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Artículos científicos

El método de cascada en la comprensión de textos académicos en estudiantes universitarios

The Cascade Method in the understanding of academic texts in university students

O Método Cascade na compreensão de textos acadêmicos em estudantes universitários

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Resumen

La presente investigación tuvo como objetivo determinar la influencia del método de cascada en la comprensión de textos académicos en los estudiantes del I ciclo de la Universidad Nacional Mayor de San Marcos, en el periodo 2018-I. Con el anhelo de ejercitar la lectura comprensiva, inferencial y crítica, se emplearon diversas técnicas de estudio, así como el aprendizaje híbrido, colaborativo y holístico. El método de investigación fue de carácter hipotético-deductivo con diseño cuasiexperimental; la muestra fue elegida de manera intencional. Se seleccionaron dos aulas (grupo control y experimental) donde se aplicaron una preprueba y una posprueba. Los resultados fueron analizados estadísticamente indicando una diferencia porcentual significativa respecto a la comprensión de textos en el grupo sometido al tratamiento. Se concluye que el método de cascada es una herramienta metodológica que influye significativamente en la enseñanza y aprendizaje de la comprensión de textos académicos.

Palabras claves: aprendizaje híbrido, modelo holístico, niveles de lectura, técnicas de estudio.

Abstract

The present research aimed to determine the influence of the Cascade Method on the comprehension of academic texts in students of the I cycle of the Universidad Nacional Mayor de San Marcos, in the period 2018 - I. With the desire to exercise comprehensive reading, Inferential and critical, various study techniques were used and the hybrid, collaborative and holistic learning was promoted. The research method is hypothetical - deductive in nature with a quasi-experimental design, the sample was chosen intentionally. Two classrooms were selected; (control and experimental group) both not equivalent with pre-test and post-test. The results were statistically analyzed indicating a significant percentage difference with respect to the comprehension of texts in the group submitted to the treatment. It is concluded that the Cascade Method is a methodological tool that significantly influences the teaching and learning of the comprehension of academic texts.

Keywords: hybrid learning, holistic model, reading levels, study techniques.

Resumo

O objetivo desta pesquisa foi determinar a influência do Método Cascade na compreensão de textos acadêmicos em alunos do 1º ciclo da Universidade Nacional Mayor de San Marcos, no período de 2018 - I. Com o desejo de exercer a leitura integral, Inferencial e crítico, várias técnicas de estudo foram utilizadas e promoveram a aprendizagem híbrida, colaborativa e holística. O método de investigação é hipotético - de natureza dedutiva com um desenho quase experimental, a amostra foi escolhida de forma intencional. Duas salas de aula foram selecionadas; (grupo controle e experimental) ambos não equivalentes com pré-teste e pós-teste. Os resultados foram analisados estatisticamente indicando uma diferença percentual significativa com relação à compreensão dos textos no grupo submetido ao tratamento. Conclui-se que o Método Cascade é uma ferramenta metodológica que influencia significativamente o ensino e a aprendizagem da compreensão de textos acadêmicos.

Palavras-chave: aprendizagem híbrida, modelo holístico, níveis de leitura, técnicas de estudo.

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Introduction

Currently, students entering the higher level have the ability to read aloud, articulate words and incorporate musicality into the language, although they do not perform the most difficult task: unraveling the essence of textual content in order to analyze, argue and criticize it. In this regard, Márquez, Prat and Marba (2008) mention: “In teaching, the difficulty that students have in understanding the text has been detected. This makes them apathetic to the bibliographic revision of academic demand or other useful materials for the formation and intellectual development ”(p. 67).

There are international entities such as Unesco and the Organization for Economic Cooperation and Development (OECD) that ensure quality education. However, Latin American countries are unable to enhance the capacities required by global learning standards (UMC-Minedu, 2018, slide 14). In the specific case of Peru, the country shows some signs of improvement in reading comprehension, as reflected in the latest PISA-2018 evaluation of 15-year-old high school students, where it is shown that 45.7% understand what they read and 54.3% do not. They do, a situation originated by the influence of various factors such as the socio-economic and cultural context, and socio-emotional development (concentration, attention, active listening, motivation, interest in reading, etc.). Given this, Martin (2012) states: “Strengthening the educational service requires applying in the classrooms what is known about how people learn. The contributions of cognitive psychology need to be taken into consideration and applied to classroom learning ”(p. 26).

For this reason, this research proposes the application of the cascade method to promote the understanding of academic texts in students of the I cycle of the Universidad Nacional Mayor de San Marcos, with the purpose of providing a methodological tool that contributes to learning autonomous, collaborative and the acquisition of critical thinking. The research was designed taking various edges, such as reading comprehension techniques (graphic organizers). According to Arévalo (2015), these “are study techniques, shapes, visual representations, strategies that help to better understand a text [for which] it is considered a powerful tool to achieve meaningful learning” (p. 1). Likewise, the hybrid model (blended learning) was used, which focuses on “creating effective or successful experiences on its implementation, and in turn, (...) [considers] the inclusion of mobile education” (Balladares, 2018, p 55). In addition, holistic learning (comprehensive knowledge) was taken into account. In this regard, Gluyas et al., (2015) affirm:

Holistic training requires the integration of knowledge: knowing how to be from self-knowledge, to project it into a knowing knowledge that motivates continuous learning with a view to being reflected in a know-how that impacts the development of the immediate environment, with resonance in the society and humanity (p. 3).

Taking into account the above, it was established as a general objective to determine the influence of the waterfall method in the understanding of academic texts in students of the I cycle of the National University of San Marcos. The specific objectives were the following: a) to establish the influence of the waterfall method in the comprehensive reading of academic texts, b) to determine the influence of the waterfall method in the interpretive reading of academic texts, and c) to establish the influence of the waterfall method in the critical reading of academic texts.

The general hypothesis raised was the following: the application of the waterfall method significantly influences the understanding of academic texts in students of the 1st cycle of the Universidad Nacional Mayor de San Marcos. From this, the following specific hypotheses are broken down: a) the application of the waterfall method significantly influences the comprehensive reading of academic texts. b) the application of the waterfall method significantly influences the interpretive reading of academic texts. c) the application of the waterfall method significantly influences the critical reading of academic texts.

To determine the methodological approach, international antecedents such as Gatty (2008) were taken into account, who in his doctoral thesis demonstrated comprehension strategies favor the identification of the main ideas of the study texts, which promotes the motivation of the student. pupil.

Regarding national antecedents, Enciso (2017) points out that there were significant differences in the level of reading comprehension of a group of students who received the “direct teaching strategy” treatment compared to a group to which said treatment was not applied. The researcher concluded that the referred strategy improved (statistically, pedagogically and didactically) the reading comprehension of the university students.

Currently, professors have in their hands the titanic task of training students who are capable of understanding texts of various kinds and who become aware that reading is the only way to build more complex knowledge in the society of science and technology.

Justification

The present research justifies its execution from a theoretical and practical perspective that arises from empirical reality with the aim of trying to penetrate the student's mental scheme the importance of using strategies to achieve an adequate understanding of academic texts and to awaken his taste in him. by reading various documents (scientific, humanistic, technological). To do this, an attempt is made to associate content analysis with real life problems to distinguish what is relevant from what is irrelevant in each situation of the political, economic and social context. In this regard, Royce (1997) points out:

The waterfall method, as a sequential development process that is conceived as a set of stages, which when executed in an orderly manner, by the position occupied by the different phases, placed one on top of another and following an execution flow from top to bottom. down like a waterfall. It is based on having a strong overview planned carefully in the project, the date, the budget and the implementation of the entire system (p. 7).

If what is stipulated is rigorously taken - without altering the order - then the reconstruction of the context of the discourse and the cultural universe that the reader intends to update through his words will place it on a sociocultural map that will contain all the data on the subject treated in the text, as well as the different points of view, the previous speeches that have been disseminated, the interests of the different interlocutors, etc. Although it is not always easy to separate them, we can distinguish the following parameters of discourse situations: "Identify the purpose, recognize the content, identify the voices, detect the positioning" (Cassany, 2007, p. 113).

The cascade method takes as a resource hybrid learning, a flexible educational model that adjusts to modern times. Likewise, it encourages collaborative learning to exchange information in a certain work team, enhancing assertive communication, active listening, tolerance to achieve raising soft skills and, finally, holistic learning in order to consign a comprehensive education in the student. On this, Delors (1996) states that education must be comprehensive to cover all aspects of life, with scientific knowledge (learn to know), professional skills (learn to do), human values and principles (learn to be), and the exercise of civic responsibility (learning to live together) (p.91-13) If you work in an orderly, efficient and effective manner, the process

of applying the waterfall method will provide the desired positive results, that is, promoting meaningful learning of college students.

Contribution to research

The contribution of the research is the application and elaboration of the cascade method according to the pedagogical and technological advance (active methods). For this, it has been considered that "the selection of a development methodology varies depending on the objective, time and resources that the team has at the time of treatment" (Prieto, 2015, p. 23). The design implies that students receive training, which begins with basic training (comprehensive reading), through intermediate training (inferential reading) until reaching more complex training (critical reading). This cascade training program must be implemented in a time limit, which consists of a system of order, time and plausible needs according to the reality of the students. In addition, the knowledge levels of the students are taken into account, as well as their learning rhythms. According to Royce (1997), "the benefits of this methodology arise when there are no immediate implementation dates, [so] there is an appropriate time to develop each phase" (p. 7). For this model to have a lower risk index it is necessary that the requirements are very clear and have been officially established in the first part of the project.

Cascade training is based on training an advanced group of students, who will transfer their knowledge to a second group and so on. If each teaching event operates on one student, for every five participants by the third round it is theoretically possible that twenty students have been reached. For the effectiveness of the process, it is necessary for the professor to carefully select the resources and materials (texts, books, reprints, brochures, blackboard, multimedia, etc.). Student leaders must possess competencies such as assertive communication, empathy, tolerance, teamwork, a desire to learn, and transmit knowledge to their peers. Furthermore, it is anticipated that not everyone learns in the same way and that there may be students with limited educational abilities.

The cascade method is a methodological approach that rigorously orders the stages of the process for the development of teaching-learning of the reading of a text in such a way that the beginning of each stage must wait for the completion of the previous one. In other words, it must be ensured that each event, including the first, is conducted in circumstances similar to those faced by those at the bottom of the waterfall. For this reason, the evaluation is formative and continuous from the

beginning of the process to the end (in a systematic way) to prove that the learners really understand, infer and criticize the various academic texts with logical reasoning.

It is important to bear in mind that when working with the waterfall method in understanding academic texts, the professor in charge must act with responsibility and motivation to create stimulating learning situations; Likewise, it must be reflective in order to promote feedback on the successes and failures of the learners.

Methodology

The research design had a quantitative approach, based on the epistemological principles of the empirical-analytical paradigm, which is why it is applied-technological. Likewise, it was a quasi-experimental investigation, with two non-equivalent groups with pre-test, post-test and intact groups (control and experimental group). The scheme - according to Sánchez and Reyes (2015) - is as follows:

$$\frac{GE O_1 X O_2}{GC O_3 X O_4}$$

As:

GE = Experimental group

CG = Control group

X = Independent or experimental variable

O1 = Pretest experimental group

O3 = Pretest control group

O2 = Post test experimental group

O4 = Posttest control group

The population consisted of 200 students from the 1st cycle of the area of Economic Sciences and Management of the Universidad Nacional Mayor de San Marcos, enrolled in the year 2018-I, morning shift. The sample was chosen intentionally: section A (experimental group) made up of 30 students, and section B (control group) made up of 30 students.

As a collection technique, a survey was used in order to verify successes and mistakes in textual comprehension. The instrument used was a reading comprehension test, adapted to the solved exercises of the Universidad Nacional Mayor de San Marcos at the following levels: comprehensive, interpretive and critical reading. The test consisted of 5 fragments with 20 questions, and the form of evaluation was multiple

selection. The instrument was evaluated by a panel of five doctors with extensive experience in the field of educational research.

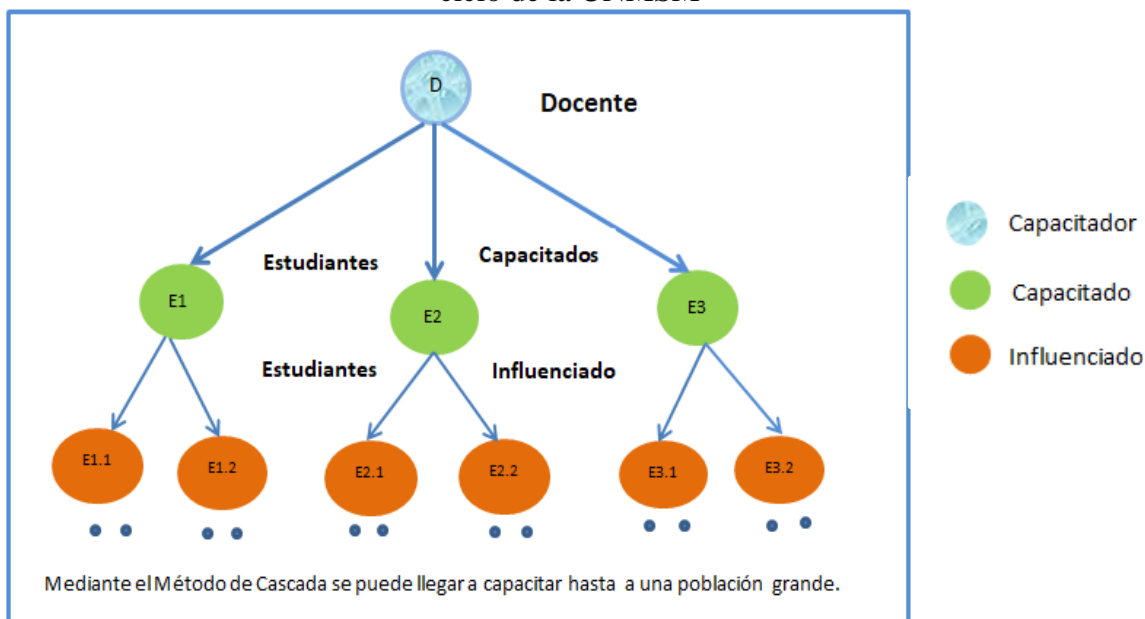
The data analysis was carried out with the purpose of weighing the degree of effectiveness of the waterfall method in the comprehension of academic texts in students of the I cycle of the Universidad Nacional Mayor de San Marcos. The elaboration, execution and evaluation of the cascade method in both groups was in charge of the researcher. The selection of the samples was done intentionally and under similar conditions in both classrooms. The only variation was in the application of the method, which was 10 academic months, with students whose ages ranged from 18 to 21 years.

The percentage distribution made it possible to objectively examine, compare and translate the results of the entry and exit tests of both groups (control and experimental). Hypothesis testing was evaluated using descriptive statistics (arithmetic mean, variance, standard standard deviation, coefficient of variation). To test the specific hypotheses, the U Mann-Whitney statistic was used for independent samples. Pretest and posttest differences were analyzed with inferential statistics, Student's t test and the use of the SPSS program.

Results

The application of the waterfall method through a simulation is a complete process carried out in miniature with respect to the execution of the method in text compression, for which the b-learning method (traditional and online learning) was used as a resource. This can vary depending on the time scale and the problems of each architectural step.

Figura 1. Estructura arquitectónica de capacitación en cascada a los estudiantes del I ciclo de la UNMSM



Nota. El gráfico representa el entrenamiento de cascada que está basado en capacitar a un grupo avanzado de estudiantes, quienes transfirieren sus conocimientos y habilidades a un segundo grupo, éstos a un tercer grupo, y así sucesivamente.

Fuente: Elaboración propia

Tabla 1. Resultado de la prueba de entrada del grupo control en comprensión de textos aplicado a los estudiantes del I Ciclo de la UNMSM

Prueba de entrada del grupo control														
07	07	07	07	08	08	08	09	09	09	09	09	10	10	10
10	10	11	11	11	11	12	12	12	12	12	13	13	14	14

Fuente: Elaboración propia

Tabla 2. Resultado de la prueba de entrada del grupo experimental en comprensión de textos aplicado a los estudiantes del I Ciclo de la UNMSM

Prueba de entrada del grupo experimental														
07	07	07	07	08	08	08	08	08	09	09	09	09	09	10
10	10	10	10	10	11	11	11	11	12	12	12	13	13	14

Nota. En un rango de calificación de 00 a 20 puntos, se puede decir que la nota promedio en la prueba de entrada del grupo control fue de 10.16, mientras que la del grupo experimental fue de 9.76.

Fuente: Elaboración propia

Tabla 3. Resultado de la prueba de salida del grupo control en comprensión de textos aplicado a los estudiantes del I Ciclo de la UNMSM

Prueba de salida del grupo control														
08	08	08	08	09	09	09	09	10	10	10	10	10	11	11
11	11	11	12	12	12	12	13	13	13	14	14	15	15	16

Fuente: Elaboración propia

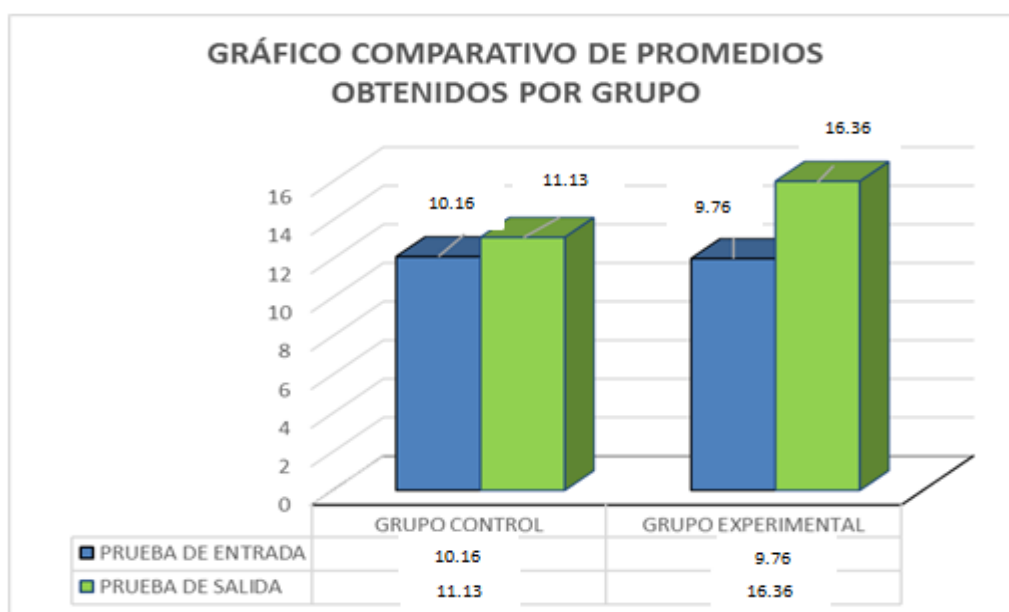
Tabla 4. Resultado de la prueba de salida del grupo experimental en comprensión de textos aplicado a los estudiantes del I Ciclo de la UNMSM

Prueba de salida del grupo experimental														
14	14	15	15	15	15	15	15	15	16	16	16	16	16	16
16	16	17	17	17	17	17	17	18	18	18	18	18	19	19

Nota. A partir de las cifras enseñadas en la tabla 3 y la tabla 4, se puede afirmar que la nota promedio en la prueba de salida del grupo control fue de 11.13, mientras que la del grupo experimental fue de 16.36.

Fuente: Elaboración propia

Figura 2. Comparación de resultados entre la evaluación de entrada y salida de ambos grupos de estudio en la comprensión de textos aplicados a los estudiantes del I Ciclo de la UNMSM

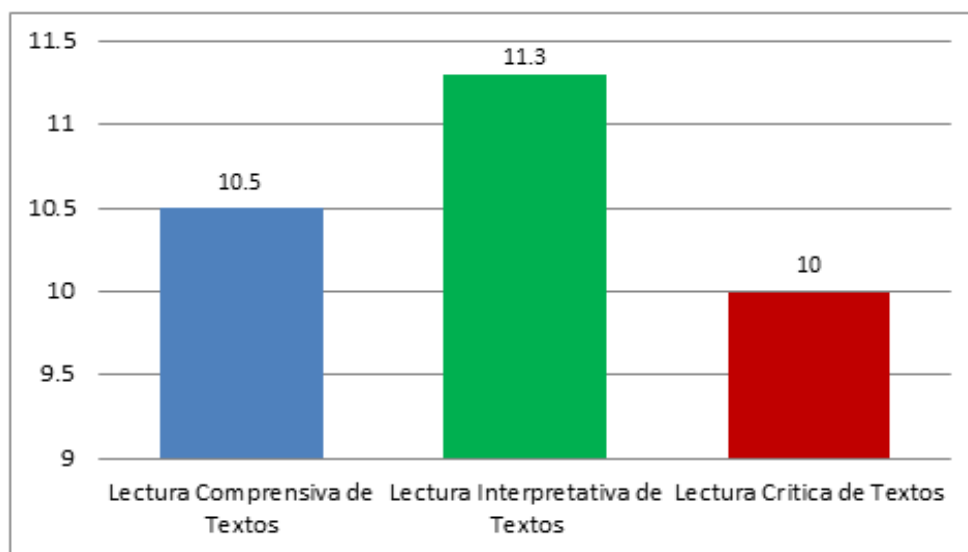


Nota. En la figura anterior se evidencia que el método de cascada contribuyó a un aumento significativo en la comprensión de textos académicos en el grupo experimental, que se evidencia en la prueba de entrada donde se registró un promedio de 9.76

(regular), mientras que en la prueba de salida se obtuvo un promedio de 16.36 (excelente). En cambio, en el grupo control no se observó una mejora significativa, como se evidencia en la prueba de entrada el promedio fue de 10.16 y en la prueba de salida fue de 11.13.

Fuente: Elaboración propia

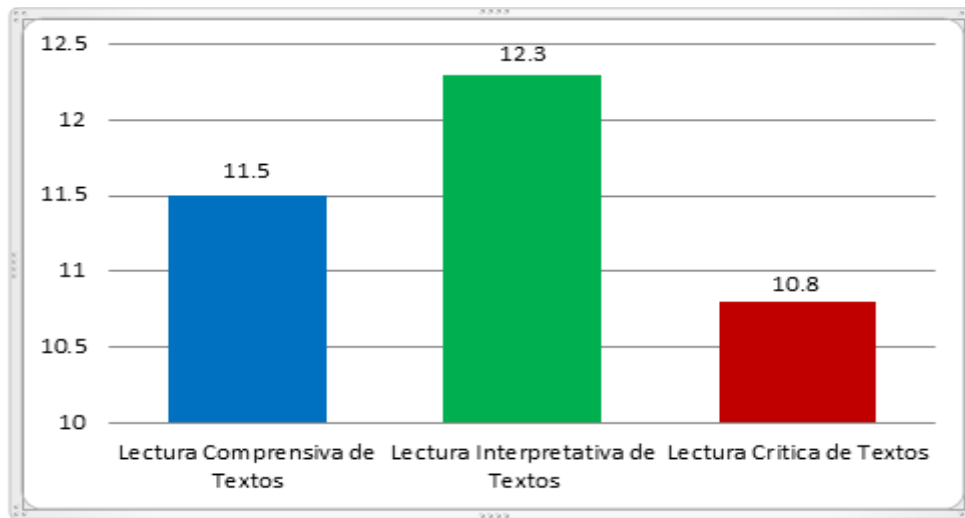
Figura 3. Promedio de la prueba de entrada del grupo control en los niveles de comprensión de textos aplicados a los estudiantes del I Ciclo de la UNMSM



Nota. En la figura anterior se aprecia el promedio de la prueba de entrada del grupo control en los niveles de: lectura comprensiva de textos fue 10.5, en lectura interpretativa 11.3 y en lectura crítica 10.

Fuente: Elaboración propia

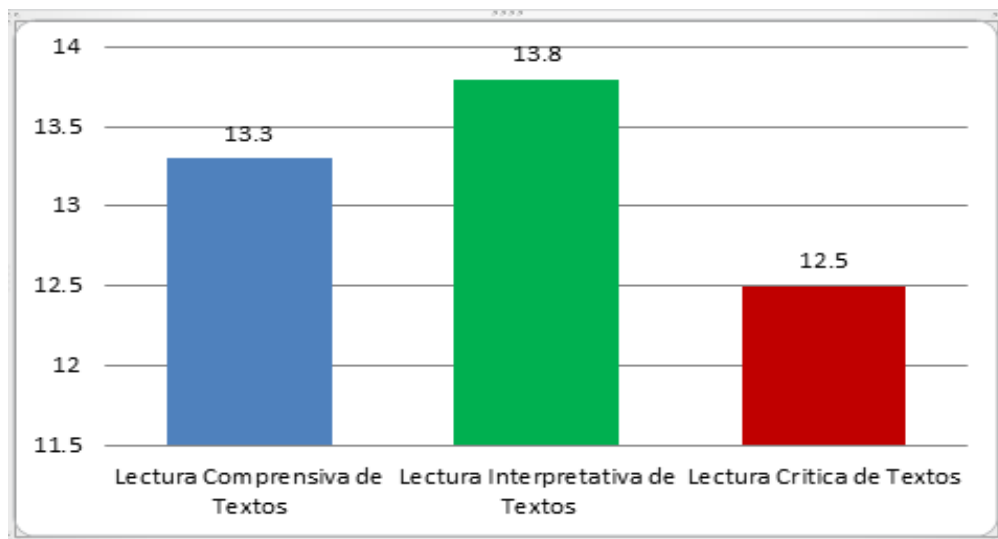
Figura 4. Promedio de la prueba de salida del grupo control en los niveles de comprensión de textos aplicados a los estudiantes del I Ciclo de la UNMSM



Nota. En la figura anterior se muestra el promedio de la prueba de salida del grupo control en los niveles de: lectura comprensiva de textos fue 11.5, en lectura interpretativa 12.3 y en lectura crítica 10.8.

Fuente: Elaboración propia

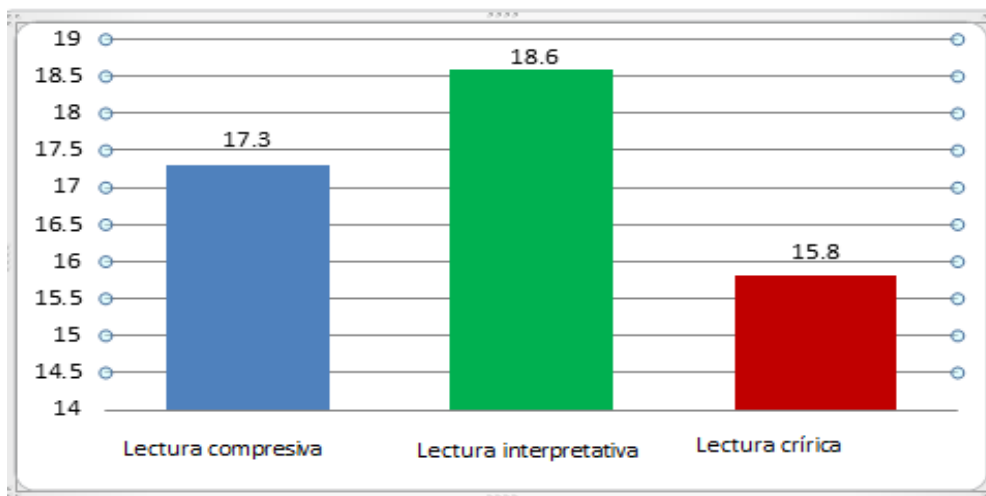
Figura 5. Promedio de la prueba de entrada del grupo experimental en los niveles de comprensión de textos aplicados a los estudiantes del I Ciclo de la UNMSM



Nota. En la figura anterior se observa el promedio de la prueba de entrada del grupo experimental en los niveles de: lectura comprensiva de textos fue 13.3, en lectura interpretativa 13.8 y en lectura crítica 12.5.

Fuente: Elaboración propia

Figura 6. Promedio de la prueba de salida del grupo experimental en los niveles de comprensión de textos aplicados a los estudiantes del I Ciclo de la UNMSM



Nota. En la figura anterior se aprecia el promedio de la prueba de salida del grupo experimental en los niveles de: lectura comprensiva de textos fue 17.3, en la lectura interpretativa 18.6 y en la lectura crítica 15.8

Fuente: Elaboración propia

Now, the statistical method used to test the hypothesis was the comparison of means with the T-Student statistic for independent samples. This is a test that allows us to measure not only quantitative aspects of the responses obtained from the administered instrument, but also the influence that exists of one of the study variables with respect to the other.

In the comparison of means in the data processing that was carried out with the SPSS statistical software, the following were considered: confidence level (95%), significance level ($\alpha = 0.05 = 5\%$). The calculated T result was obtained, equal to -7,482. Also p-value = 0.000, being less than 0.05 ($0.00 < 0.05$); Based on these results, it is affirmed that there are significant differences between the evaluations of the control group and the experimental group in the exit test. With $GL = n_1 + n_2 - 2 = 30 + 30 - 2 = 58$ degrees of freedom and a significance level of 0.05, the t-critical value has been located in the T-Student table, whose value is equal to $\pm 2,002$. As the calculated T-value is -7.482 which is less than the critical T-value (-2.002), with 58 degrees of freedom, this is located in the rejection zone; therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

The statistical method to test specific hypothesis 1 was used to compare the medians with the U Mann-Whitney statistic, where the value obtained was 181,000, and that of Z was equal to -4,110, which was less than the value of Z-critical (-1.699) and

this was located in the H_0 rejection zone; therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

The statistical method to verify specific hypothesis 2 was the comparison of medians with the U Mann-Whitney statistic, where the value obtained was 252,000 and that of Z was equal to -3,134, which is less than the value of Z- critical (-1.960), which is located in the H_0 rejection zone. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

The statistical method to check specific hypothesis 3 was the comparison of medians with the U Mann-Whitney statistic, where the value obtained was 229,000 and that of Z was equal to -3,696, which is less than the value of Z- critical (-1.960), which is located in the H_0 rejection zone. Therefore, the null hypothesis is rejected and the alternate hypothesis is accepted.

Discussion

The results of the present investigation demonstrate a significant influence of the cascade method on the comprehension of academic texts in the students of the 1st cycle of the Universidad Nacional Mayor de San Marcos. This can be affirmed because the students in the experimental group demonstrated greater efficiency in understanding academic texts at the end of the treatment they were subjected to, in contrast to those in the control group, who continued with traditional teaching. It is observed that the average of the entry test (pretest) of the experimental group was 9.76 (regular) and the average of the exit test (post-test) was 16.36 (excellent).

Regarding the comprehensive reading dimension, the results show the effectiveness of the cascade method in the experimental group, since in the entry test the average was 13.5, while in the exit test it was 16.5. In other words, the students subjected to this method achieved a higher level of textual comprehension.

Likewise, regarding the interpretive reading dimension, the data show the effectiveness of the cascade method in the experimental group, since the average in the entry test was 14.1 and the average in the exit test was 17.1.

Regarding the critical reading dimension, the effectiveness of the cascade method is also appreciated in the experimental group, since the average in the entry test was 11.4 and in the exit test it was 14.4. This means that the students reached higher levels in the development of critical thinking and independence of judgment.

Therefore, in general it can be stated that the cascade method is useful as a methodological tool to improve meaningful learning in the understanding of academic texts in students of the I cycle of the Universidad Nacional Mayor de San Marcos.

Study limitations

- a) Lack of background information (thesis, specialized journals, scientific texts, etc.) on the implementation of the waterfall method to promote the understanding of academic texts in undergraduate university students, especially based on current pedagogical approaches (eg. , hybrid and holistic teaching, and experimental methodology).
- b) Time, since students who attend the university do not have hours available to dedicate specifically to reading. In fact, within the study plan there are no subjects or workshops dedicated to promoting such actions. Therefore, taking into account the insufficient time for the application of the cascade method, the use of hybrid learning was taken as a measure, which allowed to comply with the programmed.
- c) Cognitive and motivational process: This is related to basic psychology where imperfect abilities such as comprehension, attention, concentration, demotivation or simply emotional problems of the age of the students are manifested (Fuenmayor and Villasmil, 2008).
- d) Lack of standardized or validated tests to measure the comprehension of academic texts in university students.

Strengths

The work with the waterfall method to promote the comprehension of texts was assumed with responsibility, motivation and time necessary from the moment of planning. The purpose was to create spaces where learning was stimulating and reflective, and where feedback on the successes and failures of the students was encouraged, who at the same time were committed to the cognitive, affective and emotional teaching-learning of their peers.

Difficulties

University professors face a series of problems that affect teaching praxis, which is why some questions arise such as the following: what will be the cause of the ineffectiveness of university apprentices in understanding texts? How could professors mitigate Ineffectiveness in text comprehension? What methods or strategies can be



applied to overcome the deficiency in text comprehension? What strategy would be effective to achieve a high degree of competence in text comprehension? Answering these questions is a complex task.

According to Roa (2013), “teachers from the beginning and during the student's course in the classrooms, must try for and take care of generating actions aimed at students learning strategies, comprehension techniques, discrimination and self-regulation, based on different types of texts and communicative situations ”(p. 82). In this sense, there is a range of factors that can contribute to the improvement of the academic training of university entrants, for which one should not fall into the vicious circle of blaming others (educational policy, teachers of regular basic education or the national curriculum). In other words, everyone must assume responsibility for it regardless of the educational level in which they are working.

Conclusions

In the present study, it was demonstrated - in terms of the general hypothesis - that the cascade method significantly influences the comprehension of academic texts at all levels (comprehensive, interpretive and critical reading) in students of the 1st cycle of the National University Mayor of San Marcos.

Therefore, it can be affirmed that the results are encouraging regarding the use of this strategy, which is supported by the use of a range of study techniques that professors can creatively adapt according to the work context and the particularities of the students. .

The cascade method is a methodological tool that favors university students, as it boosts their ability to interpret textual content, develops their oral expression with critical thinking and logical reasoning, induces them to write various types of texts and encourages their self-realization. In the case of the teacher, it helps him fulfill his role as a guide and makes him aware of academic problems and the promotion of soft skills.

Finally, and to achieve more solid results, it is worth emphasizing that reading and writing are knowledge that must be taught in all subjects, and not only in language or communication. In short, reading and writing are essential for individuals to build and appropriate the vast information that exists in the world today.

Future lines of research

As future lines of research, reading workshops based on the waterfall method can be included in the study plans in order to promote meaningful learning based on competitiveness, meritocracy, systemic graduation of knowledge and planning of motivational activities. For this, however, it is necessary to take as a bastion hybrid and collaborative learning, and the holistic model.

Finally, it should be noted that to get the most out of the waterfall method, teachers must be trained and made aware of the use of techniques and instruments that adjust to the new demands of the globalized world.

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