



RESEARCH ARTICLE

THE COMPETENCE “TEAMWORK” IN PROFESSIONAL TRAINING IN EDUCATION SCIENCES

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ABSTRACT

The competence of teamwork is a research study within pedagogical competence, as it is considered in all universities as a strategy that integrates into any group of people, both in the workplace and in the professional sphere. Professional training in the Bachelor of Education Sciences is observed to encompass a profile of emerging pedagogical competencies. The objective was to implement an educational intervention that would foster the development of teamwork competence in the professional training of education sciences. The methodology employed involved educational research with a qualitative approach and the action research method with its educational intervention component. A diagnosis was conducted to identify students' needs regarding teamwork competence, and an intervention plan was designed, which included 21 strategies and 42 activities over a period of three weeks involving a total of 31 students. The most relevant results indicated that students achieved a level of mastery in leading workgroups and directing them towards high performance. This led to effective integration and collaboration through the implementation of strategies for academic tasks involving free expression of ideas and collaborative, cooperative, and participatory work in team projects. There was an improvement in students' willingness to complete activities and meet their objectives.

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INTRODUCTION

Teamwork competence, a key aspect of pedagogical competence, is the subject of this investigation. It is universally acknowledged as a strategic skill that integrates into various groups, both in the workplace and in the professional realm (Villa and Poblete, 2007). Professional training with an emphasis on pedagogy for educational practice is gaining increasing importance. This requires a shift in teachers' attitudes and mindsets, moving from merely imparting knowledge to sharing personal experiences to enrich the teaching profile. Training new teachers to rethink and reconceptualize their daily work in new contexts fosters a more profound self-awareness and a nuanced understanding of educational realities and practices. In some regions, teacher training institutions struggle to meet the needs for early childhood education, special education, art education, intercultural education, and more. This situation poses new challenges for teacher training institutions operating within a highly restricted and segmented market (Arnaut, 1998). The concept of a profession, in a broad sense, requires specialized training endorsed by an educational institution. This training prepares individuals for a specific occupation, with a recognized social status and established compensation. In other words, higher education, in the strictest sense, includes certified and institutionally authorized competencies (Colom, 2011). However, professional training in teaching is considered the beginning of a knowledge-building process within an institution that issues a standardized credential for practicing a qualified service in the educational context. Within the Bachelor of Education Sciences program, there is an integration of a profile with emerging pedagogical competencies. The objective was to implement an educational intervention that would foster the development of teamwork competence in the professional training of Education Sciences. As a discipline, pedagogy encompasses "what one must know, do, and be," and as a scientific study of education, it involves working with various forms of knowledge, including didactics and social pedagogy, among others (Van, 1998, p. 62). The pedagogical nature is present in every teaching situation, and the pedagogical moment lies at the core of praxis, which involves the best way to act. Acting pedagogically implies empirical knowledge and a sense of values, norms, and moral principles, as teaching practice is a professional exercise that demonstrates a level of theoretical and technical competence in what should be (Van, 1998). Henceforth, teacher training and professional development reflect a comprehensive education of a competent professional, aimed at developing strengths in their educational tasks, as an alternative to an objective-

based system. This approach is born from the focus on competencies derived from the labor needs of society, a high level of student development, optimal performance of personnel, and continuous education (UNESCO, 2007). The term "competencies" has a long history and has gradually infiltrated classrooms, teacher meetings, evaluation tests, and curriculum development. There continue to be various approaches and definitions of the concept (Tacca, 2011). For us, the concept of competency is an internalization system of knowledge that bridges the gap between theory and practice in a human being, enabling them to take action, solve problems, and meet the objectives demanded by each situation in a given context. Knowledge involves understanding conceptual content; know-how refers to the skills and abilities that a person applies in their procedural knowledge; knowing how to be is a person's behavior that reflects values and attitudes in a given situation, and the purpose is based on the goal and purpose of learning and human action (Tacca, 2011). When incorporating competencies into the educational curriculum, it's crucial to define the professional profile by determining which competencies future professionals need to enhance the quality of the teaching-learning process. It also involves considering the approach towards performance, curriculum design flexibility, self-reflection as the core of competency-based training, and strategies for processing and manipulating information. All of these are requirements for a professional profile that necessitates determining competencies related to foundational generic competencies and specific competencies (Villa and Poblete, 2007).

Both generic and specific competencies are developed through pedagogical mediation, facilitated by expert teachers in professional training programs. Hence, we define the following competencies: generic competencies are those that shape us as better individuals in any field of study or work; specific competencies are linked to a particular field of study, and professional competencies involve the application of integrated knowledge by humans to meet the demands of the labor field within professional training programs (Villa and Poblete, 2007). In other words, the defined competencies play a role in the favorable development and application of professional performance in a specific area. The professional performance of competencies is categorized into three categories, according to Villa and Poblete (2007): "Instrumental competencies combine manual skills and cognitive abilities; interpersonal competencies are the ability or skill in expressing feelings and emotions; systemic competencies are skills and abilities related to the entirety of a system" (p. 25). These classifications are action schemes that make the formation of competency-based education possible, rooted in the ways of our practice as a primary teaching competency, with prior knowledge and the construction of professional competencies.

This study is focused on developing teamwork competence, categorized as a generic interpersonal competency. These competencies refer to various capacities, skills, and abilities that enable individuals to collaborate on common goals that facilitate cooperation and social interaction processes. These competencies are subdivided into two types: individual interpersonal competencies include self-motivation, diversity, and interculturality, resilience and adaptation to the environment, and ethical awareness; and social interpersonal competencies include interpersonal communication and teamwork. Considering the possibility of educating students in pedagogical competencies leads to the creation of a professional profile and an enhancement of educational knowledge in accordance with the specific needs and circumstances that comprise the actions taken upon graduating from the Bachelor of Education Sciences program. This study aims to provide a realistic understanding of the field of pedagogical competencies for students, as one of the essential components of the professional profile of the program. Additionally, the study involves implementing innovative didactic actions to clarify and develop these competencies. Specifically, it focuses on teamwork competence, aiming to enhance student participation and willingness, thereby broadening their understanding of professional development both individually and collectively.

METHODOLOGY

The methodology employed in this study was an educational research approach with a qualitative focus, utilizing the Action Research method, complemented by its educational intervention component. Initially, a diagnostic phase was conducted to identify the needs of students concerning teamwork competence. Subsequently, an intervention plan was formulated, comprising 21 strategies and 42 activities spread over three weeks, involving a total of 31 students. The results indicated an acceptable level of integration and collaboration, achieved through the implementation of strategies for academic tasks. These tasks promoted the free expression of ideas, collaborative work, cooperative efforts, and active participation in team projects. The participants in this study were second-year students from the Bachelor of Education Sciences program. In 2020, the total student population in the Faculty of Education Sciences was 908. The sample selection was conducted using a stratified probabilistic approach, with the criteria based on factors related to curriculum development and school functioning. The diagnostic phase included 183 students from the Bachelor of Education Sciences program, while the intervention phase involved a sample of 30 students, forming one group. Criteria for selection included being part of a full-time group, voluntary availability, and demonstrating a personal interest in participating. The findings from the initial diagnostic assessment, which was administered to determine deficiencies in the students' pedagogical competencies during their professional training, are presented in Table 1:

Table 1. Results of Generic Competencies

Generic Competencies (Pedagogical)		
Category	Subcategory	Specific Competencies
Instrumental	Methodological	Learning orientation
Interpersonal	Social	Teamwork
Systemic	Entrepreneurial ability	Creativity

Source: Self-created.

As a result of the initial assessment, it was determined that several competencies were deficient among the students, with teamwork competency notably lacking for a significant percentage of students. To address this, we focused on promoting teamwork strategies in the intervention plan, implementing activities designed to foster self-regulation and integration among the students. The intervention process incorporated a methodological contribution through the structuring of a general action plan, based on the model proposed by John Elliott in 1993.

This model was adapted to suit the specific needs identified in the diagnostic assessment of students and faculty within the education program. Modifications to Elliott's model (1993) resulted in a three-cycle structure for the intervention. Each cycle began with an initial idea that identified a specific area needing improvement. Following the implementation of activities, we conducted a review of their effectiveness, assessing any shortcomings. This led to a revision of the initial idea, allowing for corrections or redesign of the activities before their re-implementation and moving on to the subsequent cycle. The intervention plan was a dynamic interplay of strategies and actions within the pedagogical intervention. Activities were organized into sessions structured like a course-workshop, each targeting a specific objective related to cognitive competency and the strategies implemented. The results of each activity, whether completed or not, were meticulously recorded. Progress was analyzed and documented, with a unique format designated for each session. In this pedagogical intervention, competencies were characterized as a combination of generic and specific activities. These activities were selected to define the learning strategies that are most suitable for achieving the developmental objectives of pedagogical competencies within the professional profile of Education Sciences. The intervention primarily aimed to enhance student engagement through the use of teamwork strategies. Each intervention session was an hour long, conducted over four days per week. Over the span of three weeks, a total of 12 hours was dedicated to this intervention. Each week involved the implementation of a specific number of strategies and activities, as detailed in Table 2.

Table 2. TeamworkCompetencyStrategies

TeamworkCompetencyStrategies					
Scheduling	Strategies		Strategies	Activities	Hours
	New	Recurring			
First	4	0	<ul style="list-style-type: none"> • Project-Based Learning • Guided Cooperation • GroupResearch • Co-opco-op 	12	4
Second	6	2	<ul style="list-style-type: none"> • ThePuzzle • LearningTogether • AcademicControversy • AnalysisTeam • Role-Playing • Cooperative Integrated 	17	4
Third	1	8	<ul style="list-style-type: none"> • AnalysisTeam 	13	4
Total	11	10		42	4

Source: Self-created.

The data obtained from the intervention were systematically compiled in a table, detailing various elements: a classification label for generic and specific competencies, attributes of these competencies, evaluation indicators, the subject's name, semester, session number, and hours. Additionally, the table included information on strategies, student activities, the format of activities (individual, team, in-class, or extracurricular), duration, outcomes, and indicators specific to each competency. These specific competencies are classified into various approaches, each associated with different fields of action and achievement, integral to acquiring a teaching professional profile. In the context of teamwork competency, attributes such as professional preparation and personal maturity are emphasized for each individual. Mastery of this competency is delineated into three levels: a) active participation and collaboration in team tasks, promoting trust, friendliness, and a joint task orientation; b) contributing to team consolidation and development by enhancing communication, task distribution, internal climate, and cohesion; c) leading workgroups. Strategies for cooperative and collaborative learning were meticulously programmed. Initially, the objective was to achieve learning goals through interaction facilitated by teamwork activities. Subsequently, students collaborated, sharing workload equally to progress toward the anticipated learning outcomes.

Owing to its complexity and importance, teamwork competency is associated with three levels of mastery. The first level involves achieving common objectives in tandem with the individual objectives of team members, encompassing task completion, meeting deadlines, and managing individual responsibilities within the team. The second level includes increased participation and involvement in group effectiveness, fostering understanding and harmony among team members, with each contributing to the others' learning and mutual respect. The third level pertains to leadership within the group, necessitating the ability to organize, take initiative, support peers, and exert a positive influence. These levels of mastery are evaluated through indicators that ascertain each student's level of professional development. These indicators are employed to evaluate learning progress across the mastery levels, including task completion, class participation, organization, and the social value of teamwork. The assessments of teamwork performance involve task selection, organization, distribution, coordination of team contributions, active participation in planning, application of methods and procedures for task development, and communication of ideas and opinions to enhance teamwork. The initial program's strategies and activities for teamwork competency were adapted from Barriga & Hernández (2010), and they include:

Table 3. First Programming of Teamwork Competency Intervention Activities

Competency Classification: <i>Interpersonal Generic</i>									
Specific Competency: <i>Teamwork</i>									
Attributes of the Specific Competency: Collaborate actively and integrate with others, areas, and organizations to achieve common goals.									
Indicators of the Specific Competency: (A) Selects, organizes, and distributes tasks; (B) Coordinates contributions from other team members; (C) Actively participates in the planning of work; (D) Applies methods and procedures for task development; (E) Communicates ideas and opinions to improve teamwork.									
Subject: Knowledge, Science, and Society Programming: First Semester: Fourth Number of Sessions: Four									
Reinforcement Strategies for the Specific Competency	Student Activities	Format				Time	Activity Product	Indicator	
		Individual	team	Classroom	Extracurricular				
Learning through Projects	<ul style="list-style-type: none"> Establish the topics and purposes of three didactic sequences. Present the topics and purposes of the didactic sequences 		X	X		20'	<ul style="list-style-type: none"> Stated topic and purposes Oral presentation of the topic and purposes Printed and digital information about the topic 	B	
				X	X			20'	C
								20'	A
Guided Cooperation	<ul style="list-style-type: none"> Apply strategies to understand the previously obtained information. Learn in voice the sections of the text that are shown in the pizarrón 		X	X		20'	<ul style="list-style-type: none"> Understanding of printed and digital information Oral participation in reading Discussion of team problems 	D	
				X	X			20'	B
				X	X			20'	E

Source: Self-made.

Project-Based Learning (Aprendizaje mediante proyectos): This experiential strategy involves 'learning by doing,' and reflecting within real-world practice contexts. It emphasizes project management and collaboration, enabling students to apply various knowledge, skills, and attitudes related to pedagogical competence. Activities included developing projects with three didactic sequences on a self-selected topic, encompassing topic selection, purpose establishment, and information research.

Guided Cooperation (Cooperación guiada): This cooperative strategy, employing didactic interaction, facilitates the inclusion of experimental controls. It engages students in complex learning and research tasks, executed in pairs, focusing on cognitive and metacognitive activities. Roles alternate between learner-reciter and listener-examiner, providing feedback on task performance or student knowledge levels. This strategy supports students with lesser knowledge.

Group Research (Investigación en grupo): Teams of two to six students use cooperative research tools, group discussions, and project planning. They select topics from a content unit, break down the topic into individual tasks, and execute activities necessary for a group report. Findings are then communicated to the class. This strategy tackles complex tasks involving multiple information sources, text analysis, and synthesis.

Co-op co-op (Flexible Cooperative Learning Technique): This strategy enhances student participation and explores topics of interest. Students control their learning, developing cooperation and team communication skills. It involves selecting, preparing, and developing topics and subtopics; team preparation and presentation; and evaluation by team members, the class, and the teacher. (See a sample activity program in Table 3). Indicators of the Specific Competency: (A) Selects, organizes, and distributes tasks; (B) Coordinates contributions from other team members; (C) Actively participates in the planning of work; (D) Applies methods and procedures for task development; (E) Communicates ideas and opinions to improve teamwork.

In each of the strategies, specific activities were integrated to reinforce and expand personal interaction, thereby promoting the development of social and collaborative skills essential for cooperative learning. It is believed that through these activities, interpersonal communication competencies are improved, certain values are fostered, and the ability to work effectively in teams is enhanced. One of the strategies employed was the jigsaw method, wherein teams divided the work sections among their members. Each member studied their assigned part and then collaborated with members of different teams who focused on related topics. This approach facilitated learning from one another, fostering social experiences, developing an understanding of others, and enhancing perception. This jigsaw strategy aligns with the three levels of mastery, involving responsibility in meeting deadlines, and active team participation in presenting, sharing comments, and reflections. This process stimulated the generation of divergent viewpoints and joint reasoning. The team analysis strategy, critical in the intervention, involved analyzing texts through a variety of activities, enabling students to understand and interpret the material effectively. Students, working in teams, critically analyzed a reading as an individual activity, with specific roles assigned to each member, culminating in a group discussion. Additionally, the role-playing strategy was incorporated to develop speaking and listening competencies. It aimed to encourage greater student participation. Each student assumed a role, reflecting on designing the required interaction environment. In this activity, students performed skits requiring dialogue in small teams, with the scenes reshaped for further dialogue exchanges among peers. Role-playing provided a platform for students to experience emotional and intellectual responses within an assumed identity or imagined circumstance. Another employed strategy was Cooperative Integrated Reading and Composition (CIRC), typically used in higher elementary grades for teaching reading and writing. It involves reciprocal teaching activities like mutual reading, predictions about text endings, summarizing, story writing, and content questioning. In this strategy, students created scripts for skits related to reading, discussion, and planning activities. Through communication, students built confidence and trust, fostering a conducive learning environment. They were punctual in meeting evidence submission deadlines, made decisions collaboratively, and supported each other in team activities.

RESULTS

The intervention in teamwork competence was conducted through a workshop course with a group of 31 students. A total of 21 strategies and 42 activities were implemented, resulting in student-created products. The evidence presented at the end of each session was evaluated using indicators, with the following results:

In the first program, the focus was on the first level of mastery (active participation and collaboration in team tasks). Students applied reinforcement strategies and activities, such as problem-posing and developing teaching strategies. Eighty-one percent of the students achieved this level of mastery. In the second program, the emphasis was on the second domain (Contributing to team consolidation and development). Activities included proposing ideas, creating models, exhibitions, and more. Fifty-eight percent of the students acquired this domain. The final program addressed the third level of mastery, which involves directing workgroups towards high performance. Activities included script creation, presentation of skits, and development of didactic sequences. Only 3% of the students reached this level, reflecting its challenging nature. The intervention was monitored using a class journal as a tool for self-observation and reflection. This journal detailed each intervention session and was utilized to analyze, interpret, and reflect on various aspects of the students' activities, including evidence, evaluations, forms of interaction, participation, and dynamics. Formative and developmental assessments were conducted using rubrics, which encompassed a broad set of indicators assessing progressive levels in competence performance, from basic to highly competent.

These rubrics were linked to the attributes of each competence to evaluate performance, problem-solving, case analysis, and project execution. Portfolio assessment, as a formative evaluation tool, enabled students to compile a collection of works, including reading comprehension tests, ideas, project progress, recordings, digital activities, case study analyses, solved problems, synoptic charts, and concept maps. This demonstrated their effort, progress, and level of mastery in competencies. Table 4 below presents a comparison of students' attributes before and after the teamwork competence intervention. The monitoring of the activities played a significant role in terms of organization, data analysis, decision-making, activity adjustment, observation of student performance, and identification of competence development levels. These contributions were instrumental in gauging the progress students made in various aspects of pedagogical competence. Key areas of development included the use of learning strategies and techniques, capacity for self-regulation, creativity and innovation, and the ability to relate to peers and transfer knowledge. Additionally, there was a noticeable increase in students' interest in understanding and comparing their own learning approaches. Importantly, the monitoring process fostered an awareness among students of the ongoing need to develop teamwork competencies, which are vital for their future roles as teaching professionals.

Table 4. Comparison of Student Attributes Before and After the Intervention in Teamwork Competence

Classification of Competence: Generic Interpersonal			
Specific Competence: Teamwork			
Attributes of the Specific Competence: Collaborating and actively integrating to achieve common goals with other individuals, areas, and organizations.			
Subject: Knowledge, Science, and Society Session: Four Semester: Fourth			
Strategies	Student Activities	What the Student Knew (before the intervention)	What the Student Gained (after the intervention)
Group research	<ul style="list-style-type: none"> Identify three educational problems related to the established topic. Search for teaching strategies. Analyze the selected teaching strategies. 	<ul style="list-style-type: none"> Team conflict in problem-solving. Difficulty in communicating with team members. Confusion in the application of a method. 	<ul style="list-style-type: none"> Improved communication among team members. They find it easier to resolve team conflicts. A balanced distribution of tasks. Contribution of ideas for method implementation.
Co-op-co-op	<ul style="list-style-type: none"> Organize verbs into the categories of conceptual, procedural, and attitudinal knowledge. Present the verbs to their team members. 	<ul style="list-style-type: none"> Lack of interest in cooperating within the team. Confusion in communication with team peers. 	<ul style="list-style-type: none"> Cooperative involvement for the sake of achieving teamwork. Ability to communicate through team integration and motivation.
Learning together	<ul style="list-style-type: none"> Determine the model (static, dynamic, or movement) for the model. Use the assigned materials to create the model. 	<ul style="list-style-type: none"> Resistance to team workflow organization. Limited acceptance of team material organization. 	<ul style="list-style-type: none"> Being actively involved and collaborating actively in team tasks. Maturity to address differences in team tasks.
Role-playing games	<ul style="list-style-type: none"> Determine the name of the sketch. Plan a sketch related to the reading text. 	<ul style="list-style-type: none"> Limited leadership among team members. Low performance in teamwork. 	<ul style="list-style-type: none"> Leading workgroups that maintain team integration. Ability to guide teamwork towards high performance.
Cooperative Integrated Reading and Composition (CIRC)	<ul style="list-style-type: none"> Create a script for the sketch. 	<ul style="list-style-type: none"> Impose their opinions without listening to their peers' input. 	<ul style="list-style-type: none"> Integrating the opinions of others while maintaining a climate of understanding and harmony among them.

Source: Self-created.

DISCUSSION

The empirical data on teamwork competence significantly surpassed the expectations outlined in the intervention's objectives, which aimed to enhance the use of teamwork strategies with active student participation. This pedagogical intervention, resonating with Perrenoud's concepts of organizing and managing learning situations with an emphasis on team project management, facilitated the development of key pedagogical qualities. This competence, as defined, encompasses the ability to mobilize diverse cognitive resources to address specific situations. In this case, it involved the strategies and activities executed by students, as well as their engagement with new technologies. Integral to this competence are the ethical dimensions of the teaching profession and the commitment to ongoing professional development. Students proactively developed competencies in interpersonal communication, teamwork, conflict management, and negotiation, as described by Villa & Poblete. This development also entailed organizing learning activities, forming and renewing pedagogical teams, navigating ethical challenges, and cultivating a sense of professional responsibility. These pedagogical qualities align with Zabalza's emphasis on planning the teaching-learning process, the selection of relevant content, and the guidance of teaching and learning strategies. The intervention reflected the students' growing sense of responsibility and maturity. They demonstrated improved collaboration and teamwork skills, the ability to organize ideas and information, self-critical reflection, receptiveness to constructive criticism, and a heightened sense of social cohesion promoting friendship and collaboration. Notably, they recognized the need to continually develop pedagogical competencies, which, despite being implicit in the curriculum of their bachelor's degree in educational sciences, had previously gone unrecognized. Initially marked by passivity and apathy towards learning and activity participation, the students showed a transformative shift, becoming more active, engaged, and positively oriented towards the learning process throughout the intervention. This marked advancement in teamwork competence exceeded the initial aims of both the intervention and the overarching research objectives. This underscores the multifaceted nature of professional teaching training, encompassing the four basic aspects identified by Porlán: practical problems, conceptions, experiences, contributions from various knowledge sources, and the dynamics of their interactions. Such knowledge, pivotal for effective pedagogical action, must be specific and student-oriented. This view is in concordance with Gimeno's description of pedagogy as a discipline focusing on critical aspects of the teacher's role and the capacities necessary for creating enriching learning environments. Similarly, it aligns with Van's pedagogical perspective emphasizing the core elements of teaching and learning processes, reflecting the students' developed responsibility and maturity. Moreover, students showcased their abilities to collaborate, organize information, engage in reflective thinking, accept criticism constructively, and foster a supportive social environment. They acknowledged the value and transformative power of their professional training, recognizing their roles as active participants in their learning journey and the commitment required in professional teacher training. In summary, this research highlights the significance of educational research in professional training for a comprehensive understanding and fulfillment of educational programs in Educational Sciences. It offers fresh insights into teaching and learning processes and addresses the diverse challenges of education. This study presented an opportunity to innovate pedagogical strategies for professional training, leading to observable changes in conventional teaching methods and notable shifts in student responses. As an educator and researcher, this experience provided invaluable learning and insights into real-world challenges in higher education. Future research directions should include conducting more interventions in similar and varied domains, such as informatics, to further enhance student competencies and teaching practices in those specific areas.

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