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Active Learning: A Didactic Proposal to Regulate the Cognitive Attention of Students at the Upper Basic Level

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Abstract: The objective of this study was to design a didactic proposal based on active learning to regulate the cognitive attention of students of higher basic education in an educational institution in Guayaquil. A quantitative methodology was used, with a quasi-experimental approach, using two comparative groups, control and experimental and a longitudinal design. The population consisted of 125 students, of which a sample of 90 was intentionally selected. Data collection was carried out through surveys, validated by experts. The results showed significant improvements in the experimental group in all dimensions of cognitive attention, with 88.9% of higher level in sustained attention and 97.8% in concentration after the intervention. In contrast, the control group did not show significant progress. It is concluded that active learning strategies have a positive.

Keywords: cognitive attention, active learning, basic education, didactic strategies.

Introduction and background of the study

Attention is currently one of the most prevalent problems in the classroom that teachers face during the teaching-learning process. Considering this context, several studies have been carried out and shown that attention acts as a fundamental cognitive filter that allows selecting and assigning mental resources to process information, depending on the level of difficulty or complexity of the task (Wicken, 2021). In this sense, attention directly influences the way in which the student engages, understands and demonstrates interest in the content presented.

Despite the efforts made, the constant influence of digital resources, the persistence of traditionalist teaching models and the lack of motivation in the classroom cause students to divert their attention to contexts that they perceive as more stimulating, as observed in students at the upper basic level in an educational institution in the city of Guayaquil. This disconnection with the educational process translates into a progressive loss of interest in studies, significant gaps in knowledge and even, in some cases, school dropout.

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For Krauzlis et al. (2023) Attention is a set of dynamic brain states that evolve over time, allowing appropriate behaviors to be selected according to the demands of the physical, psychological, and emotional environment. For their part, Guedj et al. (2023) attention is the cognitive process responsible for maintaining focus on information that is useful and relevant, allowing the selection, organization, and construction of the knowledge necessary to achieve personal and academic goals.

In this context, it is necessary to understand attention not as a single process, but as a complex phenomenon that encompasses various dimensions within learning. According to Eriksen et al. (2022), attention can be classified into three fundamental components: sustained attention, selective attention, and concentration. For Ko et al. (2017) sustained attention is a process that involves the ability to maintain continuous and persistent focus on a task, dedicating constant mental effort for prolonged periods in the search for an answer or solution; On the other hand, selective attention is a cognitive process that allows the brain to filter and process relevant information captured by the senses, regulating neural communication through specific functional connections that prioritize certain stimuli over others (Pagnotta et al., 2022); Caamaño et al. (2021) Concentration is defined as the ability to maintain precise and constant attention on a specific task, avoiding distractions and allowing for a deep focus on the activity being performed.

Addressing the types of attention is essential to understand in depth how this cognitive process works. It is necessary to consider each of its dimensions in a differentiated way, since each one plays a specific role in the processing of information. When its principles and functions are not recognized, it is difficult to identify what type of care is involved in a given activity. Therefore, understanding these processes allows us to apply timely and appropriate pedagogical strategies, favoring the development of significant learning. In this sense, active learning offers an ideal methodological approach, since it proposes dynamic and participatory activities that simultaneously stimulate different forms of attention, strengthening students' ability to focus, select and sustain attention during the development of school tasks.

Therefore, attention is understood as a key dimension of cognition that needs to be stimulated and strengthened through appropriate didactic strategies, in order to be sustained over time when the task demands it. In the field of education, enhancing attention is not only desirable, but necessary, since it is a fundamental means to promote meaningful and lasting learning.

Faced with this problem, it is essential to explore alternative methodologies that are stimulating and interesting, capable of keeping students active, participative and motivated during the development of classes. The purpose of active learning is to promote the development of critical thinking through strategies such as collaborative work and problem solving, encouraging students to reflect, analyze and apply their knowledge in real contexts (Dogani, 2023).

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Various studies have shown that active learning has significantly transformed contemporary education, evidencing its positive impact on the teaching-learning process. This was evidenced by Doolittle et al. (2023) by affirming that active learning must be designed according to the student, considering their needs, interests and the available resources that favor the development of higher-order thinking. That is, it must generate meaningful experiences that awaken curiosity, stimulate deep reasoning and motivate the student to go beyond the informative to build authentic and lasting learning.

The aim is for the student to move away from a passive stance focused solely on the reception of content, and to become an active agent of their own learning, capable of finding meaning in the acquisition of knowledge. This is supported by Mystakisdis (2021) who maintains that significant learning has as its purpose the development of higher-order thinking through the active participation of the student. This type of learning promotes inquiry, critical and creative thinking, problem-solving, and the strengthening of metacognitive skills.

In view of the above, it is essential that teachers resort to activities that allow active learning to be implemented as a way to achieve meaningful, lasting and applicable learning throughout life, even beyond the school stage. Through this methodology, in addition, the student's cognitive processes are stimulated, training their brain to critically assess and process any type of knowledge they receive.

Nguyen et al. (2021), they developed a series of concepts in which they detail different types of active learning strategies, with special emphasis on explanation, facilitation and exploration strategies, which allow clarifying the purposes of learning and capturing the interest of students. In particular, and taking as a reference the empirical practice in the classroom, facilitation strategies seek to promote active participation and maintain the dynamics of the group once the activity has begun. Suggested concrete actions include touring the classroom, observing students' work, and directly motivating them to participate, thus fostering a continuous and interactive learning environment.

This type of learning follows the line of constructivism and what was stated by Vygotsky 1978 who emphasizes that knowledge is edified when it comes into contact with the environment that surrounds it and not with a simple repetition of content (Wibowo et al., 2025). In this sense, the present study is especially pertinent, as it contributes to recognizing and analyzing the factors that favor students to maintain their interest and give meaning to the learning process.

In view of the above, the research question arises: How does the implementation of active learning strategies affect the regulation of cognitive attention of students at the upper basic level in an educational institution? And the general objective is to design a didactic proposal based on active learning to regulate the cognitive attention of students at the upper basic level in an educational institution.

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Materials and methods

This research is classified as applied, since it is based on theoretical and practical foundations to address a specific problem: difficulties related to cognitive attention in students of higher basic education. A quantitative approach was adopted, based on the collection and analysis of statistical data, which allowed the hypotheses formulated regarding the influence of active learning on students' attention to be tested.

The methodological design was quasi-experimental, using two comparative groups: one control and the other experimental. The study had a descriptive scope, focused on characterizing how the implementation of active learning contributes to regulating cognitive attention. Likewise, a longitudinal design was applied, which allowed the changes in the dependent variable to be observed over a given period.

For data collection, a structured survey was applied to the representative sample of students in higher basic education. The survey included questions aimed at measuring the dimensions of the dependent variable and allowed quantifiable information to be obtained for statistical analysis. The application was carried out in two moments: before and after the intervention with active learning, which facilitated the comparative analysis of the impact of the program.

The independent variable, active learning, was defined as the conscious involvement of the student in his or her own training process, combining previous knowledge with new experiences. To measure it, a questionnaire structured in three dimensions was developed; behavioral, cognitive, and emotional, with specific indicators and items assessed by means of an ordinal scale that was detailed as follows: never, sometimes, always.

On the other hand, the dependent variable, cognitive attention, was understood as the psychological process that allows selecting and maintaining mental focus on relevant stimuli. This was evaluated using an instrument composed of three dimensions: selective attention, sustained attention and concentration, whose items were also rated on an ordinal scale and grouped into low, medium and high levels.

Population and sample

The study population was made up of 125 students distributed in three parallels, from which a sample of 90 students belonging to parallels A and B was intentionally selected, identified as those with the greatest attention difficulties. This selection was the result of intentional non-probabilistic sampling, aimed at the most relevant groups for the study.

Structured observation was used as the main technique, complemented by Likert-type questionnaires validated by experts in the area, which allowed an accurate measurement of both variables. The reliability of the instruments was checked using Cronbach's alpha coefficient, obtaining a value of 0.89, which reflects a high internal consistency.

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Regarding ethical principles, respect for the rights of the participants was ensured, guaranteeing their anonymity, institutional confidentiality and transparency throughout the research process.

Proposal

The didactic proposal presented in this research consists of an Active Learning program designed to regulate the cognitive attention of students of the higher level of an educational institution in the city of Guayaquil. The programme was developed during 15 structured sessions, of approximately 60 minutes each, and is based on active methodologies such as project-based learning (PBL), cooperative learning, and the use of ICT.

Each session is made up of three moments: beginning, development and closing. The activities are related to the interests of the students and allow them to strengthen their concentration, self-regulation, teamwork and cognitive skills.

Prior to the development of the program, an initial diagnosis was made through surveys, interviews, and direct observation to identify the level of attention, motivation, and academic performance. During the process, a continuous formative evaluation was applied, and at the end of the program a final evaluation was implemented, using measurement as observation scales, rubrics and comparative analysis of academic results.

The program is theoretically supported by Piaget and Vygotsky's constructivism, as well as Ausubel's meaningful learning, ensuring a student-centered and contextualized approach. The main beneficiaries were the students, who will improve their attention and academic performance, and the teachers, who had new methodological tools.

Results

Once the active learning proposal had been applied in the experimental group and the information had been collected through the instruments validated by experts, the data was analyzed in order to test the hypotheses raised. The results obtained allowed to identify significant differences in the levels of cognitive attention between the study groups, which evidences the positive impact of the pedagogical intervention. The main results are presented below, organized according to the dimensions of the variables analyzed, in order to offer a detailed view of the students' behavior before and after the implementation of the methodological proposal.

Table 1. Results after the implementation of the active learning proposal

RANGES				
Variable	Groups	Number of students	Average	Sum of ranks
	Control	45	29,42	1324,00

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Cognitive care	Experimental	45	61,58	2771,00
	Total	90		

Source: Prepared by Vera (2025)

Table 1 shows that 61.58% of the students in the experimental group achieved a high level of cognitive attention, in contrast to the 29.42% recorded in the control group. These results show a positive impact of the methodological proposal, which confirms the fulfillment of the objective set in the research.

Table 2: Constation of the general hypothesis

	Variable Attention
U de Mann-Whitney	289,000
W for Wilcoxon	1324,000
Z	-5,849
Asymptotic sig. (bilateral)	0,000

Source: Prepared by Vera (2025)

Table 2 refers to the results of the Mann-Whitney U test, detailing a significance value of 0.000, less than $p < 0.05$, which shows significant differences between the experimental group and the control group, which allows the null hypothesis to be rejected and the alternative hypothesis to be accepted.

Frequencies of results according to study dimensions

In this section, the results obtained according to the study dimensions reveal a significant improvement in the experimental group compared to the control group. These findings confirm that active learning had a positive impact on each of the dimensions evaluated, thus strengthening students' cognitive attention.

Table 3: Results Obtained From The Frequency Of Response In The Pretest Of The Control Group. SELECTIVE ATTENTION DIMENSION

	Frequency	Percentage
Inferior	1	2,2
Middle	15	33,3
Superior	30	66,7
Total	45	100,0

Source: Prepared by Vera (2025)

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Table 3 shows the results of the pre-test applied to the control group indicate that 66.7% of the students were placed at the higher level of cognitive attention, while 33.3% reached a medium level and only 2.2% were positioned at the lower level. These data serve as a starting point to compare with subsequent results and evaluate the impact of the proposal on the experimental group.

Table 4: Results obtained from the frequency of response in the pretest of the experimental group. SELECTIVE ATTENTION DIMENSION

	Frequency	Percentage
Inferior	1	2,2
Middle	20	44,4
Superior	24	53,3
Total	45	100,0

Source: Prepared by Vera (2025)

Table 4 shows the results obtained in the pre-test of the experimental group, which show that 53.3% of the students were placed at a higher level of selective attention, while 44.4% reached a medium level and only 2.2% were at the lower level. This distribution shows that, before applying the pedagogical proposal based on active learning, more than half of the students had an adequate level of attention, and a considerable proportion still required strengthening.

Table 5: Results obtained from the post-test response frequency of the control group. SELECTIVE ATTENTION DIMENSION

	Frequency	Percentage
Inferior	3	6,7
Middle	25	55,6
Superior	17	37,8
Total	45	100,0

Source: Prepared by Vera (2025)

Table 5 shows the results of the post-test of the control group in the dimension of selective attention. These reveal that 55.6% of the students were placed at an intermediate level, 37.8% reached a higher level and only 6.7% remained at the lower level. This distribution indicates that, without pedagogical intervention based on active learning, most students maintained an intermediate performance in this dimension, with limited improvement compared to previous levels.

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Table 6: Results obtained from the frequency of response in the post-test of the experimental group. SELECTIVE ATTENTION DIMENSION

	Frequency	Percentage
Inferior	3	6,7
Middle	25	55,6
Superior	17	37,8
Total	45	100,0

Source: Prepared by Vera (2025)

Table 6 shows that the posttest applied to the experimental group in the dimension of selective attention, obtained that 55.6% of the students were located at the middle level, 37.8% at the higher level and only 6.7% at the lower level. Although this distribution is identical to that of the control group, the trend proposes that the pedagogical proposal based on active learning generated stability in the medium and high levels of selective attention, which is interpreted as a positive contribution to the students' concentration process.

Table 7: Results obtained from the frequency of response in the pretest of the control group. SUSTAINED ATTENTION DIMENSION

	Frequency	Percentage
Inferior	2	4,4
Middle	8	17,8
Superior	35	77,8
Total	45	100,0

Source: Prepared by Vera (2025)

Table 7 presents the results of the pre-test corresponding to the control group, of the sustained attention dimension. It shows that 77.8% of the students were placed at the higher level, while 17.8% reached an intermediate level and 4.4% were at the lower level. These results reflect that, before the proposal, a considerable majority of the students in the control group showed a high capacity to maintain attention for prolonged periods.

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Table 8: Results obtained from the frequency of response in the pretest of the experimental group. SUSTAINED ATTENTION DIMENSION

	Frequency	Percentage
Inferior	1	2,2
Middle	21	46,7
Superior	23	51,1
Total	45	100,0

Source: Prepared by Vera (2025)

Table 8 refers to the results of the pre-test of the experimental group, in relation to the dimension of sustained attention. In this sense, it was observed that 51.1% of the students reached a higher level, while 46.7% were located at the middle level and only 2.2% at the lower level. These initial results show a balanced distribution compared to the control group, which justifies the need to implement pedagogical strategies such as active learning to strengthen this dimension in students.

Table 9: Results obtained from the post-test response frequency of the control group. SUSTAINED ATTENTION DIMENSION

	Frequency	Percentage
Inferior	1	2,2
Middle	21	46,7
Superior	23	51,1
Total	45	100,0

Source: Prepared by Vera (2025)

Table 9 shows that, after the application of the post-test to the control group in the sustained attention dimension, 51.1% of the students reached a higher level, 46.7% were at a medium level and 2.2% remained at a lower level. These results reflect a slight improvement compared to the pre-test, although the percentage distribution remains practically the same. This is due to the absence of a specific intervention, such as the proposal based on active learning, there were no significant advances in the development of sustained attention among the students in the control group.

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Table 9: Results obtained from the frequency of response in the post-test of the experimental group. SUSTAINED ATTENTION DIMENSION

	Frequency	Percentage
Inferior	0	00,0
Middle	5	11,1
Superior	40	88,9
Total	45	100,0

Source: Prepared by Vera (2025)

Table 9 shows that, after the application of the post-test to the experimental group in the dimension of sustained attention, 88.9% of the students reached a higher level and 11.1% were located at the middle level, with no cases recorded at the lower level. These results are remarkable compared to the pretest, which indicates that the intervention based on active learning strategies had a positive impact on the development and strengthening of sustained attention in students, thus meeting the objectives set out in the research.

Table 10: Results obtained from the frequency of response in the pretest of the control group. CONCENTRATION DIMENSION

	Frequency	Percentage
Inferior	0	00,0
Middle	28	62,2
Superior	17	37,8
Total	45	100,0

Source: Prepared by Vera (2025)

Table 10 shows that, in the pre-test applied to the control group in the concentration dimension, 62.2% of the students were placed at the secondary level, while 37.8% reached a higher level. These results indicate that, before the intervention, most of the students in the control group had a moderate performance in their ability to concentrate, which shows an opportunity for improvement in this cognitive dimension through active didactic proposals.

Table 11: Results obtained from the frequency of response in the pretest of the experimental group. CONCENTRATION DIMENSION

	Frequency	Percentage
Inferior	0	00,0

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Middle	18	40,0
Superior	27	60,0
Total	45	100.0

Source: Prepared by Vera (2025)

Table 11 shows that, in the pre-test corresponding to the experimental group, 60% of the students reached a high level in the concentration dimension, while the remaining 40% were at an intermediate level. These results reflect that, prior to the intervention, the majority of the experimental group already demonstrated a considerable capacity for concentration, which is a favorable starting point to enhance this skill through active learning.

Table 11: Results obtained from the post-test response frequency of the control group. CONCENTRATION DIMENSION

	Frequency	Percentage
Inferior	0	00,0
Middle	27	60,0
Superior	18	40,0
Total	45	100.0

Source: Prepared by Vera (2025)

Table 11, corresponding to the post-test of the control group in the concentration dimension, shows that 60% of the students were placed at a medium level, while only 40% reached a higher level. These results reflect a slight improvement compared to the pre-test, but do not represent a significant advance, which deduces that, since a specific methodological intervention was not applied in this group, a substantial development in the students' ability to concentrate was not achieved.

Table 12: Results obtained from the frequency of response in the post-test of the experimental group. CONCENTRATION DIMENSION

	Frequency	Percentage
Inferior	0	00,0
Middle	1	2,2
Superior	44	97,8
Total	45	100.0

Source: Prepared by Vera (2025)

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In Table 12 belonging to the post-test of the experimental group in the concentration dimension, it is observed that 97.8% of the students reached a higher level, while only 2.2% remained at the middle level and none at the lower level. This result presents a notable improvement in the ability to concentrate after the application of the active learning proposal, which confirms the effectiveness of the proposal in strengthening this cognitive dimension.

Discussion

The development of this research evidenced positive results in the regulation of students' cognitive attention, achieving significantly favorable effects in each of the dimensions evaluated.

In the dimension of sustained attention, 88.9% of the students in the experimental group reached a higher level, in contrast to 51.1% in the control group. This result shows that active learning strategies favor the maintenance of attentional focus for prolonged periods, increasing the capacity for cognitive persistence. This difference is aligned with what was proposed by Ko et al. (2017), who argue that this type of attention requires sustained mental effort, stimulated in this study through participatory activities.

On the other hand, in the dimension of selective attention, the results of the post-test were similar between both groups, the stability in the medium and high levels of the experimental group reveals a favorable trend in the maintenance of this ability, aligned with the proposal of Pagnotta et al. (2022), who argue that such attention is essential to filter relevant stimuli in contexts with high sensory load.

In the concentration dimension, it showed an even more pronounced increase in the experimental group, where 97.8% of students reached a high level after the intervention, which indicates that active learning strengthens the ability to avoid distractions and maintain a deep focus on school activities. This strengthens what Caamaño et al. (2021) pointed out about the importance of concentration as the axis of effective information processing.

Thus, it is confirmed that active learning not only promotes the acquisition of knowledge, but also regulates fundamental psychological processes such as attention, favoring the development of more lasting and functional learning

Conclusions

The experimental group showed significant improvements compared to the control group. Therefore, it is confirmed that active strategies allow regulating and strengthening attentional processes in educational contexts, especially at the upper basic level.

Each of the dimensions evaluated showed significant progress in the experimental group, with concentration being the dimension with the greatest improvement, reaching 97.8% of students

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at higher level after the intervention. This shows that active participation, interaction, and reflection strengthen mental focus and reduce distractions.

The use of active methodologies such as project-based learning, cooperative work and the use of ICT contributed to the student's development, allowing them to link content to their context, solve real problems and maintain a high level of engagement during the sessions.

The pedagogical intervention designed was effective in achieving the objectives of the study, as it managed to enhance not only academic performance, but also key cognitive skills such as self-regulation, critical thinking and sustained attention.

The results obtained allow us to recommend the implementation of active learning as a permanent didactic strategy, not only to strengthen cognitive attention, but also to motivate, involve and empower the student as the protagonist of their learning process.

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