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Article

Invisible learning in the investigative competence of Lima schoolchildren

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Abstract: The present study, developed under a quantitative approach, explanatory scope and causal correlational design, aims to determine the influence of invisible learning on the research competence of high school students in two private schools in the city of Lima, Peru, whose educational models seek to develop autonomous learning and research through discovery learning and experimentation. Two questionnaires were applied to 120 students of the VII cycle of basic education, one to measure the perception regarding invisible learning with 20 items and the other to measure investigative competencies with 21 items; both instruments underwent the corresponding validity and reliability tests before their application. Among the main findings, descriptive results were obtained at a medium level for both variables, the correlations found were significant and moderate, and as for influence, the coefficient of determination R^2 yielded a value of 0.13, suggesting that 13% of investigative competence is predicted by invisible learning. These results show that autonomy, the use of digital technologies, metacognition and other aspects that are part of invisible learning prepare students to solve problems of varying complexity, allowing them to face the challenges of contemporary knowledge in an innovative and effective manner.

Keywords: invisible learning; research competence; secondary education; discovery learning; experimentation learning

1. Introduction

See the end of the document for further details on references. Learning is authentic, multifaceted and dynamic and is therefore capable of taking place not only in formal settings such as the classroom, but also in informal settings. In these contexts, learning is spontaneous and takes place in everyday situations; where continuous interaction prevails between the individual, their environment and their peers, developing capacities to seek divergent strategies and solutions to conflicts that may arise in their daily lives (Consejo Nacional de Educación, 2020; Fleer, 2023; Schei and Nerbø, 2015).

Today's technological innovation, globalization and contemporary learning are a latent invitation to establish action- and research-oriented transformative education. The challenge lies in guiding the teaching-learning process, so that the learner forges new knowledge at cognitive, socio-emotional and behavioral levels to learn and relearn (Gupta and Yadav, 2023; Unesco, 2017, 2024). In this sense, the student has a leading role that will direct the construction of their learning as a result of their critical-reflective, inquiring and co-creative interventions (Minedu, 2017; OECD, 2017; The National Academies of Sciences Engineering, 2021).

The Invisible Learning theoretical approach postulated by Cobo and Moravec (2011), argues that individuals acquire knowledge in a meaningful way through

exploration and experimentation, either individually or collaboratively, in diverse educational environments, both formal and informal, even unthinkable. This type of learning is characterized by its ubiquity, as the use of technology opens up access to educational resources at any time and place, fostering personalization, connectivity in learning networks and a focus on practical and continuous experience throughout life. It also enhances invisible competences that transcend beyond specific knowledge, such as critical thinking, effective communication, intellectual curiosity, among others, which are essential and contribute to the comprehensive development of students (Barber and King, 2016; Velásquez et al., 2021).

In this sense, it is crucial to highlight that invisible learning is conceptualized as a metatheoretical integration, which takes various educational theories as a basis for its conceptual foundation (Castorina, 2022). Considering the writings of Cobo and Moravec (2011) as a frame of reference, it is understood that the theories of autonomous learning, collaborative learning, experiential learning, meaningful learning and metacognition underpin invisible learning; considered as dimensions for the purposes of this research.

The afore mentioned dimensions are crucial in the educational process as they not only facilitate the process of acquiring knowledge, but also enrich the educational experience by promoting life skills. The first dimension, autonomous learning, refers to the ability of individuals to direct and control their own learning, involving self-regulation of objectives, strategies and evaluation of progress (Caballero et al., 2023; Luelmo, 2020). The second dimension, collaborative learning, is based on interaction and cooperation among learners, who work closely together to achieve shared goals (Curay, 2022; Vargas et al., 2020). The third dimension, experiential learning, emphasizes learning through direct experience and reflection on experiences, which allows for a thorough understanding of the knowledge acquired (Avila et al., 2024; Gleason and Rubio, 2020).

The fourth dimension, meaningful learning, highlights the relevance of creating personal and important connections with the content to ensure effective grounding and application in other contexts (Baque and Portilla, 2021; Parra and Mejía, 2022; Zamora et al., 2023). Finally, the fifth dimension, metacognition, refers to the ability of individuals to monitor and reflect on their own thinking and learning processes with a view to improving their academic performance (Embleton, 2023; Moreno et al., 2022; Salazar and Cáceres, 2022).

On the other hand, to speak of investigative competence is to refer to the set of skills, knowledge and attitudes that enable students to carry out processes of enquiry, exploration and analysis in a systematic manner. These competences are fundamental for fostering critical thinking, creativity and autonomous learning from an early age. This conception is based on the enquiry learning approach developed by renowned authors such as Dewey, Vygosky, Schwab and Linn, who maintain that students construct scientific thinking through the formulation of hypotheses, experimentation and critical analysis, thus promoting active participation and the autonomous discovery of concepts (Linn et al., 2004; Minedu, 2017; Rubio, et al., 2018; Rapana, 2023).

In the Peruvian National Curriculum for Basic Education, it was identified that the only subject where these competences are addressed is Science and Technology,

specifically in competence 20 “Investigates using scientific methods to construct knowledge”; however, it is considered that they should be developed in a cross-cutting manner in the other subjects. This competence stipulates a set of skills that will be considered as the dimensions of this second study variable, namely: problematizes situations, designs strategies, generates and records data, analyses data, evaluates and communicates results. It should be noted that the position of various authors such as Dewey, Lederman, Charpark and Schwab was contrasted in order to make an inference that these skills do not belong to an area of knowledge, but are part of the scientific method, but adapted to the level of studies where this research was conducted (Gómez et al., 2022; Izquierdo and Solaz, 2022; Minedu, 2017; Uzcàtegui and Betancourt, 2013).

The dimensions of the second variable refer to a set of skills that allow students to face the challenges of a constantly changing world, fostering a culture of innovation that can generate significant advances in various fields (Campos et al., 2022; Martins and McCauley, 2021). The first dimension, problematizing situations, refers to the raising of questions about certain events, their interpretation and the elaboration of associated theories and hypotheses. The second dimension, designing strategies, focuses on creating different scenarios for the execution of certain procedures, selecting inputs, instruments and specific data to corroborate or refute the hypotheses raised. The fourth dimension, analyzes data, focuses on the comparison of the interpreted data with the hypotheses generated and the information related to the problem, allowing the writing of well-founded conclusions. Finally, the fifth dimension, evaluates and communicates results, includes a process of critical reflection to detect the difficulties encountered and the knowledge forged in relation to the research question (Aguirregabiria, 2023; Bilbao, 2021; Imbert and Elósegui, 2020).

Consequently, the teacher must provide the student with the opportunity to participate independently and deliberately in their learning process, the student remains the protagonist, assuming an active role in the exploration, research and problem-solving. The role of the educator must resemble that of a “know-all”, someone versatile and adaptable, capable of researching, innovating, solving problems and facilitating the learning process of their students, especially from an early age (6 years) since it been shown that these scientific skills begin at that stage (Incháustegui, 2019; Laura et al., 2021; Osterhaus and Koeber, 2023).

According to the previous studies reviewed the link between the study variables as well as their components, it has been shown that invisible learning not only significantly facilitates the development of collaborative work among students, but it also enhances transversal competencies such as empathy, leadership, creativity and even the ability to manage situations under high pressure; likewise, students indicate being aware of the application of critical thinking skills when analyzing practical cases that reflect their contextual reality. In addition, they demonstrate notable autonomy in the manipulation of various digital resources, which underlines their adaptability and competence in advanced technological environments (Cobo and Moravec, 2011; Chancusig et al., 2017; Velásquez et al., 2021; Velásquez, 2022).

On the other hand, other findings reflect that an educational environment that is flexible and provides attractive and experiential experiences, allows the student to

think, feel and learn while acting; making this learning transcendental for him. Likewise, a favorable impact is generated in terms of student motivation, encouraging him to participate independently and forging a better relationship with his teacher. Likewise, it is recognized that this process is not exclusive to the teacher and therefore, it is clear that he is the one who, through his actions and position, influences in a decisive way the acquisition of scientific competencies in his students (Aguirregabiria, 2023; Molina, 2023).

It is worth highlighting that, in these educational environments, the student becomes the main agent of his or her learning, thus promoting self-education guided by his or her personal interests. This dynamic facilitates genuine inquiry into areas that the student considers exciting and pertinent, which stimulates curiosity and intrinsic motivation to delve deeper into research and discovery. In this sense, Information and Communication Technologies (ICT) are naturally integrated into the daily lives of students, becoming essential tools for searching for information and actively participating in their educational process. This allows them to interact with the real environment and apply their research skills in authentic and significant contexts (Cobo and Moravec, 2011; Dunlop et al., 2019; Medina et al., 2018).

Other authors have been able to verify the favorable impact of cooperative learning on the development of investigative competence, due to the fact that it improves the ability to search for and manage information, as well as the incorporation and use of technological resources for this purpose; in addition to mutual support when doubts arise in the process, students disseminate and contrast information as a result of research and reflection that leads to merely substantial learning. Likewise, the identification of problems and the proposal of solutions within teams, together with oral communication and the reception of observations, promote essential communicative skills for research.

However, it cannot be said that a person can acquire investigative competence from one moment to the next since, like any competence, it is necessary to work on it and develop it continuously over time to fully enhance and integrate it (Bilbao, 2021; Guerra et al., 2019; Morales et al., 2021). Likewise, the use of new technologies and digital resources provides students with a new alternative to connect and work together from other scenarios (forums, Google Drive, Moodle, among others), adopting a role as an online actor. It is worth mentioning that it is important to make a timely selection of the instruments and applications to be used since these should not only manage to awaken visual interest but should also serve and enhance the student’s learning processes. For this, it will be necessary to carefully design the learning sessions, clearly defining the objectives to be worked on and at the same time, the teacher should supervise that, in effect, the students are using said technological tools in a productive and reliable manner. (Lizcano et al., 2019; Ramírez, 2019; Yong et al., 2023).

Respecting to the influence of experiential learning and its link to investigative competence, the consulted sources state that promoting educational experiences close to the daily life of students allows them to actively participate in the world through informed decisions. This, in turn, generates greater interest and commitment between the students and what they are learning, allowing them to develop emotional, social and practical skills by exploring, experimenting and solving conflicts. In

addition, it is important to keep in mind that the evaluation of any competence must be verified through its practical application, focusing on the process as such and not necessarily on the results (Alba, 2019; Azqueta and Sanz, 2021; Aguirregabiria, 2023; Ávila et al., 2024; Morales et al., 2020).

With reference to the autonomous learning dimension, the studies reviewed reveal that it is necessary to encourage the development of autonomy in students and of course, the implementation and application of e-learning since it allows them to obtain new knowledge in different subjects independently. Through ICT, students have broad and easy access to various sources of information, deepening and enhancing their knowledge; which they must later filter according to the research they are carrying out. (Aliaga, 2022; Mayasari, 2021; Mendoza, 2022).

Regarding the significance of learning, different authors state that teachers must be able to manage and create a complex, attractive and motivating learning environment, which is a direct invitation to their students to explore and experiment in their interests, needs and personal experiences by applying their knowledge in their daily lives; in this way, the development of effective investigative skills is facilitated. In this type of learning situation, the student is exposed to developing their critical thinking based on their knowledge to give way to the resolution of the problems that arise (Moreira, 2021; Posso et al., 2020).

On the other hand, there are two factors that must arise for learning to become meaningful: the student's predisposition and the gradual and systematic acquisition. With respect to the first factor, there must be a desire to acquire new knowledge and regarding the second, it refers to the fact that it must be linked and integrated with their previous knowledge. In this sense, resorting to techniques such as memorizing content is not enough; on the contrary, it is imminent to generate problematic situations that demand autonomous efforts and encourage problem-solving to apply what has been learned in a practical and contextualized way (Céspedes et al., 2019; Gómez et al., 2019).

Moreover, evaluation should not only be external, but the student must also be aware of his or her abilities, skills and particularities when learning, since this will allow him or her to autonomously discern what is favorable to him or her from what is not. Having the ability to criticize one's own practices and generate improvements only reveals a high level of commitment, as well as the promotion of cognitive and social skills essential to ensure the development of critical citizens who are aware of their environment. In this way, the student has the possibility of controlling and explaining his or her own reality, and even more, so his or her behavior, being able to modify structures that he or she deems convenient (Moreno et al., 2022; Molina et al., 2023; Molina, 2024). In this sense, it is essential that the teacher can be a guide and companion: first, since he or she must serve as an example to model how the student can carry out this process and second, to question, provide feedback and make it more complex. Therefore, the metacognitive dimension in the acquisition and development of skills or learning will be effectively achieved when students are able to understand and direct from a holistic perspective. (Moreno et al., 2022; Molina, 2024).

Investigating invisible learning has a theoretical relevance, as it is an emerging metatheory that challenges and expands the traditional conceptions of learning, it

begins at an empirical level to a proposal of its components, as well as its links and influence with some variables, in this case with the investigative competence. After carrying out the corresponding state-of-the-art, it was concluded that there are few investigations carried out to date, even though the topic is relevant in the contemporary world in which students develop essential competencies and skills in informal contexts with the support of ICT, it is inferred that in traditional or conventional education the topic has been underestimated (Chancusig et al., 2017; Laura, et al., 2021). Its understanding will later allow practical implications, so that teachers can design more effective pedagogical strategies that promote and enhance continuous and ubiquitous learning, more inclusive and adaptive education to individual needs, valuing both formal and informal experiences.

In this framework, the general objective is to understand the influence of invisible learning on investigative competence from the perception of secondary school students from two educational institutions in Lima and the specific objectives are to describe the levels that both variables present, as well as to determine the correlations that exist between the dimensions of both factors.

2. Materials and methods

The research was conducted under a quantitative approach and causal correlational design, which answers questions related to the reasons why such problems or events originate or occur, or what are the factors or variables that intervene or affect that fact (Taherdoost, 2022). The population consisted of 120 students belonging to the VII cycle of basic education (students in the third, fourth and fifth year of secondary school) from two private educational institutions in the district of Chorrillos in the city of Lima.

Two self-directed questionnaires were applied, Likert scale type, with 5 response options in physical format during the hours assigned by the management of both educational institutions. The questionnaire to measure invisible learning was developed based on the proposals made by Cobo and Moravec, considering experiential learning, collaborative learning, metacognition, autonomous learning and significance of learning as dimensions, which were self-evaluated through 20 items. Likewise, to measure investigative competencies, it was developed based on the competencies proposed by the National Curriculum of Basic Education considering, problematizing solutions, designing strategies, generating and recording data, analyzing data, evaluating and communicating results as dimensions, and proposing 21 self-directed items. Both instruments went through the corresponding processes of content validity through expert judgment and statistical reliability by internal consistency obtaining a Cronbach's Alpha of 0.80 and 0.97 respectively.

3. Results

Regarding the descriptive results, the majority of students reported being at a medium level (62%) regarding invisible learning. The dimensions that presented the best results were those of experiential learning as a space for invisible learning with 40% of students at a high level, followed by collaborative learning with 33%. This implies that these students indicate that they have a series of skills and competencies

that they have acquired and developed outside the formal and structured educational environment, mainly through their daily experiences and interaction with others (see **Figure 1a**). Respecting research competence, many students (55%) reported being at a medium level. The dimensions that achieved the best results were evaluating and communicating results with 45% of students at a high level, followed by analyzing data with 48% of students at the same level. These results indicate that almost half of the students report that they have fundamental competencies in the field of academic and scientific research that are essential for the development and practice of methodical and rigorous research (see **Figure 1b**).

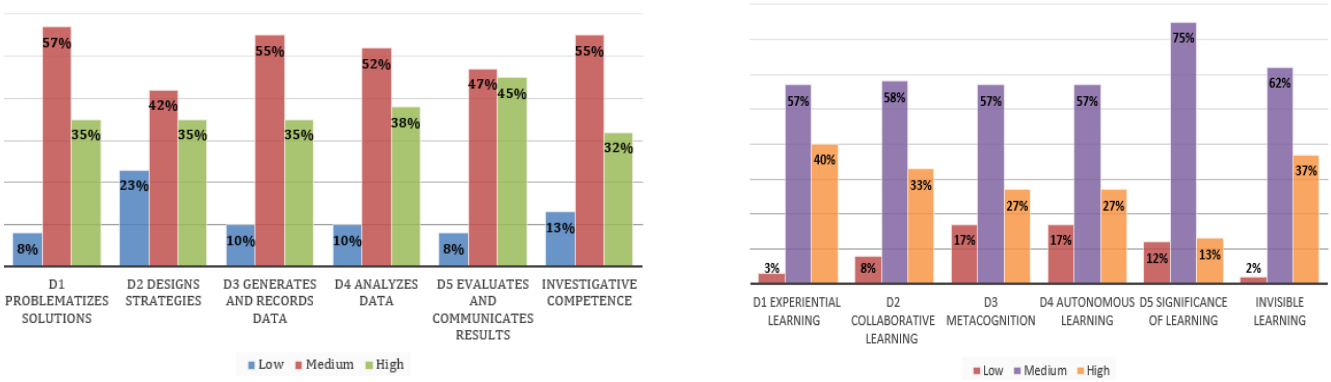

Figure 1. Descriptive results. **(a)** invisible learning and its dimensions; **(b)** investigative competence and its dimensions.

Table 1. Correlations between variables and dimensions of invisible learning and research competence.

Dimensions and variables	**Test**	**Experiential learning**	**Collaborative learning**	**Metacognition**	**Autonomous learning**	**Significance of learning**	**Invisible learning**
Problematizes situations	R de Pearson	0.21	0.32*	0.35**	0.19	0.22	0.32*
	p-value	0.112	0.013	0.007	0.153	0.096	0.014
Designs strategies	R de Pearson	0.33**	0.33*	0.36**	0.38**	0.34**	0.44***
	p-value	0.009	0.011	0.005	0.003	0.009	< 0.001
Generates and records data	R de Pearson	0.24	0.24	0.37**	0.21	0.31	0.34**
	p-value	0.068	0.061	0.003	0.099	0.018	0.009
Analyzes data	R de Pearson	0.14	0.13	0.32*	0.15	0.25	0.24
	p-value	0.288	0.318	0.011	0.264	0.057	0.07
Evaluates and communicates results	R de Pearson	0.13	0.12	0.39**	0.06	0.24	0.22
	p-value	0.321	0.349	0.002	0.627	0.063	0.094
Investigative competence	R de Pearson	0.24	0.27*	0.4**	0.24	0.3*	0.35**
	p-value	0.064	0.04	0.002	0.068	0.019	0.006
Model 1	*R*	0.35	R^2	0.13			

To verify the relationship between invisible learning and investigative skills, the parametric test of Pearson's correlation coefficient (r) was used, since the data had a normal distribution. The level of significance was set at $p < 0.05$, finding a significant relationship and a link of moderate intensity (0.35) between both variables; likewise, the following significant relationships were found between the dimensions: problematizes situations and collaborative learning (0.32), problematizes situations and metacognition (0.35), designs strategies with experiential learning (0.33), collaborative learning (0.33), metacognition (0.36), autonomous learning (0.38), as well as with the significance of learning (0.34). In addition to the relationships between generating and recording data and metacognition (0.37), generating and recording data and significance of learning (0.31), analyzing data and metacognition (0.32), and finally evaluating and communicating results and metacognition (0.39) (see **Table 1**).

To find the influence of autonomous learning on investigative competence, the coefficient of determination R^2 was used, a statistical measure used to evaluate how well a linear regression model fits the observed data, resulting in a value of 0.13 which suggests that 13% of investigative competence is predicted by invisible learning.

4. Discussion

Invisible learning is a construct that is under development; for this reason, we have initially worked with an operational model that will later go through the respective validation processes such as exploratory and confirmatory analysis; however, this limitation is an opportunity to contribute to the theoretical and operational construction of this concept. While it is true that the research focuses on a specific group of students from educational institutions in a district in Lima, limiting the generalization of the results, the task of expanding the population by considering educational institutions in other districts of Lima arises; in addition to, conducting comparative studies between schools of different types of management, educational models, socioeconomic level, regions of origin, among other aspects; offering valuable perspectives on how the institutional context influences invisible learning and investigative skills; for the time being, this research corresponds to an initial approach. Likewise, the state of the art resulted in the presence of few empirical studies related to the problem; therefore, it was decided to review studies with variables that incorporate elements and characteristics related to invisible learning and its relationship and/or influence on research competencies.

The descriptive find others; given most students perceived themselves at a medium level with respect to invisible learning; the components that presented the best results were experiential learning and collaborative learning, indicating that students refer to possessing a set of competencies developed outside the formal educational environment, with a preponderance of learning spaces through their daily experiences and interaction with others; given this evidence, there are opportunities for teachers to consciously integrate the principles of invisible learning into their practices, for example by designing experiences based on active participation in the environment, through problem-based projects or service learning.

One possible learning situation would be to challenge students to identify a real problem in their community and work on practical solutions, strengthening research skills by seeking information, designing strategies, collecting data and analyzing the results of real situations.

From the evidence, it is recommended that teachers promote collaborative work, since, through the exchange of ideas among peers, diverse learning is developed without being fully aware of this situation; teachers can organize group activities where students work in teams to investigate a topic, discuss their findings and present joint solutions to a problem.

Regarding investigative competence, most students were also perceived to be at a medium level; the best rated dimensions were evaluates and communicates results, as well as analyzes data; these results are contrary to those found by Nontol and Leyva (2023), who found that all first-year high school students were at a beginning level. This difference could be due to the fact that in the educational institutions where the research was conducted, learning is developed through discovery and experimentation; as Chávez (2022), Aguirregabiria (2023) and Molina (2023) argue, the development of investigative skills, such as problematization, theorization and verification of reality, is relevant; therefore, teachers should involve various strategies and procedures that encourage curiosity and inquiry in their class sessions.

Likewise, a moderate and significant relationship was evidenced between both variables (0.35); furthermore, the linear regression model suggested that invisible learning predicts research competence by 13%, as highlighted by Blankendaal et al (2023), students who use digital research skills in science learning environments tend to develop a better understanding and ability to construct graphs and analyze data. This suggests that the use of digital tools, characteristic of invisible learning, has a positive influence on students' investigative skills; as Greenhow and Lewin (2016) argue, students perceive that the use of digital technologies play a significant role in their invisible learning; commonly accessible spaces such as YouTube, online forums and social networks are considered valuable sources of knowledge and practical skills, which have proven to be important tools for the development of autonomous learning and interlearning, demonstrating the link of this learning with adaptability and competence in advanced technological environments (Chancusig et al., 2017; Cobo and Moravec, 2011; Velázquez et al., 2021; Velázquez, 2022).

The results of the correlations between the components of both variables, showed a significant relationship between the collaborative learning dimension of invisible learning and the dimensions problematizes situations (0.32) and designs strategies of the investigative competence (0.33); collaborative learning generates spaces for students to seek and receive support from their peers when facing doubts; likewise, the dynamics of working in teams to identify problems and propose solutions, together with the practice of oral communication and receiving feedback, promote fundamental communication skills that are crucial for the investigative process (Bilbao, 2021; Guerra et al., 2019; Morales, 2021).

Also, a moderate relationship was found between the experiential learning component and the dimension designs strategies (0.33), results that coincide with research that highlight the positive impact of educational experiences that reflect the daily life of students, in which active participation in the environment is facilitated

through informed decisions, increasing student interest and commitment to learning, allowing them to develop emotional, social and practical skills by exploring, experimenting and solving problems (Alba, 2019; Azqueta and Sanz, 2021; Aguirregabiria, 2023; Ávila et al., 2024; Morales, 2020).

Similarly, the autonomous learning component is moderately related to the dimension designs strategies and (0.38); the results of the analyzed antecedents show the importance of fostering autonomy in students, as well as the adoption of technologies, which will allow them to acquire knowledge in various subjects independently, since ICTs offer students broad and easy access to multiple sources of information, facilitating the deepening and enrichment of their knowledge (Aliaga, 2022; Mayasari, 2021; Mendoza, 2022). By fostering autonomy, students become more responsible for their own learning, teachers can achieve this by providing a variety of resources and letting students choose which materials to use and how to employ them, promoting self-efficacy and the development of research skills through independent exploration.

A relationship was also found between the learning significance dimension and designs strategies (0.34), as well as with generates and records data (0.31); evidencing that it is essential that teachers are able to manage and create a complex, attractive and motivating learning environment that invites students to explore and experiment according to their interests, needs and personal experiences; thus facilitating the development of effective investigative competencies (Moreira, 2021; Posso et al., 2020).

Finally, the metacognitive component of invisible learning is related to the dimensions, problematize situations (0.35), design strategies (0.36), generate and record data (0.37), analyze data (0.32) and evaluate and communicate results (0.39) of the research competence, evidencing the influence of metacognition in the acquisition and development of competencies or learning, allowing a deeper and more autonomous learning, helping students to perform more successfully in research environments. This self-reflection not only improves the ability to identify and solve problems, but also increases adaptability and efficiency in the acquisition of new knowledge (Moreno et al., 2022; Molina, 2024).

Although the relationships found are of moderate level, it is relevant, given the current global demands, to include ICT within learning sessions in a functional way. Students currently use platforms such as YouTube, social networks and online forums to acquire knowledge independently, therefore, teachers can take advantage of this trend by integrating the use of these resources in their formal lessons; for example, assigning students tasks that involve searching for information online, viewing tutorials or participating in discussions in educational forums, accessing a variety of information sources, facilitates a richer and deeper understanding of the content; in addition, students will develop their research skills in an autonomous and collaborative manner.

In view of the research, longitudinal studies are suggested to evaluate the impact of invisible learning on the development of research skills throughout the different stages of school life; in addition to exploring gender differences in the development of both variables, considering that some studies suggest that patterns of autonomous and collaborative learning may vary between men and women, as well

as comparative studies of contextual cut. Another line of research is related to the impacts of the implementation of pedagogical strategies based on invisible learning, such as problem-based learning, service learning, the use of technologies, collaborative learning, among others, on the development of various skills, including research skills.

5. Conclusion

Most of the students of the educational institutions studied perceive that they develop learning at a moderate to high level in informal spaces mediated by ICTs, the same with respect to their research skills. Regarding correlations, moderate and significant links were found between both variables as well as between the dimensions: problematizes situations and collaborative learning, problematizes situations and metacognition; designs strategies with experiential learning, collaborative learning, metacognition, autonomous learning and with the significance of learning. Relationships were also found between generating and recording data with metacognition and meaningfulness of learning; analyzing data with metacognition; and metacognition with communicating results and metacognition. Finally, the influence of invisible learning on students' research skills is significant, opening an important space of study for teachers to introduce in their formal practices, strategies that contribute to the interaction between students as well as with various digital resources that allow the development of "invisible learning" from the planning and thus also the development of research skills.

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