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Article

Systematic Review as a Strategy for Learning Scientific Research: An Experience with Law Students

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Abstract

The objective of the research was to determine if there is a relationship between the knowledge and practice of systematic reviews and the learning of scientific research by the students of the professional law career of the Private University of the North, Peru (Universidad Privada del Norte, Peru). The population comprised 172 students of the eighth, ninth and tenth cycle of the law degree during 2019 – 2020. The convenience sampling method was used to select 65 students for the study. The participants were trained and developed for the course activity, the systematic review in each of the academic semesters 2019-2, 2020-1 and 2020-2. Using a quantitative approach and non-experimental research design, the cross-sectional values and correlation between variables were measured. a questionnaire was designed to measure the impact of knowledge and practice in systematic reviews that students and how it contributed to learning of scientific research. The questionnaire contained 17 questions related to the measurement of the systematic reviews variable and 6 questions to measure the learning variable of scientific research. The questionnaire was validated by the Cronbach alpha technique. Good practices were observed on the development of the IMRyD sections in the development of the writing of the investigations by the students. It was found that 98% of the students considered the development of investigative skills as perfect compared to only 2% who considered it deficient. The study concluded that there was a significant relationship between the preparation of systematic reviews and the learning of scientific research, and that development processes of systematic reviews significantly influence the scientific research process.

Keywords

Research learning, scientific research, systematic reviews, investigative skills, law.

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Among the main obstacles that students face in the conduct of research is the lack of motivation to carry out scientific work. The reason given is the lack of adequate communication and coordination with the teachers and bring unaware of the benefits of research. Moreover, students do not make correct use of virtual tools in the research process, because they are not prepared to search for research in databases and make use of the Internet or the search engines that are more within their reach without corroborating its veracity (Moncayo et al., 2017); As a consequence, university students feel that the research courses carried out have not helped them to consolidate the bibliographic search competence (Rubio et al., 2018). A situation arises when even master's students, at the end of their research work, express fear, uncertainty and concern about the difficulties in locating the relevant documentation (Montesi et al., 2017).

Research training is an objective of priority since a professional needs training to develop research skills (Montesi et al., 2017). Training constitutes a transversal and structural theme of higher education (Alfaro-Mendives & Estrada-Cuzcano, 2019); however, it is a challenge not only for the teacher but also for the student (Valladares González et al., 2019). Teaching research is a complex process and a diversified activity (Ruiz-Aquino, 2018). Universidad Privada del Norte (UPN) has as a transverse educational axis to promote scientific and educational research among students, teachers and other members of the university community. This contributes to the comprehensive education of UPN students, strengthening their graduation profile and contributing knowledge and solutions for the country and especially the regions where the university operates. Traditionally, legal research is presumed non-scientific, which is why there are few scientific articles and systematic reviews published by lawyers, compared to other careers (Narváez Hernández, 2020). Many researchers in Law do not consider it important to reach the necessary parameters to be able to interact with other sciences, considering Law as an ad hoc science (Narváez Hernández, 2020).

It starts from the premise that making systematic reviews contributes to the learning of scientific research; whereas, learning is the process by which knowledge is built through own experiences (Blanco Aliaga, 2017). In this sense, it is urgent that students integrate knowledge with know-how, leaving aside the expository sessions that little develop the scientific base in the students. This will be possible only when scientific work is put into practice (Fernández & Fernández, 2017). Any research or investigative work will generate in them reflection, critical thinking and argumentation; it will enhance the skills that every professional must possess. Therefore, knowing how to do systematic reviews allows the students to participate in the study to develop their investigative skills.

In this sense, strategies that facilitate their learning should be looked into, thus raising the research question of this study: What relationship exists between knowledge and practice of systematic reviews and learning of scientific research by students of the professional career of law at the Universidad Privada del North, Peru during 2019 - 2020?

Literature Review

Previous studies like Rojas-Solís et al. (2021) were carried out in Mexico City with students from the Faculty of Psychology of a public university, with the aim of knowing the students' attitude towards scientific research and knowing whether or not teachers influence students to carry out scientific research. Among their results, it was found that the average attitude of university students towards scientific research ranged from fair to unfavorable. Most university students indicated that their participation in scientific events scheduled by the university was infrequent. Likewise, university students stated that teachers hardly presented their own research work in class.

P. H. Quispe (2019) conducted a research entitled "Science learning based on scientific inquiry to students of Regular Basic Education," based on 25 students in the fifth year of secondary education who were entering the university. The study used a quasi-experimental design, and posed a problem to students, who, in order to solve it, had to carry out an inquiry in written and virtual sources about the contents related to the problem. The data was then presented into tables and results were analyzed and interpreted using the Kolmogorov-Smirnov normality test and ANOVA. The participants subjected to the study achieved greater development of investigative skills and that learning in science was significant when it is based on scientific inquiry.

L. M. González and Rasilla (2011) reviewed the competences proposed by the Tuning project. and the proposals of other degrees and the 2061 project of the United States. The study used a qualitative experimental

research design with constructivist methodology, focusing on investigating the meaning of a phenomenon for those involved in a social program. The problem was discussed in context of a sample of 15 students; whose interest in scientific research was analyzed through evaluation matrices and systemic networks. It was concluded that there was a lack of strategies that encouraged students to internalize the learning they had learned, so that they were able to apply them in different contexts, in situations that require their integrated use. The design of the recommended strategies also focused on the achievement of specific skills, which were presented as an alternative to contribute to the appropriation of scientific culture.

A systematic review can be an experiential strategy of writing-research-publication triad in engineering (Rave, 2015). Carrizo and Moller (2018) point out that systematic reviews are ideal for learning scientific research because they require a rigorous methodology, from the formulation of the problem, the bibliographic search, and the verification of the validity of the studies. It is also required o develop the skills of the extraction of data, analysis of results and synthesis (Molina Arias, 2013). A systematic review is defined as a systematic, explicit, and reproducible method of identifying, evaluating, and synthesizing the existing body of comprehensive and recorded work produced by researchers, scholars, and practitioners (Booth et al., 2022; Fink, 2019). It implies that on one hand, it allows knowing a specific area of interest; and on the other, this knowledge must be achieved by following a rigorous process. In this regard, Littell et al. (2008) point out that the steps of a systematic review are the same as in an empirical investigation.

To prepare a systematic review, the first thing that must be done is the plan that contains a specific and structured question (Moreno et al., 2018). A research question is often helpful in searching for articles that allow answering the question. Moreno et al. (2018) add that the steps to follow to carry out a systematic review include approach to the structured question, search of databases, selection of articles, data extraction and statistical analysis.

A. M. Quispe et al. (2021) point out that to design a systematic review, the first thing that is required is a well-posed research question. Ideally, the PICO format should be used, which seeks to identify and specify the population (P), intervention (I), comparator (C) and the outcome (O) or outcome of interest. The type of evidence to review depends directly on the type of research question being asked. It is also important to apply the methodology for evaluating the quality of the evidence according to the risk of bias, which may be the Cochrane risk-of bias tool, and to define the statistical analysis plan; Likewise, to finish, the use of international drafting standards such as the PRISMA statement (Hempel, 2020) is recommended.

From the perspective of pedagogical sciences, investigative skills try to restore the necessary and essential relationship between academia, life, work environment, theory, pre- and professional practice, as well as social performance (Villar et al., 2011). Therefore, the contribution of research becomes essential for problem solving. Miyahira's (2009) study analyzes the difference between formative research and the research training provided to students in universities, stating that the ability to investigate is achieved by doing research. The author argues that research training allows university students to produce new knowledge and develop the necessary skills which allows them to carry out productive activities associated with scientific research. Moreover, formative research is a tool of the teaching-learning process developed by universities, where the teacher directs the students using the research method. The author concludes by stating that formative research is essential for research, because it allows students to develop critical thinking skills, developing the ability to propose solutions to the problems they face at university and in the exercise of their profession.

Finally, according to Vera Carrasco (2009), "The fundamental difference between a review and an original work or primary study is the unit of analysis, not the scientific principles that are applied." Therefore, the objective set for the study was to determine if there is a relationship between the knowledge and practice of systematic reviews and the learning of scientific research by the students of the professional law career of the Universidad Privada del Norte, 2019 - 2020.

Methodology

Research design

A basic cross-sectional, non-experimental, quantitative design research was carried out at the correlation level between the variables: X. Systematic reviews and Y. Learning from scientific research.

Sampling

The study population consisted of 172 law students from the UPN, Peru, located in Breña. The non-probabilistic convenience sampling method was used, due to the closeness of the object of study to the researcher (Otzen & Manterola, 2017). Finally, a sample of 65 students from three classes (8th, 9th and 10th), who belonged to three semesters (2019-2, 2020-1 and 2020-2) were sampled for the study

Instrument and research procedure

As a data collection technique, a survey questionnaire was used. The instrument was a questionnaire with 17 questions referring to the measurement of variable X (systematic reviews) and 6 questions for the measurement of variable Y (scientific research learning). The took used a Likert-type scale with four levels (X: 1 Never, 2 Sometimes, 3 Frequently and 4 Always) (Y: 1 Totally Disagree, 2 Disagree, 3 Agree, 4 Totally Agree).
The dimensions associated with each variable are presented below:

Variable	Dimensions
X: Systematic reviews	D11: Writing the context of the problematic situation of the study D12: Search for bibliographic references D13: Study findings D14: Discussions of the study
Y: Initiation in scientific research	D21: Initiation in scientific research

The reliability of the instrument was performed using the Cronbach alpha statistic where the following results were obtained:

Variable	Cronbach's alpha	No of elements
X: Systematic reviews	.918	17
Y: Learning from scientific inquiry	.755	06
Global Instrument X and Y	.927	23

The instrument associated with variable X had a reliability of 91.8%, while the instrument associated with variable Y had a reliability of 75.5% and, as a whole, the total instrument had a reliability of 92.7%. Therefore, a high reliability of the instrument used in the present investigation was evidenced.

The procedure involved selection of one course for each academic cycle (8th, 9th and 10th), to develop a systematic review study as the final product of the course. This systematic review would be graded and each student was required to participate in the academic paper contest. This system was applied during 3 academic semesters 2019-2, 2020-1 and 2020-2, with the following activities:

1. Training of students and teachers in Scientific Review.
2. Advisory services for the development of Scientific Review.
3. Scientific Review assessment in week 12 using the University-approved rubric for systematic reviews.
4. Analysis of all the Scientific Reviews of each semester by a team of researchers from the faculty, to select three best products to be awarded.

These activities allowed to have evidence of the impact of the learning process of Scientific Research, based on the knowledge acquired in conducting theoretical research, such as systematic reviews. A few study hypotheses were also proposed to validate the relationship or association between the variables:

1. H o : The systematic reviews are not related to the learning of the scientific research of the law students of the UPN, Peru during 2019 - 2020.
2. H 1 : Systematic reviews are related to the learning of scientific research by law students at UPN, Peru during 2019 – 2020

- *Data Analysis:*

Data processing and analysis was performed using the statistical software SPSS v.25, and the ANOVA test was developed to measure the significance of the dimensions of the variable X: Systematic reviews on the variable Y: Learning from scientific research. Next, the univariate descriptive statistics associated with these variables were calculated, taking into account the assessment scales: 1-Very bad, 2-Bad, 3-Good, 4-Very good.

Results

Relationship between practice of systematic reviews with learning of scientific research.

Figure 1 shows that 58% of the students always write the problematic situation based on the background when developing their research; the writing of the problematic situation starts from the general to the particular (55%); 65% always include citations in the wording of the problematic situation; 55% always pose the research problem as a question; 68% always write the objective based on the problem posed.

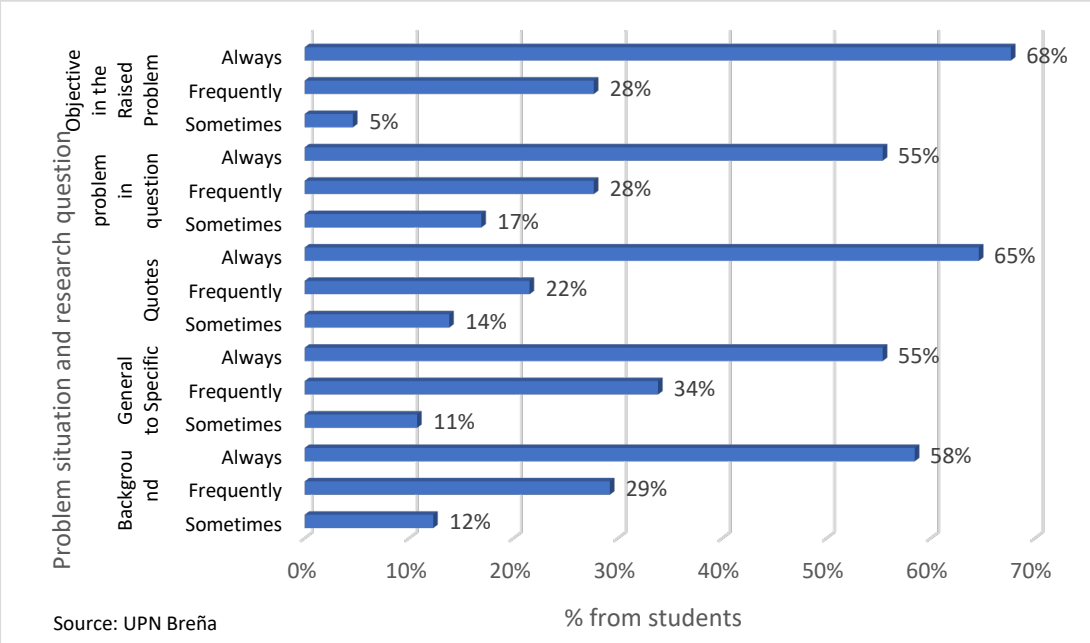

Figure 1. *Distribution of students according to problematic situation, problems and research objectives.*

Figure 2 shows that 65% of students always organize the information search process they used in their investigations; 83% always used academic search engines such as Dialnet, Google Scholar, Scielo, etc. as data collection tools; 60% always determined inclusion and exclusion criteria in their review search process.

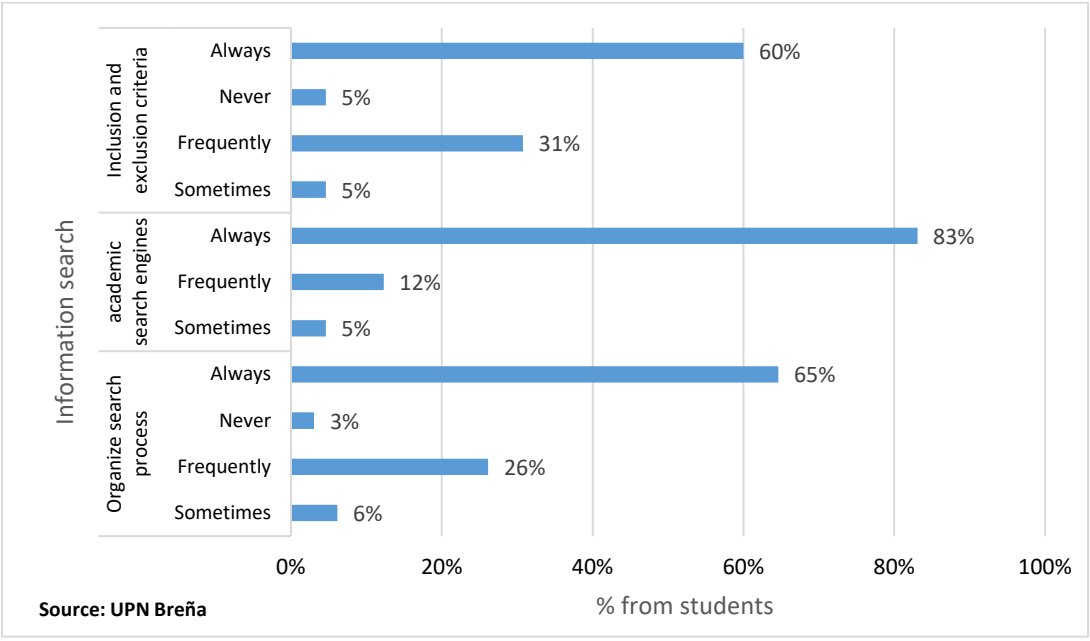

Figure 2 *Distribution of students according to search method*

Figure 3 shows that 68% of the students always organize the articles and/or references that will be used in the study within a matrix; 45% always present the findings of their study through tables and figures; 55% always consider that the results of the study are their own creations; 55% always show evidence of achievement of the stated objective; 46% always base their research on preliminary results presented by the authors of the articles and background information used in their study; 48% always consider that the results of their research allow comparisons with the references of the study.

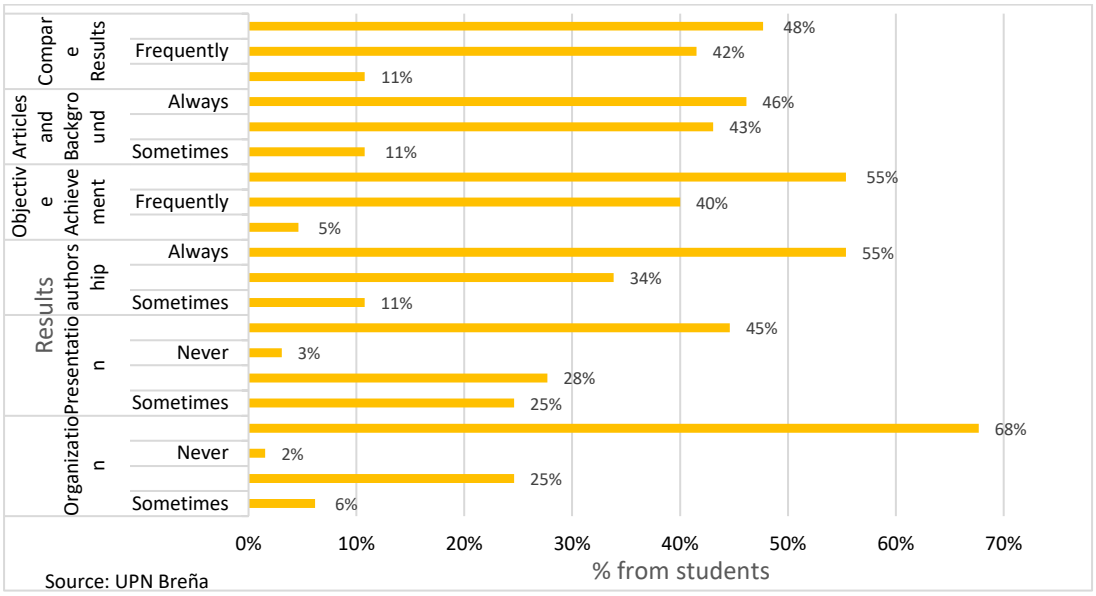

Fig. 3. *Distribution of students according to results*

Figure 4 shows that 69% of the students always consider that the conclusions of their study are related to the stated objectives; 46% always consider that the discussion of their research is carried out taking into account their results; 54% usually consider in the writing of the discussions certain differences and similarities with the references of the study.

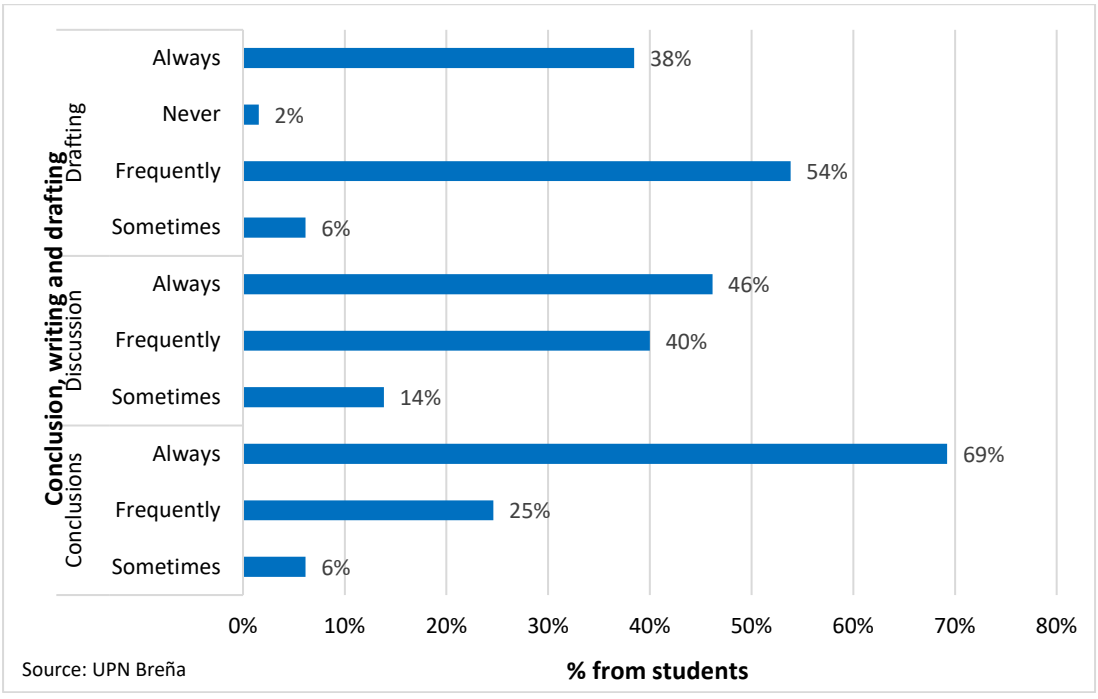

Fig. 4. *Distribution of students according to conclusion, discussion and writing of results.*

Figure 5 shows that 86% of students consider the systematic review to be very good, compared to 3% who consider it poor.

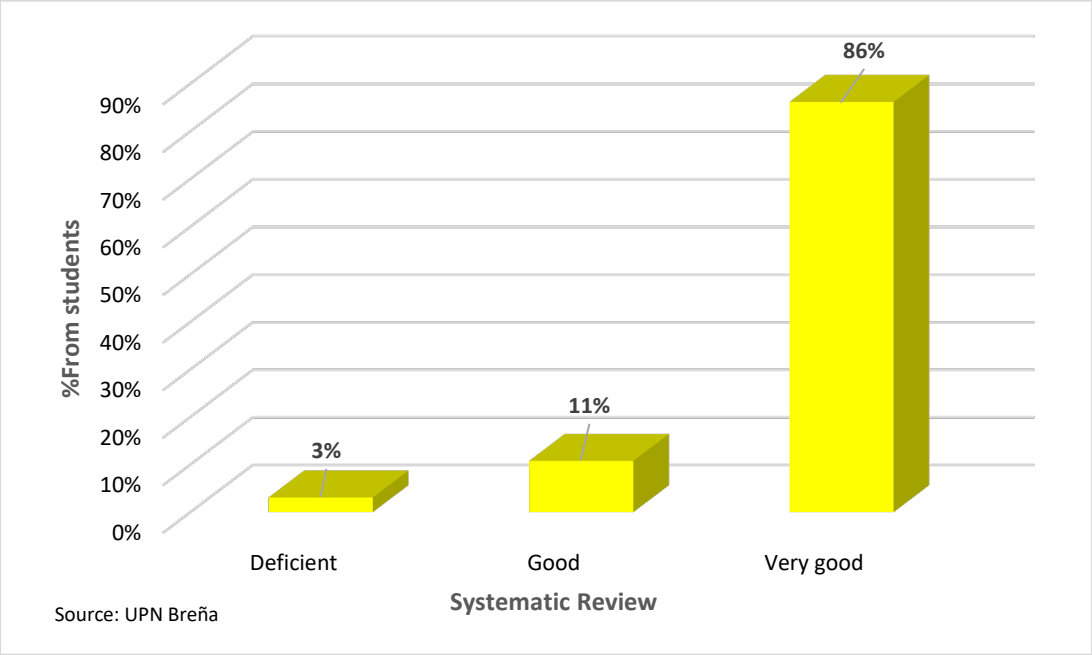

Fig. 5. *Distribution of students according to systematic review*

Figure 6 shows that 98% of students consider research learning to be good to very good, while only 2% consider it deficient.

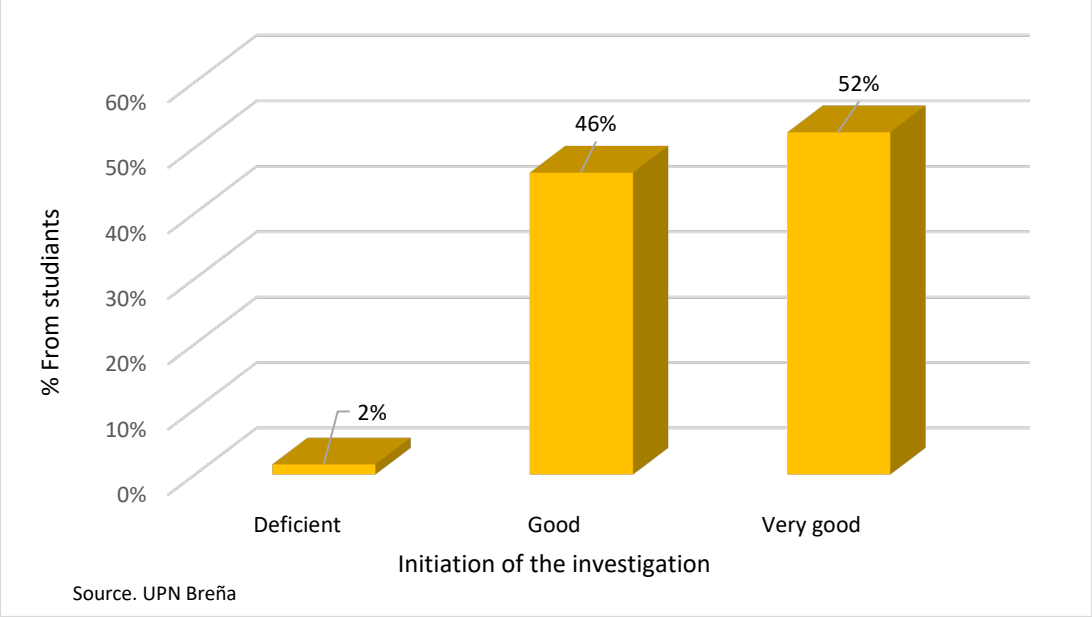

Fig. 6. *Distribution of students according to research learning*

Hypotheses testing

1. H o : The systematic reviews are not related to the learning of the scientific research of the law students of the Universidad Particular del Norte, 2019 - 2020.
2. H1: The systematic reviews are related to the learning of the scientific research of the law students of the Universidad Particular del Norte, 2019 - 2020.

Table 1 presents that the value of P – Value or Sig = 0.000<0.01 is highly significant, therefore, the null hypothesis is rejected and the alternative hypothesis H1 is accepted. At a significance level of 1%, it is concluded that systematic reviews are significantly related to the learning of scientific research by law students of the UPN, 2019 - 2020.

Table 1 *Non-Parametric Correlations According To Systematic Review And Initiation In Research*

			Systematic review	Initiation in research
Spearman's Rho	Systematic review	Correlation Coefficient	1,000	,693**
		Sig. (bilateral)		**0,000**
		N	65	65
	Initiation in research	Correlation Coefficient	,693**	1,000
		Sig. (bilateral)	0,000	
		N	65	65

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

Analysis of the X variable: Systematic reviews

The univariate descriptive analysis of the scores and the ANOVA for the dimensions of the Systematic Reviews variable are presented in Table 2:

Table 2 *Systematic Reviews In The Initiation In Scientific Research.*

X: Systematic Reviews	Initiation in Scientific Research			
	Median	SD	F	Sig
Writing The Context Of The Problematic Situation Of The Study.	3.77	0.463	7.179	0.009
Search For Bibliographic References	3.80	0.477	6.645	0.012
Study Findings	3.73	0.542	24.942	0.000
Discussions Of The Study	3.69	0.560	28.062	0.000

Source: UPN, seat of Breña 2019 to 2020

Table 2 shows that the dimensions of the Systematic Reviews variable present values greater than 3 points (good to very good) on a scale of 0 to 4 with deviations close to 0.6. Likewise, the dimensions are highly significant (p <0.05), so it is concluded that the dimensions of the systematic reviews influence the initiation of the research.

Analysis of the Y variable: Learning from scientific research

The univariate descriptive analysis of the scores and the ANOVA for the variable Learning of Scientific Research are presented in Table 3:

Table 3 *Learning from Scientific Research In Systematic Reviews.*

Y: Learning from Scientific Inquiry	Systematic Reviews			
	Mean	SD	F	Sig.
Knowing the activities to follow in an investigation process	3.34	0.644	27.052	0.000
Knowing the research process motivates your interest in research	3.38	0.764	5.445	0.011
Your knowledge is sufficient to develop an investigation process	3.02	0.800	21.743	0.000
Your skills are sufficient to carry out research work	3.26	0.691	5.179	0.006
Experience in research favors the realization of your research	3.42	0.659	24.962	0.000
Age is an obstacle for the development of research work	3.05	0.722	17.642	0.009

Source: UPN, headquarters of Breña 2019 to 2020

Table 3 shows that the items of the Learning from Scientific Research variable have values greater than 3 points (good to very good) on a scale of 0 to 4 with deviations close to 0.8. Likewise, these present highly significant values (p<0.05), so it is concluded that the items in scientific research influence systematic reviews. These results complement the existing relationship between the dimensions of the variable X: system reviews and the variable Y: Learning from scientific research, whose details are shown in Table 2.

Discussion

An important percentage of students participating in the study always use academic search engines such as Dialnet, Google Scholar, Scielo, among others, as data collection instruments. This shows that students are engaged in the search and investigating process for scientific documents (Figure 2). However, this finding differs from the results obtained by Moncayo et al. (2017) who found that the students participating in their research made use of information from Google that was more within their reach without corroborating the veracity, because they were prepared to carry out searches in databases.

The practice in systematic reviews as a means to generate scientific research learning in law students has been favorable, which confirms what was pointed out by Kitchenham and Charters (2007). These studies show that while elaborating systematic reviews, in its process, it is necessary to identify, evaluate and interpret many available research works that are relevant to answer a research question, as shown in Figures 1 to 4. This study made it evident that students value and put into practice these processes for the development of their systematic reviews. Therefore, those who follow this process naturally acquire research practices as rigorous as those required for the development of scientific research.

The findings of this study also confirm that the knowledge and practice of systematic reviews influence students' learning of scientific research, with a highly significant correlation. This is consistent with I. F. González et al. (2011), who stated that systematic reviews were also scientific research, whose unit of analysis was the original primary studies. Therefore, when preparing their systematic reviews, students followed the same steps as when conducting scientific research (Littell et al., 2008). These steps are explained below:

1. **Writing of the problematic situation**: The writing of the problematic situation in a research work, according to Espinoza Freire (2018), begins by identifying a problem for which a solution has not yet been found and must be specified and valued to proceed with in the proposed study. This skill is acquired by students who participated in the study when they formulated the specific question through a systematic and explicit process (Arévalo Barea et al., 2010); This is seen with 65% of students who indicated the development of the context of the problematic situation based on the background, including citations in their writing (Figure. 1).
2. **Information search**: Starting from the research question, it is necessary to make an adequate selection of keywords or search terms to use in bibliographic search engines (Pardal-Refoyo & Pardal-Peláez, 2020). This practice is clearly evidenced in dimension 2 of the variable X and in Figure 2 of the study, with 83% of students always used academic search engines as information (data) collection tools. All research work requires knowledge of the state of the art, which is widely covered when the student prepares the systematic review, while the location and selection of relevant study articles requires knowledge and access to databases applying inclusion criteria and exclusion, resulting in proactive learning by students, as stated by Sánchez-Meca (2010).
3. **Presentation of results**: This step follows a systematic and structured process of using the information collected, for which it is necessary to apply tools and data processors that allow the achievement of the study objective to be evidenced, and to answer the research question (Manterola et al., 2007). The process that denotes the importance on the part of the students that in 68% use matrices to organize and process information, taking into account the review articles as units of analysis (Figure 3).
4. **Writing of discussion and conclusion**: the results obtained in systematic reviews can be presented in tables, figures and text. Obviously, they can be discussed as in any scientific research, and must be concise and reasonable (Manterola et al., 2007); as evidenced in the results of the study, where 69% of the students always considered that conclusions should be drawn up based on the stated objectives.

The preparation of systematic reviews thus constitutes a tool for learning scientific research, which is similar to what Reynosa Navarro et al. (2020) concluded. It allowed students to develop criticality in the face of complex problems, contributing to their investigative training. Likewise, it facilitates investigative learning, which is contrary to the findings of Loli Ponce et al. (2015), which asserted that both the development and presentation of a research project are moments full of tension and perceived as traumatic, difficult and complicated. Therefore, when analyzing the results on the appreciation of the systematic review by the students, it was found that 86% considered it very good, confirming what Rojas Betancur and Méndez Villamizar (2017) stated about students' attitude towards research as a tool to analyze the quality of this education linked to the

scientific dimension. Thus, this study observed that students valued training in research and the academic requirement to carry it out (Figure 5).

Finally, it is important to highlight that the elaboration of systematic reviews by the students of the 8th, 9th and 10th cycle of the law career of the UPN, Peru were directed by the teachers of each course. They taught students how to search for information in databases, to process it and to develop the structure of a systematic review; how to appreciate the practice of formative research. Accordingly, students are able to contribute new knowledge by developing the competence of critical thinking, proposing solutions to current legal problems through scientific research, and demonstrates the transit through the process of training for research. This coincides with the findings of Miyahira Arakaki (2009) that formative research is essential to achieve research training.

In this regard, Rubio et al. (2018) affirm that when carrying out the analysis of the development of the research process, it can be analyzed according to investigative competencies such as general investigative concepts, bibliographic searches, information collection techniques, analysis of information, ethical treatment and academic writing. These competences impact students' average performance, as evidenced in this study, where four major skills were considered in the development of systematic reviews: Writing the context of the problematic situation of the study, search for bibliographical references, study findings and study discussion, and performing the ANOVA test, all of them have a significant influence on the learning of scientific research.

Conclusion

The study found out that the development of systematic reviews skills influenced the learning of scientific research of Law students of the UPN, Peru, because when they followed the steps to prepare the systematic review, the same steps were followed to conduct a scientific investigation. It is evident that the teaching of research through the knowledge and practice of systematic reviews can be an option to enhance the scientific research skills. L. M. González and Rasilla (2011) rightly asserted that science education should be conceived as a process of immersion in a scientific environment and the practice of systematic reviews should be a part of scientific process. When a teacher guides students in research methods, they can develop systematic reviews. The teacher contributes to learning research training of university students so that they are able to solve current legal problems and develop critical thinking.

Thus this study denotes the importance of teachers identifying difficult situations in the teaching-learning process and proposing activities that contribute to the development of students' investigative skills according to their specialty. The significance of this study lies in making advancements in helping students learn scientific research skills, which would be useful for social development and in the application of various strategies in students' professional career.

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