance student learning. Research has proved that achieving transformations in teachers' practices is not easy, and does not just happen with conferences, workshops, speeches and/or isolated reflection activities (Diaz, 2015). In that regard, these kinds of spaces evince the importance of intellectual professional dialog among peers that can recognize and acknowledge academic contributions and experiences in the midst of ideological differences, therefore, being a member of this work groups sheds a light into what is happening in classrooms by turning it into public knowledge in practice and learning communities focused on students' learning (Vescio, Ross and Adams, 2006). Changing teaching practices is difficult, especially when the way people teach is deeply rooted in beliefs about how we learn and how we teach. Said beliefs have been construed from the early years of school training, and are blurred, deformed and prevail in the face of any change initiative or message that is

proposed to the teacher (Pajares, 1992). Consequently, in situ training courses, classroom accompaniment and postgraduate teacher training (Master's and Doctorate degrees) are required (Grossman, Hammerness and McDonald, 2009) in order to transform the quality of the current educational system.

Several authors, including Furman (2013), state that changes in classroom practices require teachers to believe in their attitude towards change by becoming aware that their practices are ineffective; they may also experiment with different ways of teaching and learning, realizing what they are capable of doing and that the application of these strategies is sustainable in time, so they can develop them entirely and consolidate those that are considered new practices. If this happens, it would be possible to develop placed professional development (PPD)⁵ with real impact over classroom practice transformations. Abell, Rogers, Deborah and Gagnon (2009) and Putman y Borko (2000) suggest PPD is a key pillar for setting good practice models in the classroom in motion, which are represented by high-quality educational materials, in synch with the level and possibilities of teachers and the environment, accompanied by tutors. However, it is not just about taking expert tutors to schools to conduct activities and workshops, it is more about accompanying the development of effective teaching-learning activities that are based on good practices. PPD requires diverse resources and a cohesive and well-motivated group of teachers determined to implement good teaching practices in the classroom.

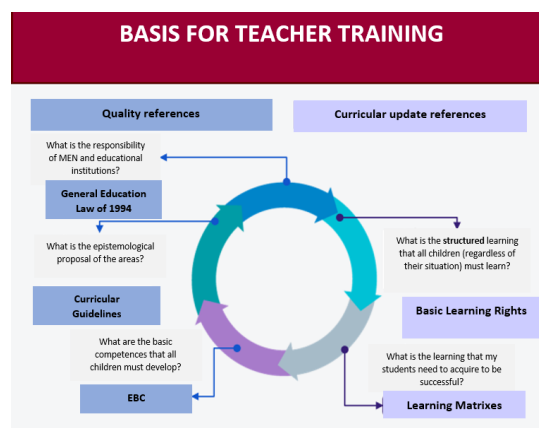
⁵ Hereinafter, Placed Professional Development will be referred to using the acronym PPD.

This process of peer learning intends to develop team members' capacities in a differentiated way to create knowledge. Teachers benefit because their isolation and uncertainty decline and because they set up truly supportive communities with the purpose of promoting professional development, teacher identity assertion, and a valuable place in an educational community (PTA, 2012). The result of applying this type of planning, observation and reflection strategy through cooperative work is an improved institutional climate and Teacher's Professional Development, which is usually regarded as the key to improve students' learning quality.

In terms of the qualification process, it is important to highlight that the efforts have focused on overcoming students' learning deficiencies in the areas of language and mathematics, especially in low-performing educational institutions, as per the SABER test results. The intentions are: first, to improve teachers' classroom practices with teacher postgraduate training and pedagogical training; regarding this aspect, it is important to emphasize that the efforts are focused on enhancing teachers' pedagogical praxis and their direct relation with academic performance. In this particular point, it is necessary to comment that pragmatic changes have occurred in mathematics and language teachers' training processes, shifting from scholar training to a model tending for teachers to aid the training of competent citizens (Basic Competence Standards, 2006) with the prevalence of a holistic method; in the words of Guacaneme, Obando, Garzon and Villa-Ochoa: "(...) a competent citizen works over less pragmatic dimensions regarding the notion of

competition... and with a more holistic view that focuses on understanding (...)" (2013).

Figure 1. Pedagogical and Curricular Orientation Scheme for Language and Mathematics Teaching in Colombia.



Source: educational quality transformation program "Todos Aprender" (2017).

It is clear that mathematics and language teacher's training is a topic of national educational policy aimed at the consolidation of a system that leans towards the quality of education, and thus, to the improvement of standardized test results. Therefore, it is important to express that mathematics and language teacher's training in Colombia takes place in three levels: Basic Secondary Education (6th to 9th grades), Mid Secondary Education (10th and 11th grades) and Elementary Education (1st to 5th grades) (Guacaneme, Bautista and Salazar, 2011).

It is possible to deduce that there are strong divisions surrounding training processes, driving complications as follows: first, with epistemological difficulties of future teachers, which is connected

with beliefs and ideas (Da Ponte,1999), or in the words of Rene Thom (1973), cited by Da Ponte (1999): “(...) behind every mathematics teaching model there is a mathematics philosophy (...)” (p.1). Second, with the balance between teachers’ beliefs and ideas and the connection with practices (Bishaw, 2011; Pajares, 1992). And third, with how this practices affect the teaching-learning process (Donoso, Rico and Castro, 2016), and consequently the assessment results (internal and external). Concerning the latter, it is important to mention how Donoso, Rico and Castro (2016, p. 78) prove the existence of “research (Aguilar, 2003; Benitez, 2013; Contreras, 2009; Donoso, Rico and Castro, 2016; Gamboa, 2014; Gil, 1999; Gil and Rico, 2003; Moreno and Azcarate, 2003; Thomaz, Cruz, Martins and Cachapuz, 1996)” that highlights the way in which teachers’ beliefs and ideas directly influence the teaching-learning process, without leaving students’ performance behind.

TEACHER TRAINING BELIEFS, IDEAS AND COMPETENCES

The following are the main findings around the aforementioned three sets of complications and the different strategies developed by academic communities to tackle and solve them. Firstly, it is substantial to mention some theoretical stances connected with teacher training and its epistemological approaches, among them: theoretical perspectives based on sociological and anthropological contexts (Malagon Patiño, 2013). Anthropological Theory of the Didactic (ATD) (Chevallard, 1999, 2001, 2005), Chevallard (1999), which elaborates on the activity of teaching and of

training “teachers” not as an “individual activity” but as a “system of practices” (Chevallard, 1999, p.223) developed by teachers in a social institution known as “school”. Accordingly, Malagon Patiño (2013) underlines that “teaching does not depend on subjects individually” (Chevallard, 1999, p.225), it starts with an interaction: teachers and their experiences while being trained and teachers when they relate to other teachers. As for the case of mathematics teachers, this “practice” is nurtured by two aspects according to Da Ponte (2004): “the first one is based on systematic recurrence and the second on the role of recognition and differentiation” (p.4) which is established in society and in the school.

Consequently and addressing the interaction axis related to the experiences while being trained, it is necessary to explain that the structure of the mathematics teachers’ training processes in Colombia is set up on four fundamental elements: educability, capacity to teach, historical and epistemological structure, and social and educational realities, as per Decree 272 of 1998 in its Article 4. However, the “Report on Initial and Continued Training of Mathematics Teachers: the Case of Colombia” by Guacaneme, Bautista and Salazar (2011) determined that the structures of mathematics teachers’ training programs revolve around curricular lines related to: “(...) mathematics training, curricular knowledge and didactic knowledge of mathematics, overall pedagogic knowledge and a line focused on communicative aspects (...)” (Guacaneme et al., 2011, p.34).

Regarding the aforementioned, it is relevant to add that a change of paradigm to aid the improvement

of these processes is proposed at national level, which is why policies may be implemented to develop competences, since according to Tobon, Pimienta and Garcia (2010) competences allow or provide “pertinent and clear answers regarding curriculum, learning, assessment and educational-teaching management” (p.3). Moreover, they allow facing problems about the “relationship between curriculum and micro-curriculum to ensure educational or training quality in connection with problem-solving, involving knowing how to be, knowing how to do and knowing to know” (Tobon, Pimienta and Garcia, 2010, p.4). This requires drafting “master” documents to dynamize the teaching-learning process, resulting in the curricular guideline as a structured “guide” intended to:

(...) increase training of those responsible for the curriculum and of those that advise educational institutions to conduct their curricular processes within the PEI – Institutional Educational Project –. These shall serve as orientation but will not replace teachers in decision matters related to content, methodologies and strategies for participation (...) (Curricular Guidelines document, 1998, p.7)

This leads to Rico’s (1995) definition of guidelines, they are useful to organize competence execution processes, and in mathematics it is called accomplishing the “execution of mathematical tasks” or procedures or “ways of knowing how to do” (Rico, 1995). Thus, guidelines become the foundation to build a wider and deeper definition of competence, the “Basic Competence Standards” (MEN, 2006) defines competences as:

(...) a set of cognitive, socio-affective and psychomotor knowledge, skills, attitudes, understandings and

dispositions that are suitably related to ease flexible, efficient and meaningful performance in an activity within a context that is relatively new and challenging (...)” (E.B.C, 2006, p.49).

Lastly, it is important to add that the implementation of competence policies collides with teachers’ beliefs and ideas, to that regard Thompson (1992), cited by Gonzalez (2015), states that most consider mathematics as a “static body of knowledge in which a series of rules and procedures are applied to come to a correct answer” (p.13). Due to these ideas it is critical to emphasize that those policies are not enough to transform teachers’ praxis in itself, the following presents additional information in this regard.

BELIEFS, IDEAS AND THE CONNECTION WITH PRACTICE AND INCIDENCE IN THE TEACHING-LEARNING PROCESS

As mentioned before, educational policy tries to modify teaching-learning processes although it faces the hindrance of teachers’ beliefs and ideas, as proposed by Gonzalez (2015), citing Barrantes and Blanco (2004) who state: “(...) teachers do not develop their work mechanically, their actions are guided by underlying beliefs that influence their teaching (...)” (Gonzalez, 2015, p. 5). On that subject, didactic proposals or strategies are originated aimed at problem-resolution as the main pillar, expecting to drive reflection processes on the teacher regarding his/her praxis; in the words of Ramos, Florez, Da Ponte and Moreno (2015): “(...) changes in teachers’ actions may be reflected in classroom tasks designed by them to tackle their practice (...)” (p.390).

Subsequently, this problem-resolution strategy articulates with MEN's (2006) definition in the framework of the Competence Document and aims at constructing mathematical knowledge. Two aspects are noteworthy: the first one is that it addresses conceptual knowledge "(...) which is theoretical, deriving from cognitive activity, rich in relationships between its components and with other knowledge; has a declarative nature and is associated knowing what and knowing why" (MEN, E.B.C, 2006, p.50). In that sense, there is an intention to disrupt the traditional model, which fails in driving reflection, because education stems from "a teacher that selects the contents of a program, arranges and explains it according to his/her point of view" (Tobon, Pimienta and Garcia, 2010, p.5) to move into a model that allows –both teachers and students – "facing a relevant task (placed) to drive knowledge by setting the whole self in motion" (Pimienta and Enriquez, 2009, p.27).

Following the idea of Pimienta and Enriquez (2009) of facing a (placed) relevant task, research proves that these teachers aim their practices to reflection and research processes, "accomplishing a more dynamic view of mathematics that results in conceptualization in the students" (Prawat, 1992, cited by Gonzalez, 2015, p.15), and perceive mathematics as a tool to "solve problems of cultural understanding" (Thompson, 1992, cited by Gonzalez, 2015, p.17). This leads to the recommendation to focus classroom practices on the construction of mathematical concepts, as well as on activities that drive reasoning and creativity, information collection, discovery and idea communication; in that regard Gonzalez (2015)

cites Ball (1993), Cobb, Madera, Yackel and Mcneal, (1993); Thompson (1993); Fenema, Carpenter, Franke and Carey (1993); Lambert (1991); Wood, Cobb and Yackel (1991).

In this aspect, it is important to mention that programs that are similar to Todos a Aprender have been developed worldwide with the intention to transform teacher practices, seeking: "(...) to improve students' results through classroom practice enhancement" (CME 2025, p.20). Apropos, research shows that the programs: "(...) in itself do not generate changes in teachers' attitudes and beliefs, successful implementation experiences are required and these happen when there is evidence of clear improvement in students' learning results" according to Guskey, cited by Malagon Patiño (2013) (p.4).

Thereby, the teacher's role is understood as a long and constant process that transcends any context associated to the teaching-learning process (Johnson and Golombek, 2011). However, studies addressed in this bibliographical review show that when teachers' professional development is executed in educational realities with different needs, driving positive results in personal, academic and cultural growth of teachers involved in this kind of training. Therefore, it is pertinent to propose these teacher professional development strategies, given that they account for the relationship of cooperative and collaborative learning between peers to enhance reading and text genre comprehension processes.

Figure 2. System of Essential Relationships for Teachers' Professional Development



Source: Grimmet, (2014). *The Practice of teachers' professional development.*

To summarize, in this figure, teacher professional development is located in the center and is the result of an institutional practice, given that teachers and institutions are not the only ones demanded to be committed with this process, but it must also be perceived by teachers as a relevant process for their context that results in a significant improvement of teaching at local context (Yamagata-Lynch and Haudenschild, 2006). Most teacher and school curricular practices seem oriented towards keeping an organized and contextualized classroom environment, while covering the mandatory curriculum to tap into students' natural curiosity and thirst for learning (Grimmett, 2014). Likewise, Grimmett argues that teachers that are capable of sustaining student's curiosity and motivation are more likely to sustain their own passion for teaching, instead of letting it wither into a boring professional life.

process and enter a classroom for the first time, as well as for experimented teachers trying to understand and solve a classroom problem, which is catalogued as a systemic process of shared intersubjectivity and authority. This type of research of teacher professional development has discovered that some schools are moving towards initiatives that provide a more didactic vision of teaching and learning, in which teachers may participate more actively in connection with his/her own professional development, working jointly with peers to tackle pedagogical problems from learning communities (Clark, 2001).

To conclude, this literature review has led to some thoughts regarding the changes happening in teachers' pedagogical practice following their training in language and mathematics teaching with the reference of the Colombian educational system as the documents that guide the pedagogical action. For instance, it is feasible to state that most studies show concern and interest by all of the members of the educational system in achieving an improvement in language and mathematics teaching through reading and mathematical competences, which are necessary to enhance educational quality at regional, national and international level, from the initial education in the areas of mathematics and language. Therefore, educational practices are defined by the curriculum, didactics and profession's awareness, yet, these notions often entail ideas, principles and actions that every teacher needs to constantly practice in the educational institutions. So, it can be said that educational policies for teacher training and pedagogical practices aimed at mathematics and language teaching are oriented by the Ministry of National Education and the education

departments of national universities towards cooperative, collaborative learning, placed professional and pedagogical development, as follows:

- a. Development of participative processes that culminate in practical proposals, applying qualitative processes in which the participation of the learning community allows the development of academic and cultural processes as the basis to also affect the transformation of educational quality in which these education systems operate.
- b. Teacher training based on the guidance of an expert tutor that seeks to improve pedagogical praxis through cooperative and collaborative learning, as well as the teacher's professional development with placed training; in connection with the development of students' competences and skills with teachers' group work and applying the class study methodology in fundamental knowledge areas.
- c. Improvement of the educational instruction and practice inside classrooms aimed at developing strategies and methodologies akin to the students' learning pace, based on competences and skills in the areas of language and mathematics.
- d. Transformations in classroom practices by implementing research processes that go hand in hand with learning communities, which are based on problem-solving as a teaching and learning approach.
- e. Implementation of systematization processes of teachers' practices, for mathematics and language alike, to permit reflecting on the design of classroom strategies to improve

results, build concepts and develop competences.

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