Development of Generic Competences in Latin American University Students. Systematic Review

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Abstract

The competencies allow efficient and ethical individual actions, oriented to the exercise of citizenship, social responsibility and environmental commitment. For this reason , the development of generic skills in university students is important . This research wsystematizes the evidence about the strategies, methods and techniques used to develop generic competencies. in university students in Latin America from 2007 to 2022 . The systematic review was carried out following the methodology proposed in the Cochrane Collaboration and the Declaration based on a sample of 28 scientific articles on generic competences developed in Latin American universities, selected from three international databases: Scopus, Scielo and ScienceDirect . ; through criteria of relevance and sufficiency. The search was carried out between July 2021 and July 2022. It involved qualitative, quantitative and mixed research carried out in five countries: Chile, Colombia and Mexico were the countries with the most development of generic skills, unlike Peru and Ecuador. . The university careers that show

the most interest in the development of these competencies are Medical Sciences, followed by Engineering, Social Sciences and Education. Strategies of an experiential nature are privileged , such as clinical and high-fidelity simulation, service-learning methodology, problem-based and project-based learning. The generic skills developed with the various strategies include: autonomous work, learning to learn, the ability to learn and update oneself permanently, teamwork, being critical and self-critical, oral and written communication, social responsibility, and intellectual curiosity. Competence-based training is necessary to promote the autonomous and responsible participation of students in their professional and personal growth, essential to contribute to human and sustainable development in Latin America and the world.

Keywords: Competition, education, Competence, development, University students, Latin America

1. INTRODUCTION

current needs of society demand from professionals the development, not only of specific competences, but also of generic or transversal competences . In response to this, universities are aligning their educational models and curricula, implementing various didactic strategies in the training of their students (Felisardo et. al, 2019; Richart et. al, 2019; Schmal et. al, 2020). So Professional training and optimal performance have become a challenge for universities in a globalized society that is increasingly demanding.

Faced with such social demands, the Tuning Project, although it began in Europe with 175 participating universities, was projected towards Latin America, thanks to the initiative of Latin American representatives during the IV Follow-up Meeting of the Common Space for Higher Education of the European Union, Latin America and the Caribbean (UEALC) in Córdoba (Spain), in October 2002. Proposal that promotes greater efficiency and quality in the professional performance of graduates. Defining yourself in a consensual manner 30 generic competences in Europe and 27 in Latin America (González et. al, 2004), from this there has been an increase in national and international research in recent decades on the development of this type of competences .

The Tuning Project defines competencies as a combination of attributes that allows the individual to be more efficient in their actions and in their way of being, taking into account the development of values (González and Wagenaar, 2009). Besides, they can be transferred in a general way to the work and personal world of each citizen (Baños &

Pérez, 2005; Villarroel & Bruna, 2014). They refer , then, to the very performance of the professional in a context where he must demonstrate not only how much he knows about his profession but also how he manifests it in the adaptation and interaction with other people.

There are various classifications of competencies, such as generic and specific; basic, generic and specific or technical; however, regarding the generic ones, they are classified as instrumental, interpersonal and systemic (Araya Pizarro, 2019; Bienzobas & Barderas, 2010; Villarroel & Bruna, 2014). Classification that coincides in both continents .

Instrumental competencies refer to the use of tools to obtain a particular purpose: such as the ability to analyze, synthesize, organize information, and for planning . The interpersonal refer to the development of effective relationships with others; criticality, self-criticism, collaborative work; among others . The systemic ones are related to the ability to understand the integrality and globality of a system, as well as the ability to apply knowledge in practice (Godoy et. al, 2019).

The development of generic competences in university students in Latin America is oriented towards citizenship, social responsibility, environmental and sociocultural commitment. At the European level, in Spain, the development of most of them is promoted at various educational levels, with management skills and relationship with the environment being promoted to a lesser extent (Ramírez-García et. al, 2018). Regarding the techniques used, a study determined that problem-based learning is a more effective method than the case study to develop transversal skills. (Arias et al., 2008).

In addition, in Argentina transversal skills were developed in Veterinary students through learning and solidarity service (Folgueiras & Martinez, 2009). While, in Colombia, through experiences in a laboratory with engineering students, it is concluded that the learning of the content of the subject is strengthened and scientific reasoning is strengthened in the student (Vega-Royero, 2020). .

According to an investigation carried out in Mexico, experiential projects, such as learning experiences during the training of university students, contribute to the development of generic or transversal competences, at the same time that they comply with social responsibility, contributing to well-being, peace and well-being. sustainable development (Gleason et. al, 2022). However, a Peruvian study reports that Dentistry graduates perceived that they did not achieve a high level in their generic skills such as: group and academic work, information and communication technology management,

language proficiency, oral and written communication. (Pachas-Barrionuevo et al, 2019).

METHODOLOGY

Objective and eligibility criteria

This study is based on the interest of answering questions such as: What is the scientific evidence on the development of generic skills in Latin American university students, 2007-2022? Which universities, faculties or university careers show the most interest in the development of these competencies?, what methods, strategies and techniques are being used for their development?, what are the generic competencies that are being developed the most?

2007 to 2022 was established .

 In order to achieve this objective, the recommendations of the Cochrane Collaboration and the PRISMA Declaration were followed (González et. al, 2011; Moher , Liberati , Tetzlaff , Altman and Prisma Group , 2014; Pigott , 2019, Bernal et. al , 2020). Articles that met the following criteria were selected: publication date (2007-2022), geography (Latin America), language (Spanish), type of resource (scientific article), sufficiency, relevance, and duplicity criteria.

Search and selection of studies

Scopus , Scielo and ScienceDirect databases . The study selection process was carried out in four phases (see Figure 1).
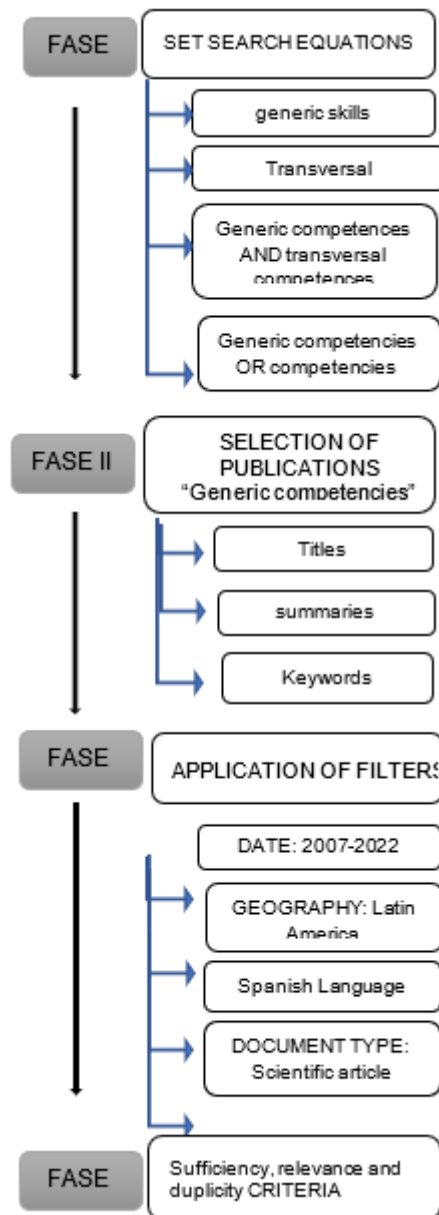
FIGURE 1. Study phases

In the first phase, the search equations were established: A1 generic competencies, A2 transversal competencies, A3 generic competencies AND transversal competencies, and A4 generic competencies OR transversal competencies. In the second phase, publications on studies that made reference to generic competencies in the title, abstract

and/or keywords were selected, resulting in 1833 publications that make up the population under investigation (see Table 1). A double manual review and computer search of the created database was also carried out.

TABLE 1. search equations

CODE	TERM		DATABASE	RESULTS
A1	"generic competencies"		scopus	52
			sky	164
			SCIENCE DIRECT	538
A2			scopus	5 1
	"transversal competences"		sky	101
			SCIENCE DIRECT	590
A3	"generic competences"	AND	scopus	04
	"transversal competences"		sky	fifteen
			SCIENCE DIRECT	83
A4	"generic competences"	OR	scopus	51
	"transversal competences"		sky	101
			SCIENCE DIRECT	83
			TOTAL	1 833

In the third phase, several filters were made; Of the 1833 publications, in a first filter (2007-2022 publication date) 1727 articles were obtained; Of these, in a second filter (Geography-Latin America) 1,188 publications remained; in a third filter (Language-Spanish) and a fourth filter (Scientific articles) there were 1127 articles. Finally, in a fourth phase, based on sufficiency criteria, 382 articles were selected; then, due to relevance criteria, 60 remained; finally verifying the duplicity, 32 withdrew; leaving the sample made up of 28 articles, in whose review the method, strategy and technique were evidenced in addition to the generic competences developed (see figure 2).
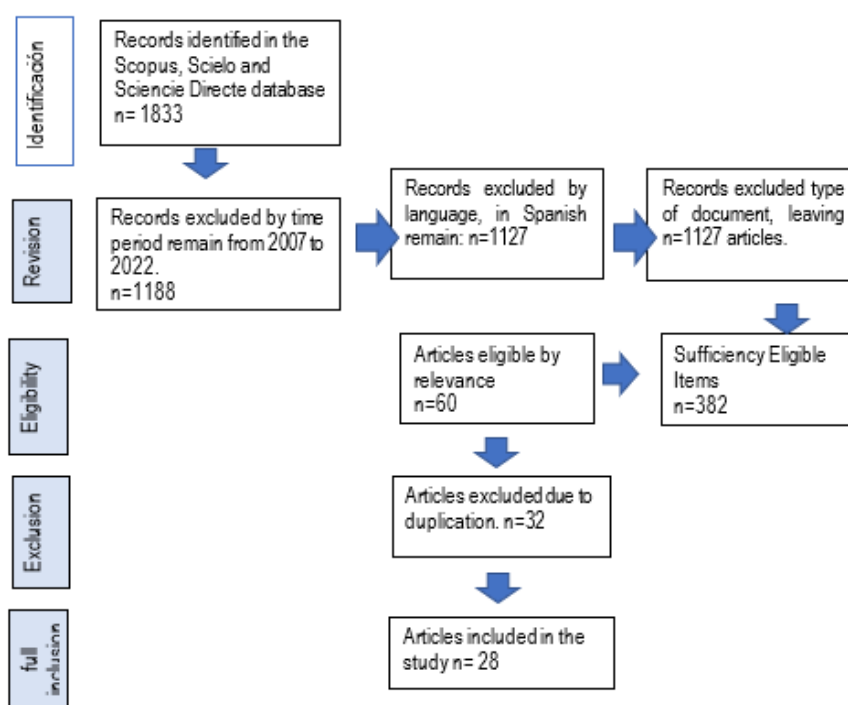
Figure 2. PRISMA flow chart for article selection

Data collection

In the analysis of the information of the selected articles, the contextual characteristics were taken into account: database, year of publication, authors, title, type of

research, method, strategy or technique used for the development of generic competences, university, faculty or professional career and the skills developed (see table 2). The studies collected from Scopus , Scielo and SciencieDirect are diverse in terms of methodology, thus they were found Total articles selected, 51.85% (14) were qualitative research, 29.62% (8) quantitative, 18.51% (5) mixed. A better appreciation of the information collected is found in Table 2, presented below:

Table 2. contextual features

No.	TITLES	KIND OF INVESTIGATION	TECHNICAL STRATEGY METHOD	DEVELOPED COMPETENCE
1	Effect of the physical education subject on the students' perception of	not experimental	Physical education classes	Teamwork and ethics

	the development of generic skills.			
2	Perception of clinical simulation as a teaching strategy for the development of transversal skills in occupational therapy.	Quantitative Experimental design, descriptive	Clinical simulation using simulated users	Creativity Autonomy Ethics Social responsability
3	Development of generic and specific competences through a strategy mediated by ICT in higher education.	Qualitative	Didactic strategy mediated by ICT	Ability to apply knowledge in practice. Skills in the use of information and communication technologies ethical attitude
4	An academic journal as a pedagogical strategy for the development of generic and specific skills of language teachers in training.	Qualitative	An academic journal as a pedagogical strategy	Oral and written communication Ability to communicate in a second language Teamwork
5	Development and strengthening of generic competencies in nursing students through the service-learning methodology.	Qualitative	Service-learning methodology.	Systemic skills: Design and manage projects, learn to learn, apply knowledge to practice, creativity Work independently, ensure quality Interpersonal skills: Teamwork Interpersonal skills to be critical and self-critical and Ethical commitment, Appreciation and respect for diversity and

				multiculturalism
				Instrumental skills:
				oral communication
				Identify, pose and solve problems
6	Perception of initial education students regarding the development of formative experiences in the A+S modality.	Comparative Qualitative	Learning and Service Modality (A+S)	Ethics Valuation of diversity Teamwork
7	Development of generic skills in students who work as peer tutors at the university.	Mixed	tutorial work	Empathy, leadership, personality and mediation.
8	Development of generic and specific skills in engineering students within the framework of the physics laboratory.	Mixed Qualitative and quantitative	Laboratory experiences within the framework of the basic physics course	Creativity Teamwork Oral and written communication
9	Learning and service: perceptions of Occupational Therapy students at the University of La Frontera.	Exploratory, descriptive and interpretive qualitative	learning and service	conflict resolution Continuous learning Critical and reflective sense.
10	Development of generic skills: first aid subject, nursing students at a Chilean University.	qualitative exploratory descriptive	first aid course	Generic skills: knowledge, communication decision making Systemic skills: motivation and leadership
eleve	Clinical simulation: opinion of nursing	Qualitative	clinical simulation	Teamwork Ability to adapt to new

n	students, Autonomous University of Chile, Temuco.	Exploratory Descriptive		situations
12	Effects of the self-instructive module on the investigative skills of students from a private university.	applied type quasi-experimental design	self-instructive module	Investigative skills.
13	Development of critical thinking through high fidelity simulation with medical students.	Quantitative, Descriptive and quasi experimental	High fidelity simulation	Critical thinking
14	The development of critical thinking in university students through Problem-Based Learning.	mixed method	Problem-based learning	Critical thinking
fifteen	Development of critical thinking through the application of Problem-Based Learning	Mixed Quasi-experimental and transactional	didactic strategy Problem-based learning	Critical thinking
16	Problem-based learning (ABP) as a strategy for the acquisition of generic skills: students of nutrition and dietetics, Universidad de La Frontera.	Exploratory Qualitative Descriptive Interpretative	Problem-Based Learning (ABP)	Self-critical capacity Teamwork Leadership self learning Communication
17	Clinical simulation as a strategy for the development of critical thinking in medical students.	Qualitative Descriptive	clinical simulation	Critical thinking problem solving Team work self direction
18	Use the wiki to promote self-learning and social responsibility in future scientists.	Quantitative	Wiki in the subject Biochemistry	self learning Social responsability

19	Case method as a didactic strategy to develop critical thinking in tourism students.	Mixed embedded design transactional type	case method	Critical thinking
twenty	Problem-based learning in the development of transversal competences in programs in the health area of a Higher Education Institution in Barranquilla-Colombia.	Quantitative	Problem-based learning	Collaborative work
twenty-one	Perceived value of an educational immersion experience for the development of transversal skills: Week I.	Educational immersion experience	Educational immersion experience	Individual and interpersonal skills intellectual curiosity and problem solving, collaborative work and communication in Spanish ˜ (level of interpersonal impact), which favors processes of cooperation and social interaction.
22	Development of Transversal Competences in the Training of Engineers through cross evaluations.	pre-experimental	cross evaluations	Collaborative work and critical thinking
23	Evaluation of the impact of project-based learning in engineering courses using multiple correspondence analysis.	multivariate statistical analysis	Project Based Learning	Teamwork, problem solving, communication skills and self-learning.

24	Teamwork and academic performance in a kinesiology course using team-based learning.	Pre-experimental design	Team-based learning	Team planning and communication, problem solving.
25	Choral groups as a strategy of formation of competencies for teamwork in organizations: a comparative perspective.	Descriptive study	Chorus	Ability to interact with other people, ability to resolve conflicts with other people effectively. Ability to face errors, willingness to adapt to changes during the work process.
26	Spatial skills and competencies Chemical engineering.	Descriptive study	Project development. Prepare plans and maque-representative rates.	visuo-spatial intelligence
27	Early clinical contact: design experiencẽ and implementation of a community service course in medicine.	quantitative pre-experimental	A service-learning methodology.	Social commitment and teamwork.
28	Challenge-based learning: an experience of innovation to address public health problems.	Quantitative in a transactional way	Challenge-based learning	Creativity and critical thinking

Responding to the general objective, to identify scientific evidence on the development of generic competences in university students in Latin America, in order to advance their understanding, the most significant results of the SR carried out were included.

scientific evidence

It can be seen in publications in Scopus journals (13) in Scielo (14) and in ScienceDirect (1). The years of publication of the articles in the Scopus database are 2022 (1), 2021 (2), 2020 (2), 2019 (2), 2018 (3), 2014 (1) and 2013 (1). Of which 6 articles correspond to Colombia; 5 to Chile and 1 to Peru. Regarding the 11 articles located in the Scielo database, they were published in 2021 (1), 2020 (1), 2019 (3), 2018 (2), 2017 (2) and 2014 (2). Of these, 5 articles correspond to Chile; 4, to Mexico; 1 to Colombia and 1 to Peru. Regarding the 05 articles located in the ScienceDirect database, they were published in 2018 (2), 2016 (1), 2015 (1), 2014 (1). Of which 2 articles correspond to Chile; 2 to Mexico and 1 to Ecuador.

Universities, faculties or university careers

The development of generic skills has been given with greater emphasis in the field of Medical Sciences with 14 investigations; in Engineering and Physical Sciences and Mathematics, 5; in Social Sciences and Education, 4; in Accounting, Business and Administrative Sciences, 1; in Biological Sciences, 1 and others, 3.

Method, strategies or techniques

The most widely used strategies to develop generic skills in Latin American university students are those of an experiential nature, such as simulation with simulated users, clinical simulation, and high-fidelity simulation. Followed by the service learning methodology, problem-based learning and project-based learning (Table 4).

Table 4 . Skills developed through more applied strategies.

skills	clinical simulation	Service Learning Methodology	Problem-based learning	Project Based Learning
skills **systemic**		design and manage Projects		
		Learn to learn	Learn to learn	
		Apply knowledge to practice		

	Creativity			Intelligence visuospatial
	Work autonomously _ _	Work autonomously _ _		
	Capacity for adapting to new situations			
		Ability to learn and constantly update		Ability to learn and constantly update
skills interpersonal	Work in equipment	Work in equipment	Work in equipment	Work in equipment
	self direction	conflict resolution _	Skills interpersonal	
	Being critical and self-critical (Critical Thinking)	Being critical and self-critical (Critical Thinking)	Being critical and self-critical (Critical Thinking)	
	Commitment ethical	Commitment ethical		
		Appreciation and respect for diversity and multiculturalism		
skills instrumentals			Oral and written communication skills	Oral and written communication skills
	social responsibility	social responsibility		
	Ability to identify, pose and solve problems (intellectual curiosity).			Ability to identify, pose and solve problems (intellectual curiosity).

More developed generic skills:

The analysis of the content of each article carried out independently by each author, made it possible to identify that, of the three types of generic competences, the interpersonal ones are the most developed, specifically, teamwork (59.09%) and criticism and self-criticism (45.45%).

In relation to systemic competencies, the most developed were the ability to learn and update oneself permanently (22.73%) and the creative ability and the ability to motivate and lead common goals (18.18%). The latter through clinical simulation and service learning methodology. Learning to learn is developed using service learning and problem-based learning methodology. Meanwhile, the ability to learn and update permanently is achieved through the service-learning and project-based learning methodology.

 Finally, regarding instrumental skills, oral and written communication (36.36%) and the ability to identify, pose and solve problems (22.73%) were developed to a greater extent through problem- and project-based learning. Social responsibility through clinical simulation and service learning methodology. Intellectual curiosity, or the ability to identify, pose, and solve problems, is achieved through clinical simulation and project-based learning.

Discussion and Conclusions

The research carried out responds to questions regarding how the competency-based approach is being applied at the level of universities in Latin America and thus systematizes all the forms that are being used to date. Faced with the permanent demands of social changes, universities have transformed their educational models towards competency-based training (Orjuela and Osses, 2021; Sandoval et. al, 2021) that focuses their attention on students, who are conceived as subjects freelancers who actively participate in the construction of their knowledge, professional and personal development; therefore, didactic strategies that favor meaningful learning and the development of disciplinary and transversal skills for the profile of their graduates are privileged (Orjuela and Osses, 2021).

In the scientific articles reviewed, it is found that the Latin American countries that have produced the most studies regarding the development of generic skills are Chile, Colombia and Mexico; being Peru and Ecuador, countries with less scientific production in this regard. For Peru, it represents an opportunity to expand its research, taking into account that Peruvian universities, in accordance with current regulations, have been implementing curricula focused on competency-based training.

The university careers that show the most interest in the development of these competencies are those of Medical Sciences (Orjuela and Osses, 2021; Boude, 2014; Godoy et. al, 2019; Sandoval et. al, 2021; Hernández, 2020; Illesca et. al, 2019; Segura, 2018 ; Nuñez et. al, 2017; Saavedra et. al, 2014; Valencia et. al, 2016; Ardila et. al, 2019; Olivares et. al, 2019; Delgado, 2017; Rivera, 2018), followed by Engineering (Vega, 2020; Lara et. al, 2021; Vidal, 2021; Fernández et. al, 2013; Valiente, 2014) Social Sciences and Education (Jones, 2022; García et. al, 2020; Uribe, 2018; Garcia, 2020).

The needs of the population and the universal right to health that all people have raises the comprehensive training of health professionals, with a competency-based approach, allowing them to articulate knowledge, skills and attitudes to respond to socio-health demands in constant change.

Social demands in the field of engineering require professionals with a solid scientific, technological and humanistic training, to develop an efficient practice that solves problems with initiative and creativity and thus adapts to the context; criteria and critical judgment for the design, execution and evaluation of projects; with full compliance with legal regulations; Being fundamental values such as discipline, responsibility, honesty and perseverance in order to achieve objectives with the lowest possible cost; training and continuous study of new technologies and engineering designs to favor the necessary adaptations to the environmental conditions and possess interpersonal skills, in this way to be able to communicate and negotiate with all the actors involved in the projects. At the same time, society demands people fully trained, for harmonious coexistence and the continuous search for well-being, human and sustainable development.

In this context, generic or transversal competences are strategic for adequate job performance (Bustos-Gonzales, 2018; Salazar and Acuña, 2018; Godoy et. al, 2019; Lara et. al, 2021), since they favor self-management in people , power to face changes, creativity and innovation (Gleason et. al, 2022). The most widely used strategies to develop generic competencies in Latin American university students are those of an experiential nature; In health sciences, studies report the use of simulation with simulated users, high-fidelity clinical simulation, and the service-learning methodology. Problem-based learning and project-based learning are the most widely used strategies in engineering sciences. and education, in addition to the service learning methodology.

Clinical simulation is a privileged pedagogical tool in the training of health professionals, since it favors the student's adaptation to social contexts different from that of the discipline itself, which integrates cognitive elements, skills and attitudes, allowing the student to be able to face with safety in challenging situations, being aware of their opportunities for improvement for their learning (Orjuela & Osses, 2021), in such a way that when acting in real situations, they do so with confidence, guaranteeing safety and quality of care (Altamirano-Droguett, 2019). .

Clinical simulation strengthens the skills for communication, empathy, and teamwork in students in health areas, and gives them the opportunity to reflect on their work through situations that are close to clinical reality, favoring feedback and learning. significant. In addition, students perceive that through clinical simulation with standardized patients they improve their autonomous performance in comprehensive care, decision-making, and increase the perception of self-efficacy, security, and confidence (Orjuela & Osses, 2021; Altamirano, 2019).

Clinical simulation, through high or medium fidelity simulators, reinforce the student's self-confidence and the performance of clinical skills in scenarios close to reality (Segura-Azuaraa et. al, 2018).

Service learning methodology, constitutes a strategy based on experience, the student learns by doing; hence its great formative value. Through it, the student of health areas reflects on the social reality and integrates learning content, skills and attitudes into an activity, to solve community needs and contribute with relevant or quality interventions to the objectives of the service.

Students develop generic competencies; such as conflict resolution, continuous study, critical and reflective analysis, so necessary to establish care links. Factors such as socio-sanitary communication, teaching support and characteristics of the work team favor the use of the methodology, while self-confidence and interpersonal relationships between the community and health actors can be a source of obstacles. The self-assessment and hetero- assessment modalities strengthen interpersonal, systemic and instrumental competencies (Sandoval et. al, 2021), in the use of this methodology.

Problem-Based Learning (ABP) encourages the student to learn in a collaborative environment, by discovery and construction; Critical thinking and decision making are essential. Based on an observed reality, it systematizes the information obtained to propose solutions to the problems that are faced and that are communicated verbally and in

writing, showing the ability to transmit it appropriately (Lara et. al, 2021).

Project Based Learning (PBL) focuses on strengthening the learning of concepts and the development of generic skills; teamwork, problem solving, communication and self-learning; as well as professional identity and development of responsibility (Fernández-Samacá et. al, 2013).

According to the review carried out, the generic competences most developed by the most used strategies include: autonomous work, learning to learn, learning and updating oneself permanently, teamwork, being critical and self-critical, oral and written communication, social responsibility, curiosity Intellectual or ability to identify, pose and solve problems.

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