

## IMPLEMENTING PEDAGOGICAL APPROACHES TO COUNTERACT THE INFLUENCE OF ARTIFICIAL INTELLIGENCE IN THE EDUCATION OF 21ST CENTURY LEARNERS

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### ABSTRACT

**Objective:** Establish a management model based on formative research, in order to raise the investigative skills of official students enrolled in the General Staff course of the Naval War Academy of the Republic of Ecuador.

**Methods:** Follows a quantitative approach and is framed in a non-experimental descriptive cross-sectional design. For data collection, the survey technique and a questionnaire based on the Likert scale, which consisted of 33 statements, were used. This tool previously validated by experts. It was applied to a sample of 39 students, reliability was evaluated using Cronbach's Alpha coefficient and the Shapiro Wilks Normality Test.

**Results:** whose results averaged 0.939 and 0.9586, respectively. The analysis of the information reflects the distribution of formative research at the following levels: high - 32.05%; medium - 38.62%; and low - 29.33%. Regarding investigative competencies, the results were distributed as follows: high - 31.09%; medium - 47.92%; and low - 20.99%.

**Conclusions:** Based on these conclusions, a model of Formative Research Management is proposed that contributes to the strengthening of investigative skills and that will have a substantial impact on the improvement of future Navy officers.

**Keywords:** formative research, investigative, management skills.

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## IMPLEMENTAÇÃO DE ABORDAGENS PEDAGÓGICAS PARA CONTRARIAR A INFLUÊNCIA DA INTELIGÊNCIA ARTIFICIAL NA EDUCAÇÃO DOS ALUNOS DO SÉCULO XXI

### RESUMO

**Objetivo:** Estabelecer um modelo de gestão baseado na pesquisa formativa, a fim de elevar as competências investigativas dos alunos oficiais matriculados no curso de Estado-Maior da Academia de Guerra Naval da República do Equador.

**Métodos:** Segue uma abordagem quantitativa e enquadra-se num desenho transversal descritivo não experimental. Para a coleta de dados utilizou-se a técnica de pesquisa e um questionário baseado na escala Likert, composto por 33 afirmações. Esta ferramenta foi previamente validada por especialistas. Foi aplicado a uma amostra de 39 estudantes, a confiabilidade foi avaliada através do coeficiente Alfa de Cronbach e do Teste de Normalidade de Shapiro Wilks.

**Resultados:** Cujos resultados foram em média 0,939 e 0,9586, respectivamente. A análise da informação reflecte a distribuição da investigação formativa nos seguintes níveis: elevado - 32,05%; médio - 38,62%; e baixo - 29,33%. Em relação às competências investigativas, os resultados ficaram assim distribuídos: alto - 31,09%; médio - 47,92%; e baixo - 20,99%.

**Conclusões:** Os alunos podem utilizar a Inteligência Artificial de forma adequada para desenvolver os seus conhecimentos, tendo em conta que a sua tendência aumentará e os professores deverão adaptar-se à nova realidade tecnológica.

**Palavras-chave:** pesquisa formativa, investigativa, habilidades gerenciais.

### 1 INTRODUCTION

Since 1948, the UN has sought in universities to train leaders committed to social transformation and environmental protection through responsible education, for which in its 2030 Agenda, within the framework of the Sustainable Development goals, it encourages the formation of a way of thinking. critical in students that results in a mentality of responsibility and autonomy, where competent educators and committed students play an essential role in achieving the purposes of all research (Borja et al., 2021).

While the Organization for Economic Cooperation and Development (OECD) maintains that knowledge is closely related to the holistic progress of nations, since it generates the resources that reinforce their economic structures. It is for this reason that, according to the 2021 ranking report of Scimago, Institutions, cited by De Moya et al. (2021), fundamental weight is given to innovation research and its influence on society. The results of this study identify Brazil, Chile, Argentina and Colombia as the countries that have surpassed the mark of 60,000 published works. In the same sense, Ecuador, Peru and Venezuela have a number of publications greater than 1,000, with Costa Rica



standing out as part of this last group. Hence Scientific production in Latin America is uneven due to insufficient investment in research (González et al., 2020; Farías et al., 2022; Pernalette & Odor, 2022), but it can be increased by strengthening research programs in educational institutions and promoting a research culture, which in the future will encourage publishing in journals with greater impact.

UNESCO (2021) states that the lack of public investment policies in research and development has led to a period of economic stagnation, which has led to a decrease in research activity, especially in nations such as Argentina and Mexico. However, given that research has assumed a fundamental role in education and constitutes a constant path that humanity follows in its search for progress and social improvement, it is imperative to acquire the competencies and skills necessary for the research process, particularly in onto-gnoseological terms. and ontological (Escobar, 2020; Delgado, 2017; and Mota, 2021).

Educational regulation in Ecuador dictates that educational institutions have the obligation to allocate resources to research with the purpose of fostering among their students and teachers a favorable environment and a genuine interest in research activity. This leads to the generation of research projects, the provision of technological infrastructure and the publication of academic works that meet Ecuadorian criteria in journals of notable influence (LOES, 2018).

Within each educational entity, the urgent need arises to establish research procedures in order to address the challenges and concerns inherent to education, especially at higher levels. In this area, where the acquisition of skills is presented as a fundamental requirement, educational institutions such as the Naval War Academy, seek a teaching-learning methodology that translates into the cultivation of skills, knowledge and values. This approach is based on the Educational Model of the Armed Forces, simultaneously supported by UNESCO guidelines, which define the types of knowledge that are established as the foundations of education. In the Armed Forces of Ecuador, research assumes a fundamental role in the structure that supports the knowledge-based society, since it becomes the crucial and strategic element for the advancement and growth of the community. In its Institutional Strategic Plan (2021 – 2025), it designates research as the tool through which novel knowledge can be generated, incorporating the cultural, social and military orientations that represent the values defended by the institution.



Under the constructivist perspective, the Naval War Academy (AGUENA) has become the most prominent higher-level educational institution within the training structure of the Ecuadorian Navy. It plays a fundamental role as an educational component in the career of naval officers. This academy aims to perfect future leaders of the Navy, aspiring to expand their set of knowledge to be able to successfully lead competitive teams in the operational, maritime and administrative fields. In addition, these leaders are expected to be trained to provide advice to the commander in the execution of maritime operations in national aquatic spaces.

Scientific production is rooted in the regulatory framework of AGUENA, which is why research training in higher and military education is necessary (Morgan et al., 2019). Formative research provides knowledge, cultivates reasoning skills and critical thinking to resolve sea power issues. A management model is analyzed in formative research to improve skills in AGUENA officers. It is significant because Ecuadorian military education recognizes human beings as a valuable resource and places them at the core of the armed institution.

The primary goal of generating scientific production is firmly rooted in the educational regulatory framework of AGUENA (Naval Warfare Academy). Precisely due to this reason, the need for research training arises not only in higher education institutions, but also in the military field. This responsibility involves the generation of knowledge during the student improvement process, as well as the development of solid research skills that are integrated as an essential part of the skills inherent to the teaching and learning processes in the academic environment. (Morgan et al., 2019).

Formative research is an alternative that provides knowledge required by students' society. Cultivates the ability to reason, critically think, and appreciate research. These qualities improve cognitive abilities to resolve sea power issues. Characteristics of a management model based on formative research are investigated to improve research competencies in course officers at the Naval War Academy of Ecuador. The importance of this study lies in the fact that Ecuadorian military education, based on its constitutional foundations, recognizes human beings as the most valuable resource and places them at the core of the armed institution. From these contributions the question arises: what is the management model to improve these skills in the investigative skills in officers of the Naval War Academy?

This inquiry finds its justification in the need to reflect on the role of research and



its type, which should be relevant in the field of military education. Its purpose is to guarantee that officers who complete the staff course at AGUENA acquire the necessary skills in the investigative field. This capacity is configured as an essential and crucial element in the progress and transformation of a society, given that its qualitative impact is reflected in the performance and competitiveness of military personnel in constant movement. In this context, the ability to innovate becomes a valuable and differentiating resource over time.

This study provides an understanding of the progress of formative research in the institution within the framework of the teaching-learning strategy of the staff development course. It is relevant to highlight that research plays an essential role in strengthening the link between the Armed Forces and Ecuadorian society, and its implementation is crucial. This is because it encourages learning by introducing new knowledge, which in turn seeks the development and improvement of leaders in the various instances and units of the Navy. In relation to its methodological value, it will have a positive impact on the development of the study plans for the general staff course, at the same time as it will facilitate the acquisition and improvement of the research skills and aptitudes required by the students taking the program. of general staff.

This research is justified by its practical relevance, as it responds to the current context of growing global interconnection that generates changes in multiple areas. Given this situation, the proposal of a management model based on formative research with a constructivist approach seeks to strengthen the research capabilities of AGUENA students.

## **2 THEORETICAL FRAMEWORK**

In this context, researchers such as Chavez et al. (2018) conducted a qualitative investigation using the Action Research methodology with the purpose of determining the effect of implementing actions for the formation of investigative skills in students of the Faculty of Business Sciences of the Señor de Sipán University in Peru. The sample was made up of 120 students. To develop the research, the Kemmis and McTaggart model (1988) was used. The actions implemented directly involved students in research activities. The results of which showed that these actions allowed the development of skills such as reflective thinking, problem solving and generation of useful knowledge for their future professional performance. It is concluded that involving students in practical



research activities through active methodologies is effective in forming the research skills required in their disciplinary field.

Rué (2019) conducted quantitative research with a correlational design to determine the relationship between investigative competencies and the educational empowerment of students of the master's degree in aerospace Doctrine and Administration of the Higher School of Air Warfare in Peru. The sample was made up of the students' thesis projects. An observation sheet was used to evaluate investigative competencies and a questionnaire to measure educational empowerment. The instruments were validated using Cronbach's Alpha test. The results of the correlation test demonstrated that there is a direct, high and significant relationship between investigative competencies and educational empowerment, with coefficients of 0.877964 for the total and between 0.783577 and 0.865733 for specific dimensions (Orué Dueñas & Carolina, 2019). Which suggests that the development of investigative skills such as inquiry, argumentation, analysis and innovation is positively related to the educational empowerment of graduate students. This highlights the importance of training these skills to enhance their self-management and autonomy in learning.

Among other researchers, Arana et al., (2018) in their compilations of Investigative Culture at the General José María Córdova Military Cadet School, carried out a comparative bibliometric analysis of the degree works of students in two consecutive academic periods. With the purpose of evaluating methodological, epistemological and theoretical indicators to propose improvement strategies. The results showed that in the second period there was an 8% increase in the appropriate use of methodologies and a 6% increase in the application of theories and concepts related to the lines of research. However, in terms of epistemological foundations, only a slight increase of 3% was recorded. Based on these findings, the authors suggest reinforcing training in research epistemology and promoting methodological advice to obtain significant improvements in the quality of degree works prepared by students, and creating management models that take these into account. foundations to achieve the necessary skills in the training of military academy students.

Finally, it can be expressed that these previous studies confirm that it is important to develop formative research management strategies, such as programs, seminars and tutorials, models that are adopted or adapted can effectively strengthen the research competencies required by Naval Academy's officers.



This research considers as a basis the contributions of Kun (1962) and Patton (1990), who define research paradigms as the lenses through which researchers perceive the world. Following the same line of thought, likewise the contributions of constructivism from Tigse (2019) and Sánchez (2018) who describe the paradigm as a set of principles that educators use to adapt the necessary research strategies and promote active and meaningful learning to the identify problems and propose solutions.

The military educational system requires having conceptual, methodological and practical elements that guide the educational process towards achieving the planned learning results. From a theoretical perspective, the vision of Kun (1962) and Patton (1990) has been taken into consideration, who define research paradigms as the lens through which researchers observe the world. In the same line of thought, Tigse (2019) and Sánchez (2018) describe the constructivist paradigm as a set of principles from which educators provide their students with strategies that promote active and meaningful learning. This leads to awakening and nurturing an investigative mentality in students, with the purpose of identifying problems and establishing solutions.

Constructivism, according to Schunk (2012), is not simply a theory, but an epistemology that presents a philosophical interpretation of the nature of learning. This is because constructivism generates its own learning process. Reflecting on this concept, it is crucial to establish that, for followers of constructivism, the world is constructed in various ways and scientific truth is not considered absolute, but there is always room for reasonable doubt. This is because, from this perspective, people create their own knowledge individually. Constructivism then proposes a vision of learning as an active process of knowledge construction, not as a passive reception of external truths.

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From a constructivist perspective and in a changing globalized context, military education must be transformed into a collaborative environment where teachers and



students generate significant knowledge through critical analysis and resolution of real problems, to promote social progress (Linares, 2021). Given the demand for greater competitiveness, military education must continually improve its quality based on research, given that several authors have defined education as a fundamental human activity that encourages reflection, curiosity, questioning and doubt, key elements to explore, deduce and acquire knowledge. Within all the interpretations present in the literature in relation to the meaning of research, the approach adopted in this study is based on the perspective proposed by Hernández & Mendoza (2018). According to this perspective, research is understood as the tool available to human beings with which they can contribute to the creation of a better world and the promotion of well-being. Following this approach, people are constantly engaged in investigating their personal, educational and social environment, with the purpose of finding optimal solutions to the challenges facing society as a whole.

The management model is conceptualized as a design that seeks to facilitate a comprehensive understanding of the system to guide efforts towards continuous improvement (Huertas López, 2020). It consists of processes, policies and organizational structures that optimize institutional performance. That is, as an integrated system that transforms human and material resources into a good or service that benefits the institution.

### **3 METHODOLOGY**

According to the Qualification Regulations (RENACYT) established by CONCYTEC in 2019, two categories of research are identified: pure research and applied research. The present research work is classified as applied research, since its approach consists of using knowledge to establish guidelines, protocols and methodological approaches. These will be used with the purpose of improving and satisfying the formative research process, as well as promoting a culture of research among the official students of the Naval War Academy.

Hernández and Mendoza (2018) propose that there are three approaches to guide the research, choosing the quantitative approach in this study due to its objective search, which allows exposing educational and social problems at the Naval War Academy, in addition to relating formative research variables and teaching-learning. A census sample is used with the descriptive method to understand the phenomenon in its context



(Hernández & Mendoza, 2018). It is non-experimental, transversal since it analyzes the object at a point in time to describe variables and propose a model (Hernández & Mendoza, 2018). It does not manipulate variables, it evaluates defined contexts (Martínez, 2018). To then use formative research that confronts theory and practice with action research, promoting an investigative mentality through learning by discovery and construction (Agraria, 2021).

According to Hernández and Mendoza (2018), the conceptualization of the population refers to the set of elements (N) that share similar characteristics in terms of content, location and time, and especially, accessibility. In the context of the research in question, the population is defined as the set of 211 student officers who entered the improvement course at the Naval War Academy in 2023. In addition, there are eight instructors in passive service with specialization in the naval field and 15 instructors in active service. Likewise, according to the perspectives of Cornejo et al (2022), it is valued that a sample that has essential and distinctive attributes constitutes an essential part of representing the population.

In the context of this study, the sample was made up of 39 students, to whom a selected and structured survey was applied that not only allows the collection of data, but also the evaluation of the trends that are manifested in the results obtained. . as presented in table 1.

Table 1. Distribution of the AGUENA 2022 sample

PARTICIPANTS	GENDER		TOTAL
	Men	Women	
Students	38	01	39

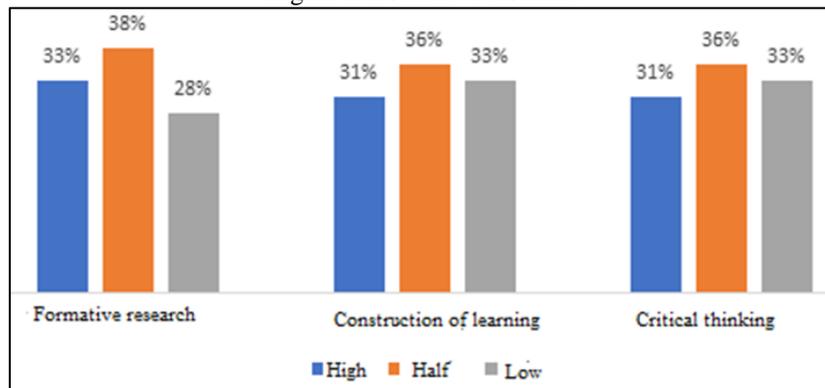
Source: Prepared by Authors (2023)

#### 4 RESULTS AND DISCUSSIONS

The results obtained through the application of statistical data are presented, which generates a discussion of the two variables from their respective dimensions. The formative research is presented in Figure 1.



Figure 1. Formative research



Source: Prepared by Authors (2023)

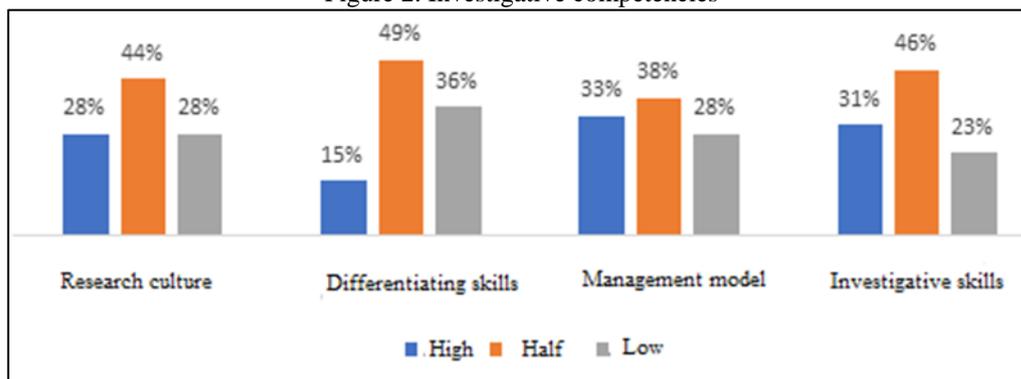
From the main findings obtained, it is possible to infer that the segment rated high reflects that 32.05% of students express that they have a level of knowledge and interest in formative research. On the other hand, the segment classified as medium and low, represented by 38.62% and 29.33% respectively, suggests that students could benefit from guidance through strategies designed to stimulate their interest and competence in formative research. This is especially important since your final coursework involves creating an Integrating Product.

In relation to the construction of learning, it can be deduced that the students of the Naval War Academy in 2023 obtained a grade of only 28.04% in the high-performance category. Furthermore, a notable 71.96% of students demonstrate that they are not familiar with the concept of formative research. Furthermore, it is evident that many students consider that the 12-hour workload and the design of the curriculum intended to teach the methodological research process are insufficient to meet the necessary requirements in the development of the final integrative products. In relation to the promotion of critical thinking, it can be concluded that the students of the Naval War Academy in 2023 have achieved a qualification level of only 35.58% in the high-performance category. Furthermore, a percentage of 64.42%, distributed between the medium and low ranges, indicates the need for the consolidation process of the AGUENA authorities, regarding formative research, to undertake measures to convert formative research in an activity gradually focusing on the academic field of the institution.

The results are presented in Figure 2 taking into consideration the variables of the Investigative competencies.



Figure 2. Investigative competencies



Source: Prepared by Authors (2023)

When analyzing the results obtained, it is essential to note that students value two crucial aspects in their evaluation: culture and distinctive research skills. It is observed that 31% of the students, in the high-performance category, consider that formative research represents a way of change for the transmission of knowledge at AGUENA. However, the remaining 69.91%, corresponding to the medium and low ranges, raises concerns since it suggests the need to introduce change actions in the teaching-learning strategy. To address this, it would be crucial to implement a management strategy aimed at to acquire the required investigative skills.

This first dimension, which refers to investigative skills, results are obtained where students show a high performance of 28.85%; Furthermore, within this same group, 46.79% are at the medium level, while 24.36% are at the low level. When evaluating the second dimension called "differentiating skills", it is observed that 32.95% of the students surveyed fall into the high-performance category. Regarding the medium and low ranges, 49.28% and 17.77% of the students respectively are located at these levels. It is notable that students recognize the relevance of establishing a formative research management model at the Naval War Academy. This model will play a fundamental role in promoting the acquisition of research competencies and cultivating these distinctive skills, rooted in a research culture. This, in turn, will pave the way for reaping benefits for both the institution and the country. Table 2 shows the correlation between the variables.



Table 2. Results of the correlation test between the variables

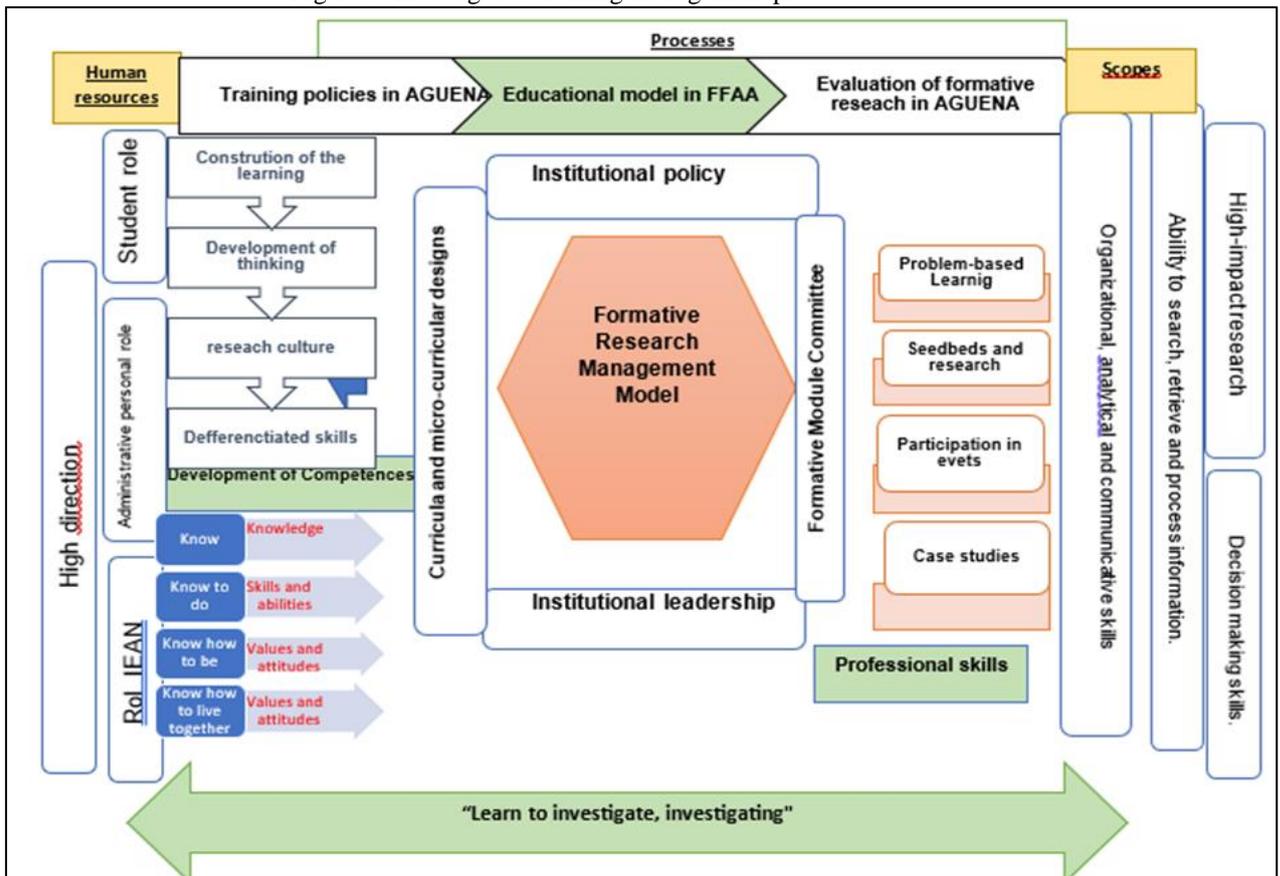
Give Pearson tea	Achievement of the variables	
Formative Research	Correlation coefficient	0,824
	One. Bilateral	0,000
	Number	39
Investigative skills	Correlation coefficient	0,821
	One. Bilateral	0,000
	Number	39

Source: Prepared by Authors (2023)

The results indicate a confidence level of 95%, it can be stated that the sample originates from a normal distribution. When analyzing these results, it is deduced that the independent variable, that is, "formative research", presents a normal distribution compared to the dependent variable, which is "research competencies in officers of the Naval War Academy."

Figure 3 shows the investigative training management process.

Figure 3. Investigative training management process



Source: Prepared by Authors (2023)

The management proposal described is focused on developing students' skills in formative research management. To do this, a process is proposed that involves analyzing



the research policies of AGUENA and the educational model of the Armed Forces. Likewise, formative research is evaluated. Each of these processes, with their respective strategies, seeks to improve the organizational capabilities of students so that they can carry out impact research and make assertive decisions.

The resources allocated by senior management to fulfill the actions of teachers, administrators and students comply with the formative research policies proposed by the institution. These policies establish guidelines for the management model in formative research, considering institutional policy and leadership, study plans and curricular design, as well as the formative research module committee. Subsequently, research training processes are evaluated at the level of learning in seedbeds, participation in events and case studies, in order to contribute to improving students' skills until they achieve high-impact research.

## **5 CONCLUSION**

Based on the results obtained, it can be inferred that the category evaluated as high reflects that students have knowledge and interest in formative research. In contrast, there is a majority located in the medium and low category, which indicates the need for students to be guided through strategies that promote and transmit these distinctive capabilities, which will provide them with the investigative skills required in the context of research. formative.

Formative research stands as the essential foundation and the central tool within the educational process, it engenders and promotes knowledge and learning, while connecting with a society characterized by its creativity and innovation. From this, it can be deduced that formative research poses a significant challenge to the advancement of both universities and the Naval War Academy, playing a crucial role in the improvement of their students.



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