

Problem Based Learning (PBL) in the Development of Emotional Intelligence of University Students

El Aprendizaje Basado en Problemas (ABP) en el desarrollo de la inteligencia emocional de estudiantes universitarios

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Summary

This article deals with the effect of Problem Based Learning (PBL) in the development of the emotional intelligence of first-semester students in a private university in Lima. To achieve this purpose, an applied research was carried out, using the experimental method (quasi-experimental design), given that the independent variable (PBL) will be manipulated so that it produces an effect on the dependent variable (Emotional Intelligence), which will be measured. To do this, a sample of 48 students was taken, it was divided into two groups: one of control (24) and the other one experimental (24) of a total population of 1281 freshmen. For the collection of data, the Bar-On Emotional Intelligence Inventory (I-CE) test was used as a pretest. PBL methodology was then applied throughout 16 learning sessions to the experimental group, while the control group received traditional learning methodologies. The same Bar-on test was then used as posttest to conduct measures for both groups. The results showed that there was significant influence of the PBL in the development of the emotional intelligence of the students of study.

Keywords: Problem-based Learning; Active Learning Methodology; Emotional Competencies; Emotional Intelligence; Soft Skills.

Resumen

El presente artículo trata sobre el efecto del Aprendizaje Basado en Problemas (ABP) en el desarrollo de la inteligencia emocional de estudiantes del primer ciclo en una universidad privada de Lima. Para lograr este propósito se realizó una investigación de tipo aplicado, empleando el método experimental (diseño cuasi-experimental), dado que se manipulará la variable independiente (ABP) para que produzca un efecto sobre la variable dependiente (Inteligencia Emocional), la cuál será medida. Para ello, se tomó una muestra de 48 estudiantes distribuidos en dos grupos: uno de control (24) y otro experimental (24) de una población total de 1281 ingresantes. Para la recolección de datos, se empleó el test de Inventario de Inteligencia Emocional de Bar-On (I-CE) como prueba de entrada (pretest), aplicándose la metodología del ABP durante 16 sesiones de aprendizaje al grupo experimental, mientras que para el grupo de control se utilizaron metodologías de aprendizaje tradicionales; para luego efectuarse las mediciones con el mismo test de BarOn como prueba de salida (postest) para ambos grupos. Los resultados mostraron que hubo influencia significativa del ABP en el desarrollo de la inteligencia emocional de los estudiantes objeto del estudio.

Palabras clave: Aprendizaje basado en problemas; Metodología activa de aprendizaje; Competencias emocionales; Inteligencia emocional; Habilidades blandas.

Introduction

The national and international context requires training human resources in order to cope with the new labor market needs, as well as our societies' global and multicultural context, It also involves a comprehensive education, not only to provide instruction or deliver knowledge, but an education to favor the development of all capacities to conduct a personal life project and as a means of changing reality.

For this reason, labor market demands require a higher education, capable of educating students with professional and human performance potential. New ways of educating higher education students to accomplish a successful labor integration are encouraged, by training them both, on a cognitive level and in the development of soft skills; which are extremely necessary in the current professional profiles. In fact, during the last years, comprehensive projects on

education reform have started, intended to find new ways of addressing current society's demands and requirements. Consequently, the strengthening of competencies or abilities linked to emotional intelligence will optimize the higher education student profile, which will in turn result in turning him/her into an upright individual, capable of adjusting and positively interfacing with the dynamic and changing environment.

Nevertheless, in view of a demand of professionals with personal, social and academic competencies, we find students, who on a higher education level, continue "carrying" those gaps, which the regular basic education could not fill: students with severe personal difficulties (low self-esteem, low self-regulation and motivation), frequently with stressful relationships and personal contacts (little development of social skills and empathy), engaged little or not at all with classroom participation and activities (rote learning, teaching-centered methodologies, merely focused on a cognitive development). All of this has resulted in continued academic drop-out among higher education institutions, as well as in a high degree of repetition.

Based on the above, it is concluded that there is a need to conduct a research on the effect of active learning methodologies to engage teachers in a proactive role at the classroom, as an actual companion in the teaching-learning process, promoting the student autonomous learning and the development of their emotional intelligence, as a fundamental basis of the integral development of our future professionals. An educational intervention program, attended in person and as a collaborative learning is proposed, i.e. the Problem-Based Learning (PBL), intended to achieve, as the purpose of the investigation, a significant effect on the development of the Emotional Intelligence components, but mostly, to ensure a comprehensive education of the students, in order to ensure personal, academic and professional success. The question to be answered was: What is the effect of Problem-Based Learning on the emotional intelligence of a group of students attending the first semester of a private university in Lima? The substantial hypothesis of this investigation assumes that an educational intervention based on the PBL methodology would significantly increase the development of the Emotional Intelligence components, compared to the traditional learning methodology.

Problem-Based Learning

Problem-Based Learning (PBL) is a "type of active methodology, of student-centered teaching, characterized by bringing about the student learning in the context of solving a real problem" (Marra, Jonassen, Palmer & Luft, 2014, p.221).

Problem-Based Learning was based on two arguments, i.e. conceptual and theoretical. One of them is the work of the philosopher of education John Dewey, who underlined the importance of learning through the experience. According to Dewey, in a real world experience, students find a problem that stimulates their thinking, they gather information to pose tentative solutions to the problem and applying those solutions help them validating their knowledge. On the other side, PBL embraces Vigotsky's sociocultural theory, which highlighted the importance of students' participation in cognitive learning communities, where the student interchanges and compares ideas with the others, actively interacting to solve problems; and the teacher coordinates their efforts (Eggen & Kauchak, 2015).

The main characteristics of a Problem-Based Learning setting proposed by Marra, Jonassen, Palmer & Luft, (2014) are the following: (1) problem-centered learning (contents and abilities to be learned and organized around true real problems), (2) student-centered learning (a series of cognitive and emotional processes are deployed to investigate and solve the problem), (3) self-direction (students are required to take the responsibility of: identifying the learning

objectives, planning information gathering and performing the searching, processing and integration of the information), (4) self-reflection (students are encouraged to monitor their understanding and learning in order to adjust their strategies), (5) collaborative work (sharing, dialogue and discussion among peers are promoted), (6) teacher scaffolding (teacher acts as a facilitator, whose basic role is to model and lead reasoning processes, as well as information searching and integration processes; facilitate group processes and make questions to ask about accuracy, suitability and depth of the information analysis).

These PBL characteristics optimally adjust to university students' learning, as "when the student access to the university system, he/she faces a complex structure of demands, to which he/she is not always ready, such as the autonomy in the learning process, the development of social skills, etc." (Lino, 2015, p. 28). Therefore, it was extremely important to use active learning methodologies, especially PBL, to achieve the appropriate guidance provided to the student, because, according to the author point of view, university students' problems are personal, family or economic, which result in insecurity and fear.

Lino (2015) proposed emphasizing the development of social skills, coping strategies and searching for social support, to offset the potential university abandonment and/or dissatisfaction at this stage, mostly among entrant students. To this extent, PBL promotes interpersonal emotional intelligence as well as social skills, which includes being able of adequately express our emotions, understand them, accept them and reduce negative emotions such as rage. Consequently, the development of Emotional Intelligence, encouraged by PBL, "seems to add certain explanatory degree to the student socio-academic adjust, particularly regarding academic performance and disruptive behavior in the classroom, as well as other variables such as stress and anxiety, tobacco and alcohol consumption, optimism or vocational maturity among students". (Pena & Repetto, 2008, quoted by Gutiérrez & Expósito, 2015, p. 45).

Problem-Based Learning Implementation Phases

Diaz Barriga & Hernández (2010) proposed three phases for the implementation of this educational proposal:

Table 1.

PBL Educational Proposal Phases

Phases	Sub-phases
a) Preparing the PBL Setting	<ul style="list-style-type: none"> Identify relevant facts and ideas which will develop into the problematic situation. Clearly define the PBL objectives. Prepare syllabuses and the evaluation instrument.
b) Establishing PBL Setting Among Students	<ul style="list-style-type: none"> Presentation and explanation of the problematic situation and the evaluation instruments for students. Build work teams. Identify initial problem solving attempts by students. Identify and discuss: previous knowledge, what they need to learn and those who will learn.
c) Problem Solving Process	<ul style="list-style-type: none"> Target Setting. Collaborating activities for searching information that will allow the setting of a solution strategy. Planning setting and implementation of a solution strategy. Communication of results to the class team and the teacher.

Steps for Implementing Problem-Based Learning.

According to Eggen & Kauchak (2015) the implementation of PBL in the classroom shall be developed in 5 stages:

Stage 1: Identifying a Question

An investigation begins when a question intended to call the attention is identified and then a challenge is posed for the students. The purpose of this first stage is to attract the student's interest, taking advantage of the motivating inquiry and challenge effects.

Stage 2: Formulating a Hypothesis

Once a question has been formulated, then the group is ready to attempt an answer. A hypothesis is a tentative answer to a question or solution to a problem that can be verified with information. A hypothesis activates interior knowledge and starts the scheme design process.

Stage 3: Gathering Information

Hypotheses lead the information gathering process. It promotes metacognition when students plan the strategies for gathering information. Within this stage, it is important that students develop abilities to organizing and presenting information by using charts, diagrams or graphs.

Stage 4: Evaluating Hypotheses

At this stage, students are responsible for evaluating their hypotheses based on data. For example, finding contradictory data is in itself, an important experience for students. There are few clear and distinctive things in life, and as more experienced the students are with respect to facing ambiguity, which requires tentative and non-dogmatic conclusions, the better prepared they will go out into the world.

Stage 5: Generalizing

The closure of content in a Problem-Based Learning course is done when the students tentatively generalize about information based results. Over time, they will develop tolerance towards complexity and ambiguity that may help them understand and face life's complexities. Finally, it is worth noting that at the end of the last stage, Problem-Based Learning also offers opportunities for the students to reflect on the process, and then it is expected that they will be able to transfer this to other activities in the classroom and ultimately to their daily life, which will be their own way of generalizing.

The PBL Advantages in the Development of competencies in University Students

Escribano & Del Valle (2010) pointed out the advantages of PBL over conventional learning methods that have promoted their dissemination and implementation in diverse disciplines at a higher education level. The advantages stated by these authors include:

- *Motivation* as the “willingness to learn” as pointed out by Bruner, is encouraged by PBL, as it invites the student to get more involved in learning, because he/she feels the possibility to interact with reality and to observe the outcomes of such interaction.

- Through this methodology, the student succeeded in establishing a significant connection between the information being received and the previous knowledge he/she possesses, generating a *more significant learning*. This learning method strengthens even his/her interest in continuing researching outside the classroom as well.
- Knowledge integration enables greater *retention and transfer* of knowledge. The PBL methodology allows, from practice, the detection of mistakes or theoretical inconsistencies, which has been shaped up as one of the most favorable strategies for building a learning linked to the previous student's concepts and contributing to transform them.
- This methodology is supported by a learning that promotes *critical and creative thinking*, i.e. promotes the acquisition of skills to identify problems and offer appropriate solutions.
- Through the PBL methodology, the student attains what is known as *knowledge integration*. The knowledge of the different disciplines is integrated to find the solution to the problem they are working on, in such a way that learning is not provided in portions, but comprehensively and dynamically.
- The PBL method promotes interaction by increasing *interpersonal skills* such as: team work, evaluation of fellow students, presentation and defense of works. This interactive methodology allows developing, extending and getting deeper into interpersonal skills: students have the opportunity to share their findings. Likewise, support is provided to solve problems and work in joint projects.
- *Educational evaluation* is promoted in a self-evaluation system for students and co-evaluation, which allows identifying and correcting mistakes, as well as ensuring attaining personal and common goals, through constructive feedback.

Finally, this Problem-Based Learning (PBL) methodology, which will be used within the framework of the intervention program, basically focus on considering the student as an active entity of its own learning and the teacher as a leader to promote this learning. There are diverse educational proposals for active learning methodologies centered on the student, which are intended to promote situated, experiential and authentic learning among students, through which they will be able to develop skills and competencies similar to those they will encounter and require in everyday life and professional situations; however, Problem-Based Learning is an active learning methodology that promotes, among higher education students, problem identification and analysis, formulation of solution hypotheses, gathering of information, the assessment of proposed solutions and their extrapolation to daily life (Díaz Barriga, 2006).

Emotional Intelligence

Since Gardner's first publication in 1993, *Frames of Mind*, the Intelligence concept was reformulated, establishing that human beings possess seven types of intelligence, each one independent from the other. Thus, Trujillo & Rivas, 2005, started a complete changeover in the perspective about the meaning of Intelligence as such. Salovey & Mayer (1990), quoted in Gabel, (2005), set up the concept of Emotional Intelligence based on Gardner's contribution associated to the concepts of Intrapersonal and Interpersonal Intelligence. Years later, Daniel Goleman defined the Emotional Intelligence as "*The capacity to recognize our own feelings and those of the others, to motivate ourselves and manage emotionality in ourselves and interpersonal relationships*" (García Fernández & Gimenez-March, 2010, p. 45). Bar-On in 1997, defined Emotional Intelligence as a set of personal, emotional, social abilities and skills that have influence on our capacity to adapt and meet the environment demands and pressure (Ugarriza, 2001).

Currently, this concept becomes increasingly predominant, considering the globalization effect, by fostering people to develop abilities and skills which will result in an appropriate performance, consistent with the demands of a dynamic and changing environment, emphasizing the role of emotions in individuals' actions.

To this extent, based on the definitions presented, we can conclude that Emotional Intelligence is the capacity that an individual has to recognize and use his/her own emotions, so as to achieve an appropriate interaction in his/her environment and therefore to be able to adapt themselves and establish healthy relationships.

Bar-On Model on Emotional Intelligence and its dimensions

This study aims at determining the effect of PBL on the development of Emotional Intelligence (IE), i.e. on individuals' functionality and the way how they interact with each other. For that purpose, the studies conducted by Bar-On were used as a basis.

This model of non-cognitive intelligences suggested that these abilities and skills develop and change over time and can be improved with training, so that being emotionally and socially intelligent means recognizing and expressing emotions, understanding ourselves, refreshing our own potential capacities, living a regularly healthy and happy life. Being able to understand the way other people feel, to have and maintain satisfactory and responsible interpersonal relationships, but not to have to depend on others (Bar-On, 1997). In other words, Emotional Intelligence became an important factor in determining our ability to be successful in life, as it has an influence on our general emotional well-being (Ugarriza & Pajares, 2005). In this respect, people who are healthier and show an adequate performance and succeed in life are considered emotionally intelligent.

Bar-On (1997) proposed the following five components:

1. *Intrapersonal Component (IAC)*: Assesses an individual's general self-regard, the emotional self-awareness, assertiveness, self-fulfillment and emotional independence.
2. *Interpersonal Component (IEC)*: Assesses empathy, social responsibility, social relationships.
3. *Adaptability Component (ADC)*: Refers to the individual's capacity to correctly assess reality and efficiently adjust to new situations, as well as to create appropriate solutions to everyday problems. Includes notions of reality test, flexibility and problem solving capacity.
4. *Stress Management Component (SMC)*: Considers the capacity to tolerate stress and the capacity to control impulses.
5. *General Mood Component (GMC)*: Assesses optimism and happiness.

Importance of Emotional Intelligence and the Development of Soft Skills in the Context of Higher Education

The development of competencies among students, particularly emotional competencies, has become a topic of great importance when selecting better job opportunities, Singer, Guzmán & Donoso (2009).

According to Fiszbein, Cosentino & Cumsille (2016) "socioemotional abilities, also referred to as soft skills, are a wide array of skills and are relevant to any type of work" (p.4). Singer, Guzmán & Donoso (2009) refer to them as an "array of non-cognitive capabilities essential to learn and successfully perform at work" (p.2). To this extent, the contribution of education in the development of the abilities and capacities of the student to be integrated in society and his/her subsequent labor insertion was highlighted, Matus & Gutiérrez (2015).

Vargas & Carzoglio (2017), collected and identified the following abilities associated to Emotional Intelligence, as being the most demanded by companies currently.

- Capacity to effectively interact, communicate messages, being persuasive.
- Problem solving, which implies the perception and analysis capacity, as well as the capacity to outline solutions.
- Working under parameters, understanding ones' limits and decisions to be taken.
- Openness to change and constant updating.
- Innovative thinking.

Therefore, the need of a higher education that pursues the students development in the labor environment was noted. Along the same line, in 2017, the Inter-American Development Bank (IDB) referred to a study conducted during this year, which found that diverse Latin American educational programs need to strengthen even more the emotional abilities in order to facilitate labor insertion.

The access to education in our region has increased in the last years, however, this does not mean that young people has developed personal competencies necessary to cope with the labor world, (2017).

Likewise, at a national level, Semana Económica (2014), quoted in Aparicio & Medina, (2015) supported an investigation on the abilities considered to be the most important, finding that Leadership, Strategic Planning, Prospective, Decision Taking, Impact and Influence, Business Knowledge, Achievement Orientation, Empowerment, People Development and Work Team Direction are best rated. To this extent, the main objective of the Ministry of Education (2015) is for students to attain relevant and quality learning, and at the same time that it will favor the national development and competitiveness. That is, to emphasize the actions that may foster and encourage the development of both, cognitive and non-cognitive learning, which encompass soft skills directly associated to Emotional Intelligence.

Based on the above, it is essential to propose and execute teaching-learning processes to allow strengthening the competencies and/or abilities most required in the labor context, which will result in emotionally intelligent students and, consequently, much more employable students. Taking into account that Emotional Intelligence as well as the use of social abilities provide the students with the necessary resources for their personal development, then, it is desirable to generate a training program in social abilities and Emotional Intelligence that may consolidate their use and the use of the main components on which all the above mentioned authors agree.

Method

This investigation will correspond to the type applied, using the experimental method (McMillan & Schumacher, 2010), due to the fact that the independent variable will be manipulated (Problem-Based Learning) to produce an effect on the dependent variable (Emotional Intelligence), which

will be measured (Hernández, Fernández & Baptista, 2010). The design is quasi-experimental (Hernández, Fernández & Baptista, 2010), groups of previously determined intact subjects will be used; each group will be pre-tested and then assigned the treatment condition (present or absent) to be finally subjected to a post-test (McMillan & Schumacher, 2010).

Participants

The population is made up of 1281 entrant students of a private University in Lima, where the research was conducted. The sample consisted of 48 entrant students from the Business Administration Career, daytime shift, registered in the class Development of Emotional Intelligence I. Of the 48 students, 24 made up the experimental group, and the other 24 were the control group. The sampling was non-probabilistic and intentional, ensuring homogeneity in both groups regarding gender proportions in each group and similar ages. Inclusion criteria include the above students who were 16 and 21 years old. The exclusion criteria considered students older than 21 years and those who were not pre-tested and/or post-tested.

Instruments

The Emotional Intelligence variable was measured with Bar-On's Emotional Intelligence Inventory Test (EQ-I Bar-On Emotional Quotient Inventory), which, from a systemic view (personal, emotional and social) considers five major components of Emotional Intelligence: intrapersonal, interpersonal, adaptability, stress tolerance and mood, that relates logically and statistically, through scores given to each one of the 133 items that made up such test (Likert type response scale form, a five-point self-rating scale) (Ugarriza, 2001).

In order to validate this instrument, Bar-On (1997) performed an exploratory factor analysis of items (extraction of principal components method with varimax rotation) to allow for a better understanding of the concept on which the inventory is based (non-cognitive intelligence). Diverse factor analysis procedures were carried out, both exploratory and confirmatory, to strengthen the inventory development process and to examine the theoretical composition of the diverse scales and therefore, to ensure the construct validity of this test. At a national level, Ugarriza (2001) conducted a second order confirmatory factor analysis and Square-Chi Test to verify the structure proposed by Bar-On, which resulted in the same factor structure. The reliability studies conducted on this instrument focused on the internal consistency and reliability retesting. Bar-On (1997) reported an internal consistency through Cronbach's Alpha between .69 and .86, and reliability retest of .85. At a national level, Ugarriza studies (2001) show internal consistency for the very high total inventory (Cronbach's Alpha coefficient of 0.93).

Procedure

Based on Diaz Barriga & Hernández (2010) proposal, for implementing PBL in the classroom, it was necessary to complete two previous phases: PBL implementation was prepared in the classroom, identifying objectives to attain with the use of this methodology; likewise, the syllabus and evaluation instruments were prepared, consistent with the Emotional Intelligence dimensions intended to be enhanced. Additionally, students exposed to the PBL intervention were prepared, that is, evaluation instruments were presented and explained under this methodology. Additionally, work teams with similar characteristics were built: each group was made up of 5 or 6 members, and members were distributed taking into account gender and ages, with the presence of at least one leader per group.

In the experimental group, intervention was developed through instruction designs, based on Problem-Based Learning, expecting to generate significant learning for the development of

Emotional Intelligence capacities. 16 learning sessions were developed, each one consisting of two 45-minute lessons, with educational team intervention in the context of a course called "Personal Development Course I", which is part of the first semester's curriculum of the university where the research was conducted. In the case of the control group, 16 learning lessons were also given in the context of the same course, but using traditional learning methodologies. Bar-On Emotional Intelligence Inventory Test was applied as pre-test and post-test for both groups.

Results

Based on the answers of the participants to the reactions of the Emotional Intelligence Inventory test, direct scores were calculated (weighted sum of items) for each emotional component or capacity (Intrapersonal, Interpersonal, Adaptability, Stress Management and General Mood) of the Emotional Intelligence dependent variable.

It is worth mentioning that considering the Shapiro Wilks (W) normality test for samples similar to this study (Razali & Wah, 2011), score distributions in all study variable components were normal, and hence, parametric statistics for contrasting hypotheses were used.

Table 2.

Inferential Analysis of differences in Emotional Intelligence components between the experimental group and the control group in the Pre-Test.

Variable	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Intrapersonal	Experimental	22	148.57	20.27	-0.429	0.670
	Control	22	145.91	21.27		
Interpersonal	Experimental	22	110.39	12.98	-1.039	0.305
	Control	22	105.73	16.95		
Adaptability	Experimental	22	87.48	9.87	0.543	0.590
	Control	22	89.09	10.06		
Stress Management	Experimental	22	63.65	9.74	0.154	0.879
	Control	22	64.14	11.39		
General Mood	Experimental	22	66.43	7.05	-1.212	0.232
	Control	22	63.05	11.32		

Note. *n*: number. *M*: Mean. *MD*: Median. *SD*: Standard Deviation. *t*: T of Student for independent samples.

No significant differences were found in the Pre-Test, between the average scores obtained by the experimental group (*n* = 22) and the control group (*n* = 22) in the five Emotional Intelligence components. T of Student values for independent samples calculated for the Emotional Intelligence components (Intrapersonal *t* = -0.429, Interpersonal *t* = -1.039, Adaptability *t* = 0.543, Stress Management *t* = 0.154, General Mood *t* = -1.212) were non-significant (*p* > 0.05), and hence, it is established that no statistically significant differences exist working with a confidence level of 95 by 100, among means (*M*) of the experimental group (CG) (Shaughnessy, Zechmeister & Zechmeister, 2007). The results obtained in the Pre-Test ensure the homogeneity of the scores in the study variables among groups, and this basic condition allows assuming that subsequent analyses will be based on the fact that the different experimental conditions arise from a score equivalent to the components of the Emotional Intelligence (Cubo,

Martín & Ramos, 2011). Thus, the changes to be subsequently generated could be attributed to the manipulation exerted on the independent variable (program based on PBL) and not to a different starting situation in both groups, associated to their Emotional Intelligence.

Table 3.

Inferential Analysis of the differences between Pre-test and Post-test in the components of the Emotional Intelligence in the experimental group and the control group.

Component	Group	n	Pre-Test Post-Test		Matched differences		M	SD	t	p
			M	SD	M	SD				
Intrapersonal	EG	22	148.57	20.27	158.04	13.41	.52	16.81	2.09	0.04
	CG	22	145.91	21.27	147.36	20.41	-1.45	18.53	-0.37	0.72
Interpersonal	EG	22	110.39	12.98	117.17	9.03	3.22	10.54	2.11	0.03
	CG	22	105.73	16.95	108.14	16.16	-2.41	11.50	-0.98	0.34
Adaptability	EG	22	87.48	9.87	89.43	8.28	2.04	8.04	2.10	0.03
	CG	22	89.09	10.06	89.05	11.57	.05	10.77	0.02	0.98
Stress Manag.	EG	22	63.65	9.74	70.83	9.55	2.83	7.20	2.09	0.04
	CG	22	64.14	11.39	63.23	11.27	.91	9.05	0.47	0.64
General Mood	EG	22	66.43	7.05	67.48	6.27	1.04	4.72	2.10	0.03
	CG	22	63.05	11.32	65.50	7.70	-2.45	9.17	-1.26	0.22

Note n: number. M: Mean. SD: Standard Deviation. t: T of Student for related samples.

The Pre-Test - Post-Test analysis in the control group (CG) (n = 22) assures the equivalence of scores in dependent variable measurements (Emotional Intelligence) in the absence of the independent variable (PBL Program). This homogeneity provides confidence with respect to the absence of strange variables that may have contaminated the study, and an evidence of internal validity associated to the research design (Cubo et al, 2011). Consequently, it can be observed that no statistically significant differences exist working with a confidence level of 95 by 100 in the control group, in measurements of the Emotional Intelligence components between Pre-Test and Post-Test, in the absence of the PBL Program.

The Pre-Test - Post-Test analysis in the experimental group (EG) (n = 22) evidence changes generated by the independent variable. Based on the experimental group results of the Emotional Intelligence components, before and after the exposure to the Program in PBL, it may be concluded that there are significant differences among both measurements' means due to the effect of the independent variable in the experimental group, working with a confidence level of 95 by 100 (Cubo et al., 2011). When comparing differences among the group means in the Intrapersonal component, statistically significant differences were found in the experimental group (Pre-Test M = 148.57; Post-Test M = 158.04; t = 2.09; p = .04), finding an improvement. With respect to the Interpersonal Component, statistically significant differences were also found in the experimental group (Pre-Test M = 110.39; Post-Test M = 117.17; t = 2.11; p = .03), finding an increase in this aspect. Likewise, differences were observed in the Adaptability Component (Pre-Test M = 87.48; Post-Test M = 89.43; t = 2.10; p = .03), finding an increase. In the case of the Stress Management Component, there are statistically significant differences (Pre-Test M = 63.65; Post-Test M = 70.83; t = 2.09; p = .04), finding improvement. In the General Mood Component, differences were also found (Pre-Test M = 66.43; Post-Test M = 67.48; t = 2.10; p = .03). Considering the trending of results observed and presented in Table 2 it may be inferred that the PBL Program is useful to develop the Emotional Intelligence components.

Discussion

The objective of this study was to identify, analyze and compare the effect of Problem-Based Learning (PBL) in Emotional Intelligence (IE) of students attending the first semester in a private university. The objective was achieved and results were presented. In this section, results obtained were analyzed and explained in the context of the background and theoretical bases of the variables from each one of their components.

With respect to the Emotional Intelligence Intrapersonal Component, intragroup differences show only one statistically significant change in the experimental group score. Hence, taking into account the intergroup (experimental and control) and intragroup comparison, in the Pre-Test and Post-Test phases, assumptions were met, and the intervention effect on these participants used by PBL in sessions of intrapersonal component development was evidenced. It is worth mentioning that the intrapersonal capacity, understood as self-awareness, assertiveness, self-concept and self-fulfillment and independence that an individual possesses, can be developed, considering the Stages of PBL implementation. As mentioned by Pérez (2018), this methodology that provides the student with autonomy, develops in him/her an attitude of engagement with his/her own learning, leads him/her to constantly reflecting and thinking on the process through which he/she builds his/her capacities by means of activities such as discussion, argumentation, self-assessment and the assessment of peers.

Regarding the Emotional Intelligence Interpersonal Component, differences in the Pre-Test and Post-Test phases were evidenced in the experimental group, after the PBL implementation, compared to the control group, who showed no significant changes. In the context of competencies or skills proposed by the education, building an empathic capacity and the student collaboration are encouraged, so as to favor the establishment of satisfactory interpersonal relationships. As proposed by Delgado & de Justo (2018), PBL requires that in the face of a problem, students form and become part of groups to work in teams, participating in a collaborative and positively interdependent process and placing their needs and perspectives before those of the others; this implies constant dialogue and building consensus in terms of the task or goal as a whole. To this extent, PBL combines the acquisition of knowledge with the development of abilities, attitudes and interpersonal competencies which are useful in the professional market (Roblego, Fidalgo, Arias & Álvarez, 2015).

As for the Emotional Intelligence (IE) Adaptability Component, statistically significant differences were evidenced in the Pre-Test and Post-Test phases in the experimental group, after the implementation of PBL, compared to the control group, where no significant changes were found. This may be accounted for by Gregori-Giralt & Menéndez-Varela (2015) studies, who found that as a method, PBL allows addressing everyday problems and at the same time is a strategy that promotes, individually and in groups, the learning of abilities to overcome obstacles in real life. This coping capacity implies the appropriate identification, selection and integration of previous knowledge, resources and skills, which entails that, in the face of a problem, an individual under the PBL method incorporates his/her learning in a coherent whole, subject to the nature of the problem (García-Castro, Ruiz-Ortega & Mazuera-Ayala, 2018).

Based on the results presented, it was observed that the Emotional Intelligence Stress Management Component showed in the intragroup and intergroup analysis, in the Pre-Test and Post-Test phases, only statistically significant changes in the scores of the experimental group. Possessing the characteristics to cope with adverse situations and controlling own emotions are capacities that allow the individual to adjust to social situations and learning. Therefore, in this study, it is evidenced that PBL has a positive effect on such component, as the use of this

methodology, as proposed by Gregori-Giralt y Menéndez-Varela (2015), allows adjusting issues to the reality of entrant students, contextualizing them in their thematic nature and assigning them a level of difficulty according to the apprentice profile. However, PBL exposure leads the student to face the challenge of adapting a new methodology, work in teams, manage information, assume positive codependence in the process and product, and gain autonomy; those becoming potential stressors, with which the student will have to deal with in order to fulfill the activities and tasks efficiently and effectively (Solaz-Portolés, San José & Gómez, 2011).

Additionally, results evidenced statistically significant differences for the General Mood Component, in the Pre-Test and Post-Test phases, in the experimental group, after PBL implementation, compared to the control group, where no significant changes were found. Findings matched Morales (2009) proposals. Morales explained that at each step of the PBL implementation, performance and achievements, where successes and/or failures are experienced, make the students learn a work dynamics that requires them to perform collaborative (non-competitive) activities of appropriate interaction among peers (not individualistic) that will finally determine the causal attribution of the results obtained as success (goal achieved) or failure (goal not achieved); those causing to experience positive emotions such as happiness, joy and optimism for ourselves, our own capacities and other's capacities. Consequently, success experiences in the classroom promote optimism for future learning successes that may involve work with peers. With respect to the latter, several studies emphasize the importance of confidence building and optimism among university students regarding the expectations of their achievements as competencies required and valued by the labor market; hence, promoting them from starting is a value in terms of employability (Maldonado & Yusit, 2013; Peralta, Besio, Rubio, Atabales & Salinas, 2010; Cuadra-Peralta, Fuentes-Soto, Madueño-Soza, Veloso-Besio & Meneses, 2012).

Finally, based on the results, it may be concluded that Problem-Based Learning has a significant effect on Emotional Intelligence among students attending the first semester in a private university. To this extent, implementing this method develops the Emotional Intelligence Components better than the traditional learning method, as expected among students. This study evidence PBL value as a method or strategy in the educational field, not only for the development of curricular capacities associated to Science and Arts teaching (hard skills), but to enhance soft skills or personal capacities associated to employability and coexistence. To this extent, it has been demonstrated that PBL implementation in the integral development, comprehensively enhance Emotional Intelligence among students, besides favoring their employability exclusively: society requires, more than ever, an education to train individuals capable of establishing a positive coexistence with those around at a personal and professional level.

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