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SCIENTIFIC COMPETENCIES IN PEDAGOGICAL INNOVATION

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Abstract
Education as a preeminent factor in societal development contemplates in its dynamism problems that arise as it advances, that is why; research in inherent to innovation are factors that through scientific competencies enable human beings to address and remedy the phenomena that afflict educability and consequently society. In light of the above, the present study aimed to determine the influence of scientific competencies of teachers of 6 institutions of higher education in Ecuador in the context of basic education and its influence on pedagogical innovation, under a basic methodology, with a quantitative approach of causal correlational scope and non-experimental design. The technique used was the survey with the instrumentation of a questionnaire applied to 205 professors, submitted to validity and with good reliability rigor according to Cronbach's Alpha located at 0.947 for variable 1 and 0.975 for variable 2. The results show that scientific competences have a strong positive relationship with pedagogical innovation in the unit of analysis, this relationship is positioned in the correlational area of 0.826 with a bilateral significance of 0.01. Therefore, it is concluded that as long as scientific competences are strengthened in the unit of analysis, pedagogical innovation increases, determining a better praxis and significance in the educational work.

Key words: Competences, Scientific, Innovation, Pedagogical.

INTRODUCTION

Research and education as instruments for the advancement of society are positioned as factors that make it possible to address the phenomenological dynamisms that afflict the dissimilar educational contexts. The progress of society is transpolated by education, research and pedagogical innovation; Undoubtedly, tripartite this position is a delimiting step for societal development, however, when we talk about society we are preeminently addressing the human being and his attitude towards the world, how he conceives it, how he intervenes in it and what he does to energize it.
Man to understand reality, society and education, to find a problem in them and to solve them, requires information; the sum and contrast of it with empirical factors are transformed into experience, which when intervened by the mental process of reflexivity, criticality, systematization, synthesis and evaluation, is transformed into knowledge; when developed and used in practice becomes a skill, the former if it is developed it is consolidated into skill, while the latter when added to individual particularities such as the motivational field, identity traits, values, etc., is structured into competition. Competencies, in short, denote intelligence and precisely that makes it possible to solve problems, as determined by Gardner (2011).

The educational realities today worldwide According to the United Nations, since 2021 higher educability has been facing new challenges, especially in reference to educational innovation; since, when man better understands reality, he finds new problems, facing them implies an integral involvement from his competencies, helping research as a means of solution and consequently science.

Scientific competencies allow solving educational problems from phenomenological experiential knowledge, an identification of causes, a segregation of effects, an evaluation of conditioning factors, a diagnostic outline, a study of alternative solutions, a creative propositional selection, a rigorous application and an assessment of correction; however, when scientific competencies are not significantly developed by professors, it leads to the educability process and consequently the integral development of the student having gaps that marginalize the quality of higher education.

From a critical point according to the State of Education in Latin America and the Caribbean 2023 report, presented by the Inter-American Development Bank in its Education Division, there is a great boom in pedagogical innovation at all scales, visualized in the fact that 35% of young people between 21 and 23 years of age in the region have not completed their secondary education. like 75% of university students according to the PISA tests, they have the lowest levels in relation to the development of reading and science skills in universities.

In Ecuador, in light of Gualán et al. (2021), a large part of teachers face difficulties in managing their methodological strategies, in such a way that there is a preeminence in requiring adequate training to identify gaps and generate knowledge in students based on science, based on the fact that many of the higher-level professors are not significantly prepared to use research as an instrument of educational development. Under this premise, society is the product of education and as such, in this development there are new pedagogical problems on a daily basis that must be solved from innovative positions and strategies in inherence to scientific competences, helping to unite research, education and innovation.

To this end, it is of greater relevance to express the justifying factors of the study. In level of convenience; The research aims to understand the factors that enable educators to acquire scientific competencies and the areas in which they require development, in order to understand the training requirements in order to overcome gaps in education through innovation. In terms of social relevance; According to Sánchez, research is a social act, in this virtue, educators, being participants in the advancement of society, it is essential that they know, possess and develop competencies that enable their exercise in a functional, systematized, inclusive and integral way in contribution to society. (2004)

On a practical level; It is relevant to know the particularities of educational actors, in order to design proposals that are aimed at solving problems from training or interventions with relevant innovative strategies focused on the social good. On a theoretical level; It is essential to produce scientific knowledge about the problems that affect educational environments, in order to understand them from rigorous approaches based on the systematization of processes that can serve to replicate them to other contexts affected by similar problematic situations.

With the above, the purpose of this study is to determine the influence of scientific competencies of teachers from 6 higher education institutions in Ecuador in the context of basic education and its influence on pedagogical innovation.

SCIENTIFIC COMPETENCIES

In the light of Pedrinaci, scientific competencies are based on an accumulation of individual skills to use scientific knowledge with the objectivity of: outlining, explaining and forecasting natural phenomena; discern the characteristic aspects of science; proposing and investigating enigmas and hypotheses; and to be informed, to argue and to select individual and social resolutions about the natural world and the transformations in the occupation of the human being.(2012)

CHARACTERIZATION OF SCIENTIFIC COMPETENCIES

As explained by Jiménez et al. , and Hernández, when discussing the term competence, refers to the ability of an individual to function in any environment based on specific capacities depending on the field of action. It is for this reason that; Scientific competencies can be discerned as the ability to constitute a certain level of correlation with the sciences. (2020)(2005)

DIMENSIONS OF SCIENTIFIC COMPETENCES

Addressing a problem implies in the first instance observing it, for effect; one of the dimensions of scientific competences is scientific observational, where Schettini and Cortazzo indicate that; Without the need to have taken conditioning in some field of profession or knowledge, each individual being performs the act of observing in different domains and situations of the daily vital world and, taking this into account, understanding and experience are built.

In addition, the experimental sciences were the first to displace the observational act to their research field, implanting a certain discipline in it. (2016)

In the same way, Bunge explains that scientific observation understood as a process of a scientific nature is particularized by being: intended, because it situates the purposes and objectivities that individuals pose in connection with the facts, to subjugate them to a theological perspective; Any type of observation to be such is within a trunk of knowledge that enables it to become such and can only be observed theoretically.(2004)

In addition, Bunge also emphasizes that observation is selective, since; we need each progress to differentiate everything that is of interest to us, to understand it and discern it from the sensational whole that bursts into us at all times; interpretive, it manifests itself to the extent that we try to detail and teach what is under our observation. Likewise, Bunge points out that; At the end of a scientific observation, we provide ourselves with some kind of solution, explanation or interpretation, referring to what we have contemplated, by placing it in correlation with other knowledge and knowledge previously received.

In this regard, Ruíz argues that scientific observation can be classified according to different criteria: a) by the degree of systematization or standardization of knowledge; b) by the different observational methods or the role of the observer; c) by the place where the observation was carried out, and, finally; d) by the number of individuals they observe. On the other hand, after observing; The researcher must have reading faculties to be able to verify, contrast and conceptualize what is visualized, and this is where the reading dimension is fundamental. (2007)

Similarly, for Chávez and Romero (2021), the reading dimension is a critical occupation that aims to exhibit meanings by communicating with the author through the written text to accept their messages. The scientist reads under the theoretical perception that is projected on the facts and the written.

For Sánchez, when talking about reading, reference is made to a set of operations in practicality, in the first instance; reading is conceived as an action consisting of the identification of letters and syllables; remember the name of the letters and link the correlation between the letter and sonority. So, reading is a complicated process that lies in finding the meanings of a written text. (2014)

On another point, describing a problem in research must be inherent to conceive several proposals to solve it, this area is called propositional, here the creative dimension is fundamental for scientific competencies, according to what was stated by Vallejo et al., creative thinking within the dimensions of scientific competencies is defined as that ability of the scientist to reorganize different ideas, predetermine them in an original way and propose resolutions with ingenuity. This thinking lies in producing ideas, articles or ways of observing different situations in a unique way. People who possess this type of thinking excel in their skills in developing, planning, producing, and inventing things. (2020)

Despite the fact that; In the dissimilar educational institutions, the growth of logical-rational thinking is encouraged, it is of utmost significance to associate this development with a creational process. This is because divergent thinking empowers the human being to inspect different alternatives, investigating different solution options in the face of a specific issue or situation. The scientific researcher is undoubtedly a creative inventor, some research being total works of art, this due to the consonance of his conceptualizations and the strength of the explanation, including the relationship between his structure and the ease of his conception.

Innovative or creative studies and proposals must be subjected to rigorous evaluations that provide reliability and reliability to their processes, it is there where the dimension of rigor is fundamental for what is committed, from the position of Sánchez, he identifies that rigor is a very broad term, however, it has trajectories: discipline, is meticulous care in work of a serious nature, and rigor is also treated as a personality trait. The scientific researcher is not inconstant or undisciplined and does not carry out his occupations with negligence, on the contrary; it can be overlooked. (2014)

Between the creative and rigorous dimension, we must not sink into a dualistic explanation, and; even less does it differ from scientific work: as if in the production of knowledge of a scientific nature everything became or was a matter of creational inspiration or serious, tenacious and meticulous work. In the process of discovering the truth, audacity and rigor are required, both of which are duly essential. This accumulation of precepts can perhaps become one of the particularities that most represents, beyond any appearance, the profession of a scientific researcher. In addition, as Chambi explains, scientific research has a methodology that the researcher uses in his studies, this must have different significant requirements such as rigor and credibility. (2017)

In addition, Sánchez also argues that the scientific task has a broad social nature, and here it is essential that the researcher contemplates the social dimension, since it is dependent on the requirements or needs of a given social group and is carried out as a team within a cooperative environment. inter- and multidisciplinary joint work. In the same way, this dimension involves a large number of soft skills such as cooperating, participating, distributing, exchanging ideologies, points of view, taking responsibility for group work, fully executing commitments and statutes,

concluding with the effective operationalization of socialization skills in praxis, and scientific evolution and development. (2014)

These edges are the most abundant occupations of future scientific research, it is because of this that various institutions that develop research constantly promote the establishment of policies and norms that benefit joint work, the constitution of competitive research units and, as a result; Partnership projects for research studies.

On the other hand, rigor guarantees reliability in the knowledge produced by research, the epistemological, ontological and epistemological foundations are also preeminent for this purpose, in this regard the dimension of construct of knowledge in a researcher is essential, Sánchez points out that research of a scientific nature in an environment of result, is a solidly founded theoretical concept, and; In the production environment, it lies in the progressive and constant conception of knowledge concerning a specific field of knowledge. (2014)

The formation of knowledge is not a simple effect or result of a solid structure and a rigorous procedure, since; From this point of view, scientific production entails postponing the scientific researcher. Likewise, scientific competencies from the perspective of Posuelo and Cascarosa (2023), require a phenomenological explanation from a scientific field; Evaluation and design of scientific research and interpretation of scientific data and evidence.

RESEARCH SKILLS

According to Colás and Hernández, the achievement of competencies related to the invention and use of knowledge is a significant goal within the higher education context. This presentation is based on the conception that a legitimate scientific and technological culture among students will enable considerable progress in the foundation of a knowledge-based economy and community. In addition, this is key for professional development in a population that requires the integral creation and mobilization of knowledge. (2021)

TROUBLESHOOTING

Jiménez et al. , in agreement with Guzmán explain that problem solving involves a full implementation and orientation by the teachers with the corresponding activities in students, this because it is not accessible for the student to associate, examine the problem in question to be able to analyze and solve it, for that reason there is success in the problem-solving methodology in the corresponding activities and in the teacher's guidance in them. In addition, teaching by this type of resolution of conflictive contexts is of utmost significance for students for the sake of their correct evolution of the development of thought. (2020)(2007)

CRITICAL THINKING SKILLS AS AXES OF EDUCATIONAL INNOVATION

As far as critical thinking skills are concerned, as Burbano et al. explain, the growth of scientific attitudes is something that has priority within educational systematization. Latin American countries such as Peru, Chile, Cuba, among others, have been collaborating participants in research with the aim of suggesting and certifying pedagogical methods concerning the development of scientific thinking skills in students and enabling the achievement of knowledge acquisition. However, today traditional education is still used as a teaching method, where rote processes prevail, this does not benefit the increase of observational, experimental and scientific inquiry skills, led to curiosity, creativity and ingenuity. (2020)

FACTORS AFFECTING STUDENTS' SCIENTIFIC COMPETENCES

According to Barahona et al., the educational success of students depends on a variety of significantly influential factors, which is why the acquisition of knowledge is not only subject to work in the classroom, but also to involvement in family, sociocultural and socioeconomic contexts, creating a link with society and a motivational interest in achieving new knowledge. delving into different areas such as life projects. (2018)

From the family context, Velasco et al. analyze that the control of occupations by parents reflects a growing probability of achieving superior results in terms of scientific competencies, this in primary and secondary students. Subsequently, this control will establish responsibility in the individual, to achieve full scientific competences in the third-level study. (2021)

EPISTEMOLOGICAL REPRESENTATION OF SCIENTIFIC COMPETENCES

Epistemology is, according to Torres and Lamenta, a discipline focused on the study, observation and evaluation of cognitive problems of a scientific nature, being an occupation of the intellect that meditates on the scientific essence and on the nature of its assumptions. Epistemology examines, evaluates, and judges the accumulation of dilemmas that reflect the course of production of scientific understanding, as well as, for example, the issues that pertain to the definition and characterization of scientific conceptions, the problem of the construction of scientific theoretical terminology, conceptions concerning methodology, logical structure, and the development of scientific theories. (2015)

ENHANCING THE DEVELOPMENT OF SCIENTIFIC SKILLS FOR INNOVATION

Imbert and Elósegui state that the study or acquisition of collaborative knowledge between teachers and students supported by projects, establishes a stimulus generated in students to be instructed in the development of proactive capacity. They further declare that; Having the option of choosing the activities to be carried out through their preference benefits the deepening of the contents that are discussed in the classroom. (2020)
In another aspect, Mariscal highlights learning by inquiry based on the context in which it is found. In this regard, the students, having the opportunity to select topics or questions elaborated by them, reflect more interest, emotion and fun in them, which indicates the significance of starting from their curiosity. In addition, it is found that; through the design of context-based Research Projects, the dimensions of concept, procedure and the epistemic dimension of scientific competencies can be significantly increased. (2015)

SCIENTIFIC COMPETENCIES AND SKILLS IN HIGHER EDUCATION

According to Nilo, scientific skills enable significant values in the context of higher education, these are: examining and proposing questions that denote observing and proposing hypotheses; use variable-based prediction to program and guide an investigation, that is, to originate an investigative question where the variables are determined and the accumulation of evidence, procedural plans and make use of tools and mechanisms is carried out; process and study the accumulated evidence to design prototypes; description of phenomena; observation and interpretation of information; drawing conclusions and running comparisons; conscious evaluation of the validity and reliability of the test conclusions by verifying the processes so that they are able to be replicated or improved; and to inform and understand the results of research trials while explaining knowledge and making use of scientific terminology.(2019)

RESEARCH COMPETENCIES FOR THE IMPROVEMENT OF HIGHER EDUCATION

According to Hernández et al., third-level education is under the obligation to constitute citizens with criticism, reflection and analysis, so that, in this way; they can be developed according to what is presented and needed in society. On the other hand, the progress of scientific research skills in university teaching staff and students is a very relevant component to be taken into account by educational establishments. Hence the need to insert classes in the curricula whose study and learning results contribute to the achievement of research competencies. Likewise, it is essential to strengthen research competencies by integrating duly carried out research into the student's education, in order to promote and empower a research culture.(2019)
According to Agudelo and Grisales, scientific or investigative skills benefit and strengthen research, as long as they are evidenced in the investigative undertake of a problem. Science is constituted through methods, which are developed from methodologies. In Higher Education, each class is based on a science, and they are organized into small units to give them to the students, therefore, for the teacher it is an obligatory commitment to understand the way in which this knowledge has been formed, as well as to guide and accompany the student to meditate on the method of that scientific area.(2019)
Finally, scientific research competencies and methodology, as expressed by Abbas (2021), make use of the following protocols: establishing, examining, and exposing questions or problems; explore, choose and interpret scientific data using specialized databases; approach to objectivities; hypothesis projection; proposal and development of sample designs; interpretation of research products; and writing and publishing scientific articles based on evidenced results.

ESSENTIAL COMPETENCIES OF THE SCIENTIFIC RESEARCHER

The attitudes considered significant of a scientific researcher according to Delgado et al., are: the desire for evolution and progress, showing a desire for discipline for constant scientific updating, with a proactive disposition towards the endless transformations caused by current technology; the joint work of local and international researchers with professionals from different cultures and languages; honesty in which every scientific researcher must be clear that the truth must be manifested in any situation. Likewise, the substantial knowledge in a scientific researcher is: philosophical, epistemological, methodical, technical and investigative understandings. Finally, the essential skills in a scientific researcher are located in: interpersonal relationships, praxis of values and order. (2020)

RESEARCH COLLABORATION BETWEEN TEACHERS AND STUDENTS FOR PEDAGOGICAL INNOVATION

The interrelationship between students and teachers, according to Abbas, is essential to achieve superior results in research processes. Likewise, the level of knowledge and experience that the professor possesses within the field of research is elementary. The teacher's duty is not only based on helping students to select their research problems, but also provides them with moral support, it is the impulse that collaborates in gaining confidence in students regarding academic issues, which results in excellent results. (2021)

Within the same aspect, the academic teacher-student relationship is based primarily on their research collaboration, students rely on the experience, reinforcement, constructive criticism, support and inventiveness of the professor. Even today; in an online evaluation systematization based on Information and Communication Technologies, students take into account that the experience, academic abilities and level of leadership that the teacher possesses are forces that serve as a boost for university students.

REQUIRED COMPETENCIES IN PEDAGOGICAL INNOVATION

It is predominant to ensure that knowledge is significant in institutions, the generation of quality in education is vital for the full development of human beings, under this precept according to Guerrero and Vásquez (2024), pedagogical innovation is subordinated to the dimensions: methodical innovation; focused on the procedures that professors use for the adjudication of information in students, taking strategies that go beyond what is particularly known and having emphasized the design of renewed forms of teaching in inherence to the styles in which individuals recognize knowledge; collaborative work, understood as the interpersonal performance of the people involved in educational praxis, taking rise in full relationships and coexistence. And, teacher training; which is part of the necessary knowledge that teachers must have for the educational exercise.

METHODOLOGY

The research was of a basic type with a quantitative approach of non-experimental design and causal correlational scope, taking 205 teachers from 6 Higher Education Institutions in Ecuador, addressing the Coastal, Serranía and Amazon zones, under a non-probabilistic sampling by judgment, involving all professors of basic education careers. by the requirement to address the problem from the individuals involved with the educational careers of that level, to measure the scientific competences they possess through the applicability of a questionnaire structured based on PISA and stipulated in OECD (2016), through the indicators inherent to the scientific knowledge of the problem, explanation of a problem in reference to societal involvement, hypothetical predictions, research and methodical purposes, research questions and scientific work, with a Likert scale distributed in: understanding, application, analysis, evaluation and creation. The reliability of the instrument was 0.947 determined at a good reliability.

Based on the measurement of pedagogical innovation, the applicability of a questionnaire was carried out based on methodical innovation, collaborative work and teacher training, with its indicators: pedagogical procedures, design of educational methods, teacher-student interrelation and updating of knowledge, with the indicators: understanding, application, analysis, evaluation and creation. Cronbach's Alpha for the instrument was 0.975, demonstrating good reliability according to the propositional ranges of George and Mallery (2003).

In the same way, Pearson's correlation test was used to measure the interrelationship between variables, through data processing in the Statistical Package for the Social Sciences (SPSS) version 20.0, analyzing the findings, To analyze the relationship between the study variables, Pearson's correlation was applied, following these steps:

The dimensions of each variable were determined based on the questions asked. Pearson's correlation between the dimensions of the Scientific Competencies Variable and the dimensions of the Pedagogical Innovation Variable was calculated. Finally, the global correlation between the Scientific Competencies Variable and the Pedagogical Innovation Variable was established.
Likewise, the criteria for the analysis of information were based on the knowledge that educators possess of the context under study in inherence to the factors inherent to scientific competencies and pedagogical innovation.
Finally, the study was based on the ethical aspects of the common good, focusing on the fact that understanding the problem in a scientific way provides possibilities for the recognition of contingent actions for societal improvement. Informed consent basis, where participants have agreed to participate in the study voluntarily. A foundation of authenticity, where it proclaims the non-manipulation of data. And, the foundation of justice, which conceives the equal treatment of the participants without any segregation, detriment or cause of non-recognition of their value.

RESULTS

CORRELATION

According to the Likert scale, once the value for each of the questions was obtained, Scientific Competencies were taken as variable (x), and Pedagogical Innovation as variable (y).

CORRELATION LEVELS

To interpret the correlation levels, the following scale was taken into consideration:
The values that r can take are: $-1 \leq r \leq 1$

Table 1.
Correlation Levels

Correlation levels	**Scale**
Perfect negative.	$r = -1$
Strong refusal.	$-1 < r < -0{,}5$
Moderate negative.	$r = -0{,}5$
Weak negative.	$-0{,}5 < r < 0$
There is no linear relationship.	$r = 0$
Positive Weak.	$0 < r < 0{,}5$
Moderate positive.	$r = 0{,}5$
Positive Strong.	$0{,}5 < r < 1$
Perfect positive relationship.	$r = 1$

TABLE 2. PEARSON'S CORRELATION BETWEEN THE DIMENSIONS OF SCIENTIFIC COMPETENCES AND PEDAGOGICAL INNOVATION

		Innovation Pedagogical			
	Correlations	**Knowledge planning and design**	**Teaching**	**Management and social relations**	**Professionalism**
Competences Scientific	**Discern the characteristic aspects of science**	,389**	,419**	,344**	,305**
	Propose and investigate enigmas and hypotheses	,186**	,196**	,273**	,252**
	Informing oneself, arguing and selecting individual and group resolutions	,441**	,348**	,354**	,475**

**. The correlation is significant at the 0.01 level (bilateral).

The correlation is statistically significant at the level of 0.01 (bilateral). This means that there is a probability of less than 1% ($p < 0.01$) that the observed correlation occurred by chance, suggesting strong evidence of a relationship between the variables.

In practical terms: The correlation between the dimensions is more significant, at the level of 0.01 (1%).

According to Table 2, a significant correlation is identified between the dimensions of scientific competencies and pedagogical innovation in the unit of analysis, the correlational range determined is positioned at , ranging from .186** to .475**.$0 < r < 0{,}5$

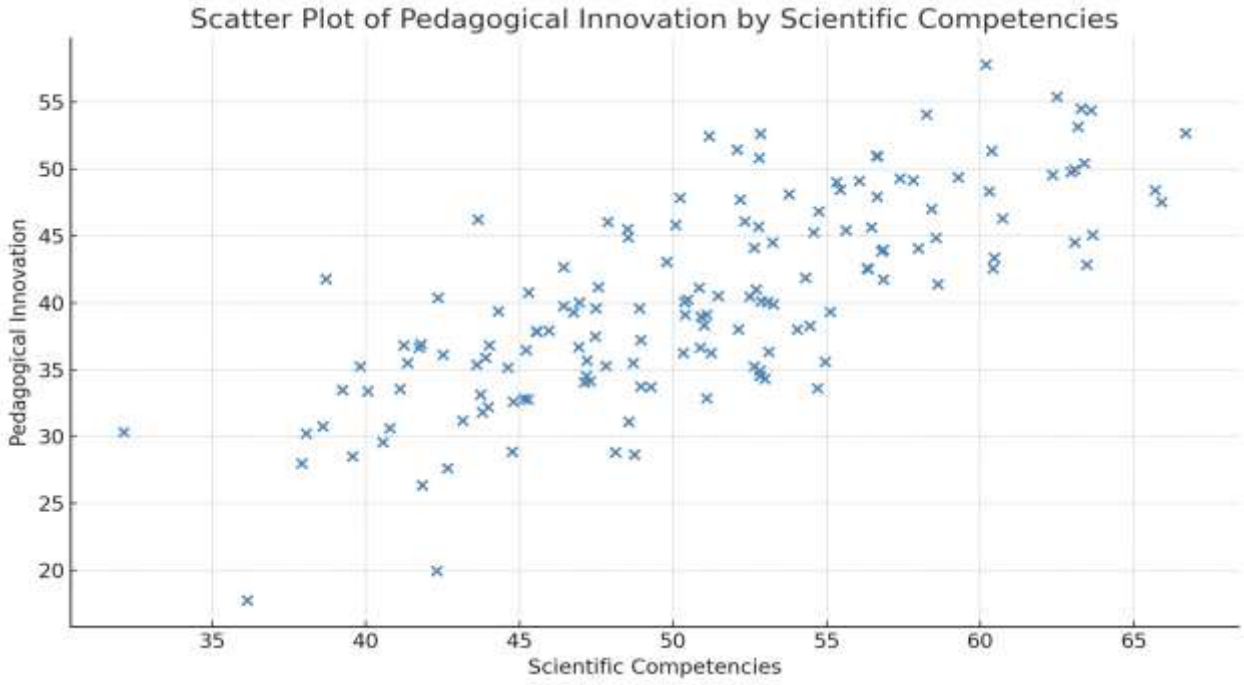
This denotes that: the ability to take an interest in scientific problems, identification of variables, critical reflection, search for information, recognition of scientific information, hypothetical approaches, verification and recognition, discernment of research purposes, methodical research approach, design and selection of appropriate instrumentation for the purposes of study, ability to process information, formulation of conclusive aspects, systematic observation, decision-making and collaborative work; They significantly influence the subjects investigated, specifically in their capacity to design learning, capacity for equitable teaching praxis, promotion of meaningful learning, involvement with pedagogical management, sense of institutional belonging, adequate time management, design of teaching methods, propositional areas with complex problems, effective interpersonal relationships and recognition, management and technological management.

TABLE 3. RELATIONSHIP OF SCIENTIFIC COMPETENCES AND INNOVATION PEDAGOGY

Correlation		Scientific Competencies	Innovation Pedagogy
Scientific Competencies	Pearson correlation	1	,826**
	Sig. (bilateral)		,000
	N	205	205
Innovation Pedagogy	Pearson correlation	,826**	1
	Sig. (bilateral)	,000	
	N	205	205

**. The correlation is significant at the 0.01 level (bilateral).

GRAPH 1 SCATTERPLOT OF PEDAGOGICAL INNOVATION BY SCIENTIFIC COMPETENCES



Source: Questionnaire on Scientific Competences and Pedagogical Innovation

Analysis and interpretation:

Considering the sign, and the numerical value of the correlation which is 0.826; which compared to the table of interpretations determines the existence of a strong positive relationship. Therefore, there is an evident strong relationship between scientific competencies and pedagogical innovation, in light of which it is determined that:
The greater the scientific skills, the greater the pedagogical innovation.
The lower the scientific skills, the less pedagogical innovation there will be.
That is: as the unit of analysis has scientific knowledge of a problem, adequately handles the information, achieves hypothetical predictions, significantly proposes the investigative and methodical purposes, knows the investigative issues of the scientific work and explains a problem in reference to societal implication; pedagogical procedures, the design of educational methods are increased in a positive and significant way, the teacher-student interrelationship is improved and the updating of knowledge is deepened.

DISCUSSION

In general, the results show that the capacities of recognition and management of scientific foundations influence innovative pedagogical praxis. In the light of Pedrinaci, scientific competences contribute to; delineate, explain, and forecast natural phenomena; discern the characteristic aspects of science; proposing and investigating enigmas and hypotheses; and to argue and select individual and social resolutions. Therefore, scientific competencies in educators are fundamental for through research, innovation and the production of scientific knowledge; transform and solve social phenomena from equanimous, comprehensive and inclusive positions.(2012)
According to Jiménez et al. (2020), scientific competence refers to the ability and willingness to use an accumulation of knowledge in duality with scientific research to solve questions of reality and act properly in dissimilar contextualizations, likewise;
In this aspect, Ruiz argues that scientific observation is fundamental to initiate the first conceptions of the problem, here the identification of the context of the object, the number of individuals involved and phenomena that intervene in the construct of the object is preeminent. In addition to this, Torres and Lamenta analyze observation from epistemological approaches, as they express; The adequate observation of a problem and the efficient treatment of it makes possible the accumulation of dilemmas that reflect the course of production of scientific understanding, the problem of the construction of scientific theoretical terminology, conceptions concerning methodology and logical structure in the development of scientific theories, all in inherence to the problem observed and studied.(2007)(2015)
On the other hand, under Mariscal's conception, context-based Research Projects significantly increase the dimensions of the concept, procedure and epistemic dimension of scientific competencies. Finally, the first step in understanding the problem is observation, which for Agudelo and Grisales, constitutes empirical evidence in the investigative undertake of a problem and if we apply this capacity to education, quality will undoubtedly improve.(2015)(2019)
From Sánchez's point of view, reading hand in hand with reflection and criticality contemplates the ability to understand a phenomenon or event, since scientific work is carried out in two orders that discern each other, although they are closely linked; the first order is the finding and the second is that of language, these denote the constituent of an action of complexity that has as its purpose scientific production, contributing to this postulate; Delgado et al. state that researchers must have philosophical, epistemological, methodical and technical understandings.(2014)(2020)
Likewise, it is established that scientific competencies have a significant correlation established in a margin of 0.826, so it is inferred that as scientific competencies are enhanced in the unit of analysis, pedagogical innovation increases, determining a better praxis and significance in educational work.
In inherence to this; Jiménez et al. , state that the individual's thought processes are characterized by aspects such as: transmission, practicality of mental development, independence and awareness, in order to dynamize the skills of problematic recognition and to carry out knowledge for critical analysis in order to solve a phenomenon in dissimilar contexts through scientific procedures. (2020)
Likewise; Burbano et al. conceive that scientific critical thinking is the result of praxis and its link with theory, involving the competence to resolve conflicts and be decisive with arguments that are scientifically validated. On another point, Guerrero and Vásquez (2024) argue that the current context in terms of the educational and research environment requires qualified teachers who are able to face social problems related to knowledge and how to construct it.(2020)
In this regard, Agudelo and Grisales state that; Science is constituted through methods, which are developed from methodologies, which are innovative and constitute units of significant strategies to be used in educability and increase its quality. In another aspect, Harris et al., states that; the professor must possess an integrated knowledge in the combination of the didactic possibilities of technology, with the pedagogical knowledge and the content that is to be taught in order to formulate innovative strategies for the allocation of knowledge, while Hernández et al., declare that;

The work of the research teacher is to constitute citizens with criticism, reflection and analysis, so that in this way; can be significantly developed in society.(2019)(2009)(2019)

On the other hand, Abbas postulates that collaboration between students and faculty in research contributes to the achievement of more relevant and superior resulting indices. In addition, at the level of researchers' involvement with the context, Barahona et al. argue that; The construct of scientific knowledge is constituted from the scientist's approach to family, sociocultural, socioeconomic and multidisciplinary contexts, creating a link with society and science, and consequently; a comprehensive motivational interest in achieving new knowledge and digging into different areas as life projects.(2021)(2018)

Likewise, Imbert and Elósegui argue that collaborative learning in teachers and students supported by projects, adjudicates the development of proactive capacity, in the same way; Castro et al. state that; The interrelationship between teachers and students in research allows us to rely on reliable and standardized sources regarding the scientific occupation in the university.(2020)(2018)

In the same way, Hoyos states that; Knowledge of scientific rigor is essential to obtain new facts and properly explain the entire research process in order to submit the results to confirmation or refutation. In other words, it is particularly essential to give reliability to the instruments and research processes. On the other hand, Delgado et al. contribute to this position by stating that; Among the attitudes considered significant of a scientific researcher is the proactive stance towards the endless transformations caused by technology, using it for methodical and technical understandings within their studies.(2020)(2020)

Finally, according to Nilo, researchers must have preeminently the ability to inform and originate an investigative question where the variables are determined and the accumulation of evidence, procedural plans, use of tools and mechanisms in the investigation is carried out, just like Sánchez, he states that the researcher is not a literate, but he must be an individual with the ability to express his reasoning entirely in a language of technicality, orally or in writing, these postulates are also inherent to that of Chávez and Romero, which positions the researcher's capacity for expression as the factor of socialization of the phenomenological particularities observed, contrasted, understood, analyzed and synthesized.(2019)(2014)(2021)

CONCLUSIONS

It is concluded that scientific competencies in higher education work are the capacities that human beings have in inherence to recognition, treatment, criticality, methodical approach, hypothetical structuring, instrumental design, data processing and production of scientific knowledge, to correct problems from education.

In the same way, pedagogical innovation is consolidated as the design of methodologies for the significance of teaching praxis, where joint work is a predominant axis, as well as interpersonal skills and recognition of contextual problems, to guarantee an educational quality that responds efficiently to current gaps.

Finally, it is concluded that, within the unit of analysis in the context studied, scientific competencies are positioned in a strong significant correlation in relation to pedagogical innovation, with a range of 0.826; significantly influencing it. This implies that, the greater the scientific skills, the more pedagogical innovation will increase and the lower the scientific skills, the less this innovation will decrease. That is to say; Knowing and significantly managing research processes denotes an improvement in the design of renewed methods for education, bringing innovation to educational praxis.

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