

# Super Learning as a Strategy to Improve of Teaching Practice in Higher Education Institutions in Engineering

María E. Ángel Ferrer<sup>1\*</sup>, Waldyr Fong Silva<sup>2</sup>, Remedios Pitre Redondo<sup>1</sup>,  
Meredith Jiménez Cárdenas<sup>3</sup> and David A. Franco Borré<sup>4</sup>

<sup>1</sup>Social Work Program, University of the Guajira, TAMASKAL Research Group, Riohacha-Colombia;  
maria.angelferrer@gmail.com, rpitre@unicartagena.edu.co

<sup>2</sup>Metrology Program, University of Cartagena, GIMIFEC Research Group, Cartagena-Colombia;  
wfongs@unicartagena.edu.co

<sup>3</sup>Social Work Program, University of the Guajira, CRECIENDO Research Group, Riohacha-Colombia;  
meredith@unicartagena.edu.co

<sup>4</sup>System Engineering Program, University of Cartagena, GIMATICA Research Group, Cartagena-Colombia;  
dfrancob@unicartagena.edu.co

## Abstract

**Objective:** To measure the Knowledge in Super learning of the professors of the civil engineering program at the Rafael Urbanite University municipality of Maracaibo-Zulia state (Venezuela). **Methods/Statistical Analysis:** The statistical method used in the present investigation was "Inferential Statistical". The T-Students test, with a significance level of 0.01 ( $\alpha = 1\%$ ), was evaluated to make the comparative analysis between the difference of the arithmetic mean of the group of professors under study. To quantify the Knowledge of Super learning of professors, each scale of the instrument used (achievement test designed by Marzol) was assessed separately and its score corresponds to the sum of each scales that comprise it. This assessment was made before and after applying the professor awareness program (psychoeducational program). **Findings:** The results indicate that there is a statistically significant difference ( $t = 29,580$ ) between the mean of the scores obtained by the groups of professors in study in knowledge of Super learning, before and after applying awareness program to professors. In the same way, the results show that teachers increased their knowledge of Super learning from 3.94 (Low) to 11.4 (medium) points, according to the interpretative classification of Marzol as a result of the psychoeducational program used in sensitization. **Application/Improvements:** By sensitizing university's professors respect benefits of super learning, it is possible that applying this strategy of improving teaching practice at the institutions of engineering education, passive students become active students thus achieving decrease the graduation times of the students. This will allow the new professionals, scientists and innovators of the future to integrate more easily into the economic and technological dynamics of the new century.

**Keywords:** Psychoeducational, Professor, Sensitization, Super Learning

## 1. Introduction

At present the teaching processes in the University must

transcend from the traditional orthodox to the practical and innovative. That is, today's society requires agile and effective academic processes that guarantee their

\*Author for correspondence

effectiveness when the student assumes their cognitive processes. This will enable students to develop metacognitive, instrumental, specific and attitudinal proactive competencies for today's knowledge society<sup>1</sup>.

The teaching-learning process focuses on the student, where work in and out of the classroom (independent work) is the central axis of most university pedagogical models. For this reason, a different strategy is needed that dynamites, motivates and innovates in these processes in such a way that the student can achieve his academic objectives and goals articulated with innovative and self-regulated elements that contribute assertively with the formative<sup>2</sup>. The difficulty of university academic processes lies in the time required for students to approve semester-to-semester credits or subjects that allow them to advance and reach their professional degree. For this reason, it is pertinent to evaluate the possibility of using Super learning as an innovative pedagogical strategy capable of helping to accelerate the academic achievement of university students.

In this order of ideas, we can say that for learning to be carried out effectively, internal biological and psychological conditions must be combined with external ones such as the way a class is organized, its activities, methods, contents as well as the professor-student relationship<sup>3</sup>. To achieve these goals, the super learning assembles these elements in an effective way and allows to accelerate the cognitive processes strengthening the potential of the individual and based on the stimuli of the environment provided by professors.

The super learning arises from the results of the research developed in the 1970s based on how the human brain works more efficiently and in an accelerated way<sup>4</sup>. This method accelerates the release of human potential through positive and creative suggestive processes in the classroom. It relies on the capabilities of the hemispheres of the brain where the right hemisphere is creative, intuitive, holistic and subjective while the left hemisphere is logical, sequential, analytical and objective. The technique consists in stimulating these hemispheres in an efficient way with the aim of maximizing the students' intellect, emotions and abilities in a positive and spontaneous way

without stress or exhaustion, making use of conditioning elements of the medium such as classical music, color and playfulness among others, which lead to the development of cognitive processes at a faster rate<sup>5</sup>.

In <sup>6</sup> define super learning as a holistic method that pursues that body and mind operate in a harmonious and integral way. They consider that the mind can assimilate more quickly if the body operates at a more efficient rate. This will allow, depending on the individual, to take more advantage of his brain capacity allowing him to develop potentialities unknown to himself and strengthen his personality due to the integration of body and mind.

Others authors define it as the accelerated assimilation and processing of knowledge in a fluid and stress-free way. It is a process based on sensory stimuli, where the environment is conditioned by songs, playfulness, role-playing, dramatizations, dialogue and imagination among other elements in a de-stressing and fun way that makes it effective because it involves learning to learn with everything the brain<sup>7</sup>.

The university professor must know the characteristics and conditions necessary that allow to create a new learning environment which must be motivating, inspiring, attractive and striking to awaken the interest - suggestively - of the students so that they engage in a decisive and fun to the educational process. In the present research, Super learning was evaluated as a strategy to improve teaching practice in the engineering faculty of the Rafael Urbanite University using the instrument designed the achievement test and that allows quantifying the indicators: relaxation, breathing, rhythm and tone of voice, mental programming and setting.

Muscle relaxation is a technique that allows us to reach psychosomatic rest, tranquility and normalization of psychological processes and the general state of the body, affected by the daily stress to which we are subjected<sup>8</sup>. The Breathing, allows regularize air inlet and outlet of our lungs, which allows the systematic irrigation of blood to all organs of the body and especially the brain achieving a relaxation of our body<sup>9</sup>. In<sup>6</sup> cite Lozano's study, who concluded in his studies that rhythm and tone of voice allows for memorizing and making learning more effi-

cient, unlike a monotonous rhythm than distracts and impairs learning. The Mental Programming, it is defined as a positive disposition of the brain, which is achieved by following well-defined and structured instructions in a sequential and logical way that allow the brain to perform efficient mental processes capable of developing processes of super learning<sup>10</sup>. The classroom setting is the space that mediates the learning process in the classroom since a pleasant place affects the predisposition to assimilate concepts and definitions unlike to an unpleasant one that interferes by becoming a barrier. For this reason, a calm and comfortable environment constitutes an element that conditions study habits since they generate security and serenity in the student when converting information into knowledge<sup>9</sup>.

## 2. Materials and Methods

### 2.1 Statistical Methods

The statistical method used in the present investigation was “Inferential Statistical” for populations of less than 30 individuals<sup>11</sup>.

### 2.2 Population and Sample Size

The study participants were professors of the fourth semester of the civil engineering program of the Rafael Urbanite University. Of the total, 75% were male and 25% female. The sample that was taken was intentional of which 25 are licensed, 12 specialists, 5 masters and 5 possess the title of doctor for a total of 47 professors.

### 2.3 Variables, Phases and Reliability of the Test

#### 2.3.1 Variables

The variables used in the research were classified into two (2) categories (independent and dependent):

- a. Independent variable: Psychoeducational program
- b. Dependent variable: Knowledge about Super learning.

**Table 1.** Interpretation scale for indicators

Category	Score
High	20.1-30
Medium	10.1-20
Low	0-10

Source: Author (2017)

The dependent variable Knowledge on Super learning was evaluated using the instrument designed<sup>8</sup> which consists of a test of achievement that is formed by 30 dichotomous questions weighted as follows: correct: 1 point; not correct: 0 points) and classified according to the categories of Table 1.

#### 2.3.2 Phases

The project was carried out in four (4) phases: The first one identified the academic program that best fit the conditions of the research applying a previous test related to the knowledge about Super learning to professors. In the second, the instrument designed<sup>8</sup> was applied to the professors of the academic program (Civil Engineering) chosen according to the results of phase 1. In phase 3, the psychoeducational program was applied, structured in strategies and techniques applied to professors in theoretical - practical sessions with the purpose that the professors apply these strategies within their classrooms. It was operationalized through a set of theoretical-practical strategies (workshops) that were applied to the professors so that they knew the potentiality of the method of super learning. In phase 4, the post-test was applied in order to evaluate the results of the workshops applied to the professors so that they knew the techniques of super learning to compare if the independent variable (psycho-educational program) affected the dependent variable (knowledge about super learning).

#### 2.3.3 Reliability of the Test

The instrument was validated by expert judgment in education and to determine the reliability of the test

the internal consistency was determined by the alpha of cronbach which yielded a value of 0.85 indicating a high degree of internal consistency.

### 2.4 Statistical Analysis

The study is longitudinal where the dependent variable Knowledge about Super learning is analyzed in two groups: one before, when applying the pre-test and another after applying the post-test. In the same way it is numerically characterized by the instrument designed<sup>8</sup> and that is quantified according to the scale of scores of Table 2.

### 2.5 Test of Hypothesis

**Hypothesis Null:** There is no significant difference between the average of the scores obtained in knowledge of Super learning before and after applying the psycho-educational program to professors.

**Alternative Hypothesis:** There is a significant difference between the average of the scores obtained in knowledge

of Super learning before and after applying the psycho-educational program to professors.

### 2.6 T-Students Test

T-Students statistical test was used since the study is of longitudinal type and it is expected to determine if there is a significant difference between the means of the two groups, that is, between the group of professors before and after applying the psychoeducational intervention program.

## 3. Results and Discussion

In order to quantify the super learning Knowledge of professors, each scale of the instrument used (test of achievement) was assessed separately and its score corresponds to the sum of each of the scales that comprise it.

The T-Students test, at a level of significance of 0.01 ( $\alpha = 1\%$ ), was evaluated to make the comparative analysis between the difference of means of the professor group with respect to their knowledge of Super learning, before and after the psychoeducational program was

**Table 2.** Score Knowledge about Super learning by categories in the Pretest

Indicator	Pretest		Categoría
	$\bar{X}$	S	
Relaxation	4.03	0.08	Low level of knowledge
Breathing	3.02	0.05	Low level of knowledge
Rhythm and tone of voice	6.64	0.07	Low level of knowledge
Mental programming	3.69	0.09	Low level of knowledge
classroom Setting	2.36	0.07	Low level of knowledge
Total score Super learning Knowledge	3.94		Low level of knowledge
Standard deviation	0.07		

Source: Author (2017)

applied. To corroborate that the data behave normally, the Shapiro-Wilk<sup>11</sup> (<30 individuals) test was applied to the knowledge about Super learning before and after applying the psychoeducational program. This test showed values of  $p > 0.01$ , which indicates that the data of the groups before and after come from a normal distribution. Table 2 shows the results of the variable: Super learning knowledge when applied to professors in the Pre-test.

Table 2 shows the results for the score obtained in the Pre-test for the Knowledge on super learning variable. It is observed that the indicators of the variable: relaxation, breathing, rhythm and tone of voice, mental programming, classroom Setting are classified in the category “low” according to the classification shown in Table 1.

In the same way, a total score of 3.94 obtained by the professors of the civil engineering program of the Rafael Urbanite University in terms of knowledge of super learning is indicated. This means that professors have “low” level of knowledge regarding super learning that they use when teaching their classes in their areas of competence, i.e. the strategies used by them today with their students are almost the same as they received when they graduated

as professionals. In the same way it can be said that professors do not involve innovative and attractive elements that arouse the interest of students.

After the diagnosis was made through the pre-test, the psychoeducational program was applied, structured in strategies and techniques applied to professors in theoretical-practical sessions so that they knew about Super learning and, in the process, used this strategy in their classrooms. The strategy consisted of 5 workshop sessions of 4 hours each for a total of 20 hours.

After the sensitization and socialization of the strategy, the achievement test was again applied achievement test to measure the degree of progress in knowledge of Super learning of the professors of the Civil Engineering program of the Rafael Urbanite University. These results are shown in Table 3.

In Table 3 it can be observed that the indicators of the variable: relaxation, breathing, rhythm and tone of voice, mental programming, and class room setting are classified in the “average” category according to the classification shown in Table 1. In the same way, a total score of 11.4 obtained by the professors of the civil engineering

**Table 3.** Score Knowledge about Super learning by categories in the Pos test

Indicator	Pos test		Categoría
	$\bar{X}$	S	
Relaxation	12.32	0.39	Medium level of knowledge
Breathing	10.25	0.41	Medium level of knowledge
Rhythm and tone of voice	13.31	0.42	Medium level of knowledge
Mental programming	12.08	0.39	Medium level of knowledge
classroom Setting	9.04	0.40	Medium level of knowledge
Total score Super learning Knowledge	11.40		Medium level of knowledge
Standard deviation	0.40		

Source: Author (2017)

**Table 4.** T- Students for related samples

Test	Average	Standard deviation	Standard error	99% Confidencie intervalos	t	gl	Sig. bilateral
Pre test Pos test	15,34	6,870	1,763	2,428	29,580	46	,000

Source: Author (2017)

program of the Rafael Urbanite University in terms of knowledge of Super learning is indicated. This means that once professors were trained in this new strategy, they increased their level of knowledge in Super learning.

The results allow to corroborate the affirmations of Fong<sup>1,2</sup> which states that the teaching processes at the University must transcend from the orthodox and traditional to the practical and innovative. This new dynamic should reduce the permanence of students in university classrooms, allowing them to achieve their professional achievements more quickly. In the same way the results allow to verify the statements of Diaz<sup>3</sup>, which states that learning will be carried out effectively when psychological aspects are combined with external conditions designed by professors such as class organization, activities, methods, techniques, contents and strategies among others. That is to say, the techniques of the Super learning are suitable to promote the capacities not only of the students but also of the professors since transcendental aspects like the relaxation, breathing, mental programming are proper of oriental techniques and serve to potentiate the capacities as much sensorial as extrasensory.

The professors participating in the study will be able to verify in their classrooms, through various strategies, the affirmations<sup>4-7</sup>. Finally, in the Table 4, the T-students test is shown below for the groups studied in this research.

As the bilateral significance of the T test (Table 4) showed a value of  $p=0.00 < 0.01$  the null hypothesis is rejected and the alternative hypothesis is accepted. That is, there is a significant difference between the average of the scores obtained in knowledge of super learning before

and after applying the psychoeducational program to the professors of the Civil Engineering program of the Rafael Urbanite University. In addition, the value  $t = 29,580$  implies a difference between the means of both groups that is significant in terms of statistics. Therefore, the application of the psychoeducational program produced a desired and positive effect in addition to sensitizing the professors about the existence of this new pedagogical strategy which can be used as an innovation in the classrooms<sup>1,2</sup>.

## 4. Conclusion

The Educational processes in 21st century university classrooms must transcend into innovative, motivating processes that fit the results of modern research related to how to learn more quickly, dynamically, cheerfully, and fun. For this reason, teaching should begin to use strategies such as super learning framed in a new pedagogical paradigm and that will transform traditional education through trans-pedagogical education, flexible, recursive and friendly.

There is a statistically significant difference ( $t = 29.580$ ) between the mean of the scores obtained by the groups in knowledge of Super learning before and after applying the psychoeducational program to the professors of the Civil Engineering program at the Rafael Urbanite University.

The results indicate that professors on average increased their knowledge of Super learning from 3.94 (Low) to 11.4 (median) points<sup>8</sup> interpretive classification as a result of the psychoeducational program used which

indicates that if it is possible to sensitize to university professors in this new avant-garde strategy. It is very likely that by sensitizing university professors to the benefits of super learning, a vanguard and futurist dynamic will be generated that will convert passive students into active students, passive professors and traditionalists into more cheerful, fun and effective professors, achieving in this way to decrease the graduation times of the students.

In addition, this new strategy of Super learning would positively impact society as new professionals, scientists and innovators of the future would not take so long to integrate the economic and technological dynamics of the new century.

## 5. Acknowledgement

This document is dedicated to our parents, colleagues and research professors of the Republic of Venezuela, without which it would not have been possible to finalize this investigation.

## 6. References

1. Fong W, Severiche C, Pitre R, Vargas L, Espinosa E. Association between self-regulation of learning, student attitude, provenance and age in engineering students. *Contemporary Engineering Science*. 2017 Sep; 10(14):665–72. Crossref.
2. Fong W, Severiche C, Jaimes J, Marrugo Y, Espinosa E. Cognition and its relationship with endogenous and exogenous factors in engineering students. *International Journal of Applied Engineering Research*. 2017 Sep; 12(17):6929–33.
3. Díaz J. *Teaching and Learning Strategies*. Editions: IICA. San José, Costa Rica; 1982. p. 1–15.
4. Lozanov G. *Suggestology and Outlines of Suggestopedya*. 1st edition. Gordon and Breach Science Publishers: New York; 1978. p. 1–377. Crossref.
5. Vigotsky LS. *Thought and language*. MIT Madras Institute of Technology Press: Cambridge, Massachusetts; 1986. p. 1–342.
6. Ostrander SH, Schroeder L. *Super learning. New methods to boost your memory and improve your professional and sports effectiveness*. Editions Gribaljo: Barcelona, España; 1981.
7. Sambrano J, Steiner A. *Mapas mentales. Agenda para el éxito*. Editorial Alfaomega. Primera edición. México; 2002. p. 1–112
8. Sambrano J. *Super learning. The pleasure of learning to learn*. Editions Alfadil: Caracas, Venezuela; 2003. PMID:12773027
9. Montero J. Conceptual problems in the analysis of human behavior. *Editorial Trillas: México. European Journal of Social Science*. 2011; 18(3):1–19.
10. Levine D, Krehbiel T, Berenson M. *Statistics for administration*. 6th edn. Editions Pearson: México; 2014. p. 1–4. PMID:PMC4175188
11. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951 Sep; 16(3):297–334. Crossref.