

# Management in Formative Research to Strengthen Investigative Competencies in Officers of the Naval War Academy

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**Abstract:** The aim of this research is to define the structure of a management model based on formative research to optimise the research skills of student officers of the Staff Course of the Naval War Academy of Ecuador. The methodological approach is quantitative, descriptive, with a non-experimental cross-sectional design. The data was collected through a Likert scale survey, its reliability was measured with Cronbach's alpha and its normality with the Shapiro-Wilk test. The behaviour of the data was analysed by frequency tabulation. The MICMAC program was used as a structural analysis tool to identify key variables and their potential impacts within a formative research management model at the Naval War Academy, based on a study of global, regional and local regulations. The research found that formative research workshops are a key strategy whose multiplier effect increases research capacity and productivity. They become spaces for multidisciplinary groups that benefit from shared experiences and help to generate differential skills and capabilities, enabling students to compete in the labour market after fulfilling their academic goals.

**Keywords:** Management, Formative Research; Competences, Skills, Reflection.

## 1. INTRODUCTION

Since 1948, the UN has sought to ensure that higher education trains leaders responsible for social and environmental change [2]. The 2030 Agenda proposes a paradigm shift where quality teachers and engaged students are key [25]. The OECD notes that knowledge is linked to development. There is a gap in knowledge production in Latin America due to a lack of investment in research and innovation [3, 12]... It is necessary to strengthen research and research culture to increase impact publications [13,15, 26].

Ecuadorian educational regulations establish that investment in research must be made to generate research culture and academic publications [18, 14,]. The new Academic Regulation placed formative research as a transversal axis to develop research competences in students. The Armed Forces of Ecuador consider that research is key to the knowledge society and development [4].

This research reflects on the role of formative research in military education, seeking research competencies in officers as a tool for development and social evolution, impacting competitiveness and capacity to innovate [22, 21]. The objective is to propose a formative research management model to develop research competences in students of the General Staff course...Formative research is a pedagogical strategy to solve problems through constructivism (2). It is an educational pillar that generates knowledge, learning and social linkage with creativity and innovation (10).

There is a relationship between teaching and research [9] Teachers need to be researchers for effective practice. Formative research improves curriculum design [11]. Educational institutions have a responsibility in the research training of students [6]

In military education, it is key to diagnose initial research strengths and weaknesses [5]. Research workshops facilitate research competencies in cadets [23]. Formative research must be integrated into military training to strengthen defence and sovereignty [14]. The implementation of a formative research management model at the Naval Academy will serve to identify real needs and create affinity between teaching-learning and research,

improving decision-making. The research workshops are effective strategies for training new military researchers [24].

## 2. MATERIEL AND METHODS

According to the Qualification Regulation (RENACYT) guidelines established by Concytec [7] main categories of research are recognized: pure research and applied research. In the present study, it falls within the category of applied research, since its focus is on the use of existing knowledge to develop guidelines, protocols and methodological approaches. These elements will be applied with the purpose of improving and enriching the formative research process, as well as promoting a culture of research among the official students of the Naval War Academy.

There are three approaches to guide the research, and in this study the quantitative approach has been chosen due to its objective approach, which allows addressing educational and social issues at the Naval War Academy, as well as establishing relationships between variables related to formative research and the teaching-learning process [19,20]. A census sample has been used and the descriptive method has been used to understand the phenomenon in its context, following a non-experimental and transversal methodology, which involves an analysis at a time point to describe variables and propose a model. Furthermore, this research does not manipulate variables and focuses on the evaluation of specific contexts [17].

Formative research is based on the approach of confronting theory and practice through action research, fostering an investigative mindset through learning by discovery and construction [1].

The conceptualization of the population refers to the set of elements (N) that share similar characteristics in terms of content, location, time and, in particular, accessibility [16]. In the context of the current research, the population is defined as the group of 211 student officers who enrolled in the improvement course at the Naval War Academy in the year 2023. In addition, there are eight instructors in passive service with experience in the naval field and 15 instructors on active duty. It is also considered, according to the perspectives of de Cornejo [8], that a sample that has essential and distinctive attributes is essential to adequately represent the population under study.

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

## 3. RESULTS AND DISCUSSIONS

### 3.1. Results The Formative Research

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.

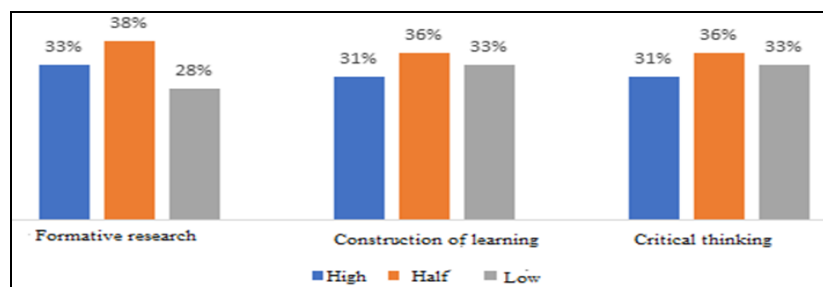


Figure 1. Formative research

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.

### 3.2. Analyzing The Results, Investigative Competencies

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

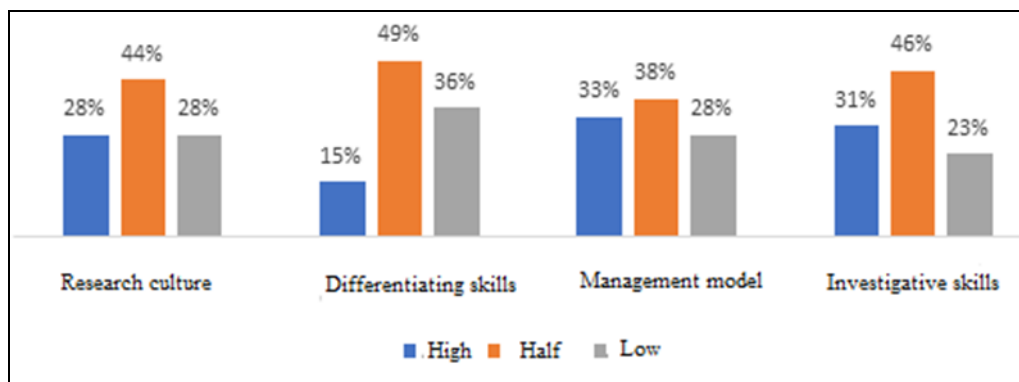


Figure 2. Investigative competencies

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.

### 3.3. Analyzing the test 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

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.

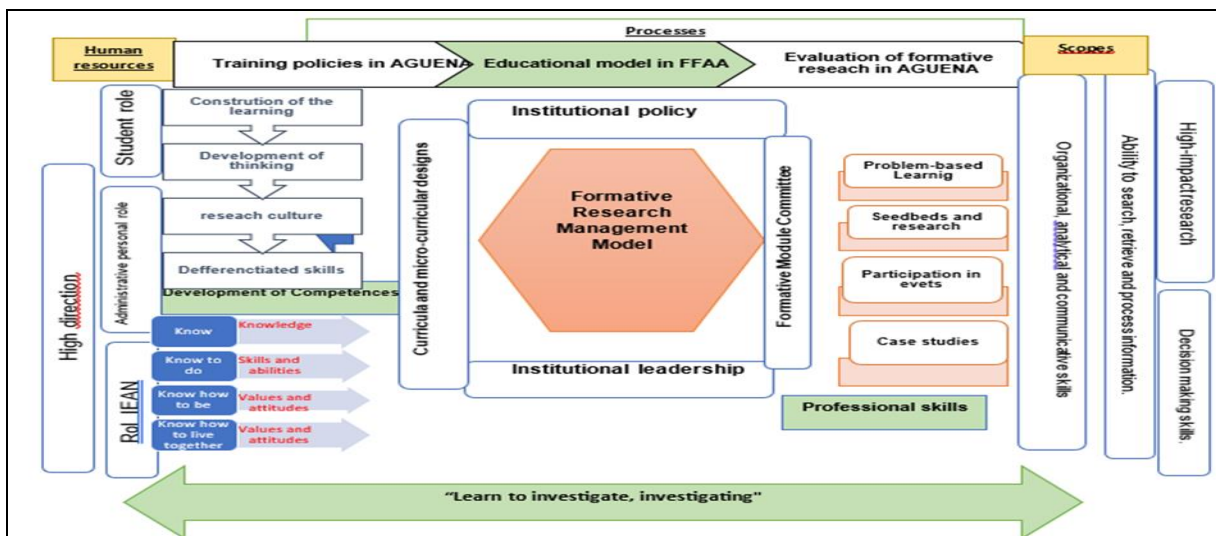


Figure 3. Investigative training management process

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 [27]. 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.

## CONCLUSIONS

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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