Research Article

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Interdisciplinary Work for the Elaboration of Formative Research: Student-Teacher and Teacher-Teaching Staff

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Abstract

The article shows a solid proposal that aims to find out whether formative research is developed through interdisciplinary work between teacher-teachers. In order to guide the research process, the following scientific question is proposed: How does interdisciplinary work influence the elaboration of formative research among teachers of the different careers of the Faculty of Educational Sciences, Humanities and Technologies? This work is descriptive in nature, the following analytical-synthetic and phenomenological research methods were used, working from a mixed approach (Sampieri, 2014). From the random online survey applied to the teachers, 88 responses were obtained, which allowed us to characterise the professional experiences with respect to the subject of formative research. The results have allowed a closer look at the development of the formative research project during the academic period April - August 2022, showing that this work is carried out on an individual basis. There is an interest on the part of the teacher in working in an interdisciplinary way, bringing together the various subjects of a semester to obtain a quality product. Meanwhile, the obstacles in the development of interdisciplinary formative research are due to factors of time, communication, lack of knowledge and limitations that have had a negative influence on its action, being a necessity.

Keywords: *education, teaching-learning, cooperative work, collaborative actions, interdisciplinarity*

1. Introduction

Article 350 of the Constitution of Ecuador states that: "The purpose of the Higher Education System is academic training (...) with a scientific and humanistic vision; scientific and technological research;

(...) in the construction of solutions to the country's problems" (Asamblea Constituyente, 2008, p. 162). Educational policies expressed in the Organic Law on Higher Education (LOES) and in the Academic Regime Regulations (RRA) also include strengthening research as one of the main objectives. Article 30 establishes the levels of institutional research for HEIs, which are formative research and academic-scientific research. According to Article 31, formative research is a fundamental component of the academic training process and is developed in the teacher-student interaction, throughout the development of the curriculum of a degree or programme; as a transversal axis of the transmission and production of knowledge in learning contexts; enabling the development of research competences by students, as well as the innovation of teachers' pedagogical practice. (Unach, 2022).

This requires changes and criteria to be met, among which are: quality education, a research transformation process, (...) as a fundamental way to maintain and improve its category according to the Council for Quality Assurance in Higher Education (CACES, 2018).

The National University of Chimborazo (Unach) since 2015, proposes the curricular redesign with subjects that involve their students in the research field throughout the process of their training in order to meet these requirements; Likewise, the Regulations of Academic Regime of the degree courses of the National University of Chimborazo in Article 82.- Of the formative research, decrees the formative research together with the research of academic - scientific character the two levels of institutional research (UNACH, 2022).

Therefore, since 2020 UNACH has increased formative research in academic training activities to strengthen this competence, which is developed by semester and subject, establishing guidelines and formats to guide teachers and students in its development, such as: Guidelines for the development of formative research at the National University of Chimborazo. Therefore, formative research is a form of teaching that places the student as the protagonist of their learning, involving them in the world of science and research through experimentation and practice, as well as allowing them to be initiated in the use of teaching methods, techniques and strategies, with the aim of learning to learn, encouraging the active participation of students in the achievement of competences, multiple intelligences and creativity (Valero, 2021). In other words, formative research is defined as the set of knowledge, skills, abilities and attitudes to develop research processes, with a view to systematising the practices of enquiry into social and organisational problems (Morillo, Pulido, & Mancipe, 2015).

Formative research is a university activity in which the role of the teacher is essential, mainly as a guide who cultivates motivation and knowledge in their students as a response to social and personal demands (Gonzaga, Cabrea & Chuncho, 2024). Therefore, formative research and interdisciplinary work are key components in education that not only enhance learning, but also prepare students to face the challenges of today's world; developing critical skills, fostering creativity and engagement through the acquisition of meaningful learning that facilitates the connection between theory and practice, which helps students to better understand concepts and their application in real situations.

2. Literature Review

Nowadays, interdisciplinary work is essential for the development of effective and quality formative research. Collaboration between students and teachers, as well as between faculty, allows for the integration of different perspectives, knowledge and skills, enriching the research process. In other words, it plays a crucial role in the development of formative research, as highlighted in several studies. Daza, (2023) emphasises the importance of fostering positive attitudes towards formative research among students to improve educational quality and competence. Vicuña & Robalino, (2023) underline the importance of formative research in promoting autonomous thinking among teachers, showing its role in meaningful learning and the development of autonomous thinking skills. Prado, (2023) further supports this type of research by suggesting that teaching strategies such as problem-

based learning and collaborative approaches are essential for cultivating research skills in university settings.

This synergy between the various educational actors fosters mutual learning, the generation of new knowledge and the practical application of findings in the classroom. By joining forces and establishing a dynamic of teamwork, an environment is created that is conducive to innovation, problem solving and the development of formative research that has a positive impact on the student-teacher and teacher-teacher teaching-learning process.

Thus formative enquiry goes beyond the mere acquisition of methods to cultivate a genuine inquiry mentality among students, ultimately improving their learning outcomes and preparing them for the demands of the contemporary workplace and society (Flores, et. al. 2021). Formative research is considered as a pedagogical strategy that enables the formation of new researchers, recognising the meaning and significance of teaching-learning processes based on the formative principles and values of collaboration, personalisation and humanisation (Quispe, et. al. 2024).

Formative research is an essential process for professional training, the research teaching strategies found are: problem-based learning, collaborative learning with a socio-formative approach, followed by the research monograph, learning by discovery and research workshops. Finally, it is necessary to promote a research culture where the basic aspects for the training of researchers from the undergraduate level prevail (Prado, 2023).

It is also considered as a strategy to initiate and perfect the student in scientific production, a task that should start from the first cycles of the university and that is centred on three principles: firstly, the question where it is argued that learning is the product of an active process of knowledge construction on the part of the student; secondly, non-directive teaching, through this principle it is assumed that the teacher assumes a guiding role, an expert guide who accompanies and respects the different points of view of the students, thus provoking autonomous learning in them and thirdly, inductive teaching, it is understood that the teacher must promote interdisciplinarity in the approach to research problems, as the students must be able to articulate diverse knowledge (Valero, 2021).

To guide the research process, the following scientific question is proposed: How does interdisciplinary work influence the development of formative research: teacher-teacher? In this sense, it is important to start with a review of the literature on interdisciplinary work and its actions.

Interdisciplinary work occurs when there is real communication and dynamic interaction between the members of the different disciplines, which consequently ensures their effective intervention (Amaris, 1999).

An interdisciplinary team is made up of a group of professionals focused on the study of an object of knowledge from various training disciplines, which demand their articulation in the logic of advising the design, implementation and evaluation of intervention processes, as an immediate response to the existing problems in the educational context (Gutiérrez & Gómez, 2017). Interdisciplinarity is a necessity for integrating knowledge and training future education professionals in which disciplinary knowledge, interdisciplinary skills and reflective attitudes are considered, as well as the incorporation of methodological strategies focused on collaborative work, cooperative work, research and problem solving (Rodríguez, Naranjo, Cargua, Bustamante, & Chasi, 2021).

Cooperation between disciplines entails real interactions, i.e. a real reciprocity in exchanges and, consequently, mutual enrichment. Consequently, a transformation of concepts, research and teaching methodologies comes to be achieved" (Larraín & Echenique, 2020). Thus, fostering interdisciplinary work involves promoting the development of familiarity with other research traditions, building confidence in other disciplines and methods. (Poteete, Janssen & Ostrom, 2012) That is, the connection with broad networks of knowledge and academic assessment that allow not only teacher-student participation, but also involve interdisciplinary work between teachers and teachers according to the needs of each discipline and group involved in the research actions.

Among the difficulties identified in interdisciplinary work are those inherent in the evaluation processes. As suggested by Caetano 2012: Evaluating interdiscipline poses problems at least as

complex as doing it. Quoted by (Repetto, Cruz, Fernández, Corbacho & Romero, 2021) If we have evaluation systems in which only formal disciplines are represented and the legitimate interdisciplinary tension is not promoted in any area, it is obvious that those who work at the frontiers will have fewer opportunities and less need to work together involving various areas of knowledge.

The purpose of this research is to focus on the potential of cooperative/collaborative work as a germinator of interdisciplinary teacher-teacher initiatives and the multiplier effect that this could generate, or be generating, within the disciplinary structures of teacher-teacher formative research. From the joint work of the disciplines, mutual enrichment is sought, bearing in mind that needs sometimes imply modifications in the initial approach of the subjects. In this perspective, joint work should be planned before the start of the academic period, considering the criteria and dates for work and the presentation of products, which should be included in the syllabus for each semester (Vargas, Chiroque & Vega, 2016).

Interdisciplinarity helps to re-signify content, as it allows students to see connections between different subjects, which increases the relevance of their learning experiences (Silva, Pereiraa & Costa, 2024). This definition emphasises the ability of interdisciplinarity to integrate knowledge, which facilitates a more holistic and contextualised understanding of learning.

Martinez et al. (2023) focus their analysis on how interdisciplinarity promotes 'the collaborative skills necessary for professional practice'. They use the example of a course that combines sciences and humanities to address a specific problem (indoor environmental quality), which demonstrates the practical application of interdisciplinarity in real contexts. This perspective highlights not only the value of integrated knowledge, but also the importance of developing interpersonal and collaborative competences that are essential in today's work environment. While interdisciplinary education offers numerous benefits, challenges remain in effectively implementing these strategies within traditional educational frameworks, requiring ongoing research and adaptation (Chagas, 2022). These authors recognise that theory and practice are often in tension, and that ongoing adaptation and research are necessary to overcome barriers to the effective integration of interdisciplinary approaches in education.

Silva, Pereira and Costa (2024) as well as Martinez et al. (2023) emphasise the benefits and relevance of interdisciplinarity, Chagas (2022) introduces a necessary critique of the difficulty of implementation, indicating that interdisciplinarity is not a static goal, but an evolving process that requires constant attention to be effective in educational practice. This duality in perspectives is fundamental to understanding the full picture of interdisciplinary education.

In pedagogical practice there are still weaknesses in the development of interdisciplinary work, due to lack of knowledge, lack of time to coordinate joint work activities, the habit of working individually, lack of communication, among others, which make it impossible to plan the development of the formative research project through interdisciplinary work. Therefore, it is proposed that the necessary guidelines be given to enable a vision of cooperative work following the required orientations and guidelines. Allowing the strengthening of interdisciplinary relations in the teaching-learning process. Therefore, interdisciplinarity is a necessity in today's world given the complex nature of reality, which implies a multidimensional approach that cannot be carried out from isolated disciplines and with fragmentation of knowledge.

The referenced aspects constitute a conceptual and methodological categorical body for any attempt to establish interdisciplinary relations. They guide the work, they support from the theory all the work that is carried out for this purpose, they are invariant in the whole process. Such interdisciplinary work involves cooperation between the different disciplines. The teaching staff exchange, reach consensus on the common boundaries between their disciplines and this must be done through joint methodological work. (Díaz, Valdés & TorrecillaII, 2016).

Therefore, it is proposed to work on formative research in each semester in an interdisciplinary way, defining that: it contributes significantly to creating and consolidating the necessary research competence in higher education students, insofar as it contributes to the achievement of significant

learning of specialised knowledge and develops research skills, through the appropriation of knowledge and skills not in a passive or consumerist way but in an active and creative way by discovering the contents of their speciality under the guidance of the teacher (López, Ramos & Gómez, 2018). It also has to do with the concept of training, of shaping, of structuring something throughout a process. Teaching teachers and students to research; developing cognitive skills such as analytical, productive thinking and problem solving; familiarising students with the stages of research and the problems they pose; and building in teachers the culture of permanent evaluation of their practice through research processes (Restrepo, 2005).

The dimensions of formative research in UNACH degree programmes justify the PIF through formal components of their curricular project such as:

- Subjects or chairs within the different units of curricular organisation that have as their object or belong to training fields of epistemology and research methodologies.
- Itineraries that complement or deepen competences in and for research,
- Teaching assistantships for research
- Degree modalities, within the degree or curricular integration unit, which are linked to research projects or scientific production (UNACH, 2022).

In addition, the degree programme may organise or participate in academic events (seminars, symposia, panels, workshops), for educational purposes or for the socialisation of research work. Extracurricular activities that promote research are important, such as reading and magazine clubs, scientific competitions, ideas fairs and open science spaces.

In the subjects, the dimensions of formative research are guided by the educational model of the institution, which favours active and collaborative work methodologies, adding to the above, problem-based learning, case studies, field work, experimentation and creation that allow us to move from theorisation to practice and from experimentation to theory. The teacher, in exercising his or her academic freedom, can add innovative strategies, reformulate, contextualise and adapt them, and even create them. By virtue of this, the teacher is responsible for materialising formative research, specifically by designing and developing activities that use research as a learning strategy. In relation to the contents of the syllabus, each teacher must specify the activities, actions, methodologies or even products that assume research as a learning strategy and that are developed in the subject (UNACH, 2022). (UNACH, 2022).

It is therefore necessary and essential to promote interdisciplinary work in the activities of the teachers in order to obtain a product worked on collaboratively, complying with the guidelines that allow its socialisation in scientific events.

3. Methodology

The National University of Chimborazo has four faculties: Education Sciences, Humanities and Technologies, Engineering, Political and Administrative Sciences and Health Sciences. For this research we had a random population of 88 teachers from the Faculty of Educational Sciences, Humanities and Technologies of the UNACH formed as a result of the extension of the Faculty of Educational Sciences of the Central University of Ecuador, on August 31, 1995, being the first or pioneer in the city of Riobamba, currently has 7 teachers aggregate I, 14 aggregate II, 7 aggregate III, 2 auxiliary, 4 auxiliary I, 6 auxiliary II, 81 occasional I, 16 main I, 6 aggregate holder, 1 auxiliary holder and 9 main holder with a total of 154 teachers. With the aim of finding out whether formative research is carried out through interdisciplinary work between teacher-teachers.

Table 1. Population

Population		
Faculty of Education Sciences, Humanities and Technologies	**Teachers surveyed**	**Percentage %**
Graphic Design	12	13,64
Initial Education	7	7,95%

Population		
Faculty of Education Sciences, Humanities and Technologies	**Teachers surveyed**	**Percentage %**
Psychopedagogy	8	9,09%
Basic Education	9	10,23%
Pedagogía de Physical Activity and Sport Pedagogy	5	5,68%
Pedagogy of national and foreign languages	11	12,5%
Language and Literature Pedagogy	10	11,36%
Arts and Humanities Pedagogy	9	10,23%
History and Social Science Pedagogy	5	5.68%
Pedagogy of Informatics	5	5.68%
Pedagogy of Chemistry and Biology	6	6,82%
Mathematics and Physics Pedagogy	1	1,14%
Total	88	100%

As can be seen in Table 2 (P-3), according to most of the teachers, the working method used for the development of formative research is individual 68.18% due to the coordination of time, because of the complementarity of the subjects, because it is difficult to agree with colleagues and to coincide in working schedules, because the competences and objectives addressed in the formative research projects were formulated in such a way as to cater for the subjects, because related activities have not been managed with other teachers, because there has not been a communication channel between the teachers of the semester to be able to plan a single project, per subject, because it is related to the learning outcomes of the subject; while 27.27 % indicated that they were interdisciplinary because it allowed them to integrate the knowledge of several subjects, to share knowledge, because each teacher contributed what he/she had mastered, because the research lent itself to this, due to the fact that it worked with another subject, and 4.55 % indicated that they carried out both processes according to the subject they were in charge of. (P-4) the majority of the teachers 56 % indicated that they have participated in induction processes on guidelines for formative research, while 18 % consider that they have not and 26 % not at all.

The methodological strategy of the research was carried out by means of an online survey that allowed the collection of information about the actions carried out in formative research by the teachers under study, which was structured by 10 questions, 7 open and 3 multiple choice, the instrument was structured through a careful and reflective process about the actions that have been carried out around the theme proposed in this research, aimed at obtaining rich and varied information about formative research and interdisciplinarity in teaching. Ensuring that the results are meaningful and useful for educational development. This not only facilitates obtaining quantitative data, but also qualitative data, enriching the understanding of the phenomenon studied, which is aimed at teachers from the Faculty of Education Sciences, Humanities and Technologies, where 88 responses were obtained that allowed us to obtain accurate and reliable information on the research topic and gather information on the actions they carried out in the development of formative research, both with students and in the planning of teaching to promote interdisciplinarity among teachers. In addition, for content validity, the information was contrasted with the opinion of experts, who showed that the items contain all the relevant aspects to be evaluated. In addition, the Cronbach's alpha reliability statistic of the IBM SPSS application was used.

4. Results

Results Carried out on the teachers of the Faculty of Humanities and Technologies of the current situation of the development of formative research: teacher-teacher.

This is based on the information obtained from the instrument applied to teachers. The survey was applied at the end of the academic period April - August 2022, with the aim of obtaining valid and reliable information regarding interdisciplinary work in the development of formative research.

According to the results, the following could be understood in this respect:

Table 2. Indicators that stood out most in the research regarding interdisciplinary work in the elaboration of formative research.

Indicators	Individual	Interdisciplinary	Both	n	Total
P3: Indicate the modality of work used (individual or interdisciplinary {teacher - teacher}) in the formative research process.	68,18%	27,27%	4,55%	88	100%
Indicators	**Si**	**No**	**No**		
P4: Has participated in induction processes on guidelines for formative research at UNACH.	56,00%	18,00%	26,00%	88	100%
P5: ¿Do you think it is necessary to generate training (theoretical-practical; {Teaching Training Offer/SICOA}) concerning formative research? Justify the importance.	88,64%	10,23%	1,14%	88	100%
P6: ¿Do you think it is important to share the formative research process with other teachers in the area as part of the work methodology (research experience)? Identify relevance	79,55%	7,95%	12,6%	88	100%
P8: ¿Based on your academic experience from semester to semester, have you generated corrective actions in the formative research process? (Name the ones)	78,40%	17,05%	4,55%	88	100%
P9: The results obtained from formative research have been relevant to be socialised in scientific events. Justify your answer	56,82%	20,45%	22,73%	88	100%
P10: ¿Do you consider it necessary to generate the dissemination of the results of the formative research project, as a motivational phase, among teaching-student peers at faculty level?	85,23%	10,22%	4,55%	88	100%

Modality of work (P3):

68.18% of teachers prefer to work individually in the formative research process, while only 27.27% opt for an interdisciplinary approach. This finding suggests a tendency towards individual work, which may limit the collaboration and exchange of ideas essential for academic enrichment.

Participation in Training (P4):

56% of teachers have participated in induction processes on formative research guidelines. This indicates a need for improved training, as a significant proportion have not received formal training in this aspect.

Training Needs (P5):

88. 64% consider that it is necessary to generate training around formative research because it would help to have new knowledge or update it to provide quality training to our students, to clarify some important points for the development of formative research, to obtain more knowledge about the implementation of formative research activity with students, because interdisciplinary work feeds more deeply into the state of research, to develop skills and abilities, because there are still processes that can be improved and can be addressed in formative research from another approach, constant training generates expertise, it is always necessary to remember important aspects of these processes. In addition, it will allow to improve the orientation of the same, since it indicates how to carry out and promote interdisciplinarity, to clarify some gaps for the implementation of the FIP; 10.23%

indicated that no because the actions to be carried out are clear and the formats facilitate their elaboration and 1.14% not at all.

Importance of Sharing Experiences (P6):

79.55 % say yes, because it means that the work is not only done in the classroom, they also point out that the curriculum of degree courses has been structured with the criterion of the relationship between the subjects of each level to provide a complete vision of the professional field and because the confrontation of ideas and processes favours the deepening in the same direction of the improvement of the investigative work. In addition, learning from the research experiences of fellow teachers also allows them to find answers and reflect on their own work; 7.95 % consider that no, because it facilitates their individual work and 12.6 % not at all.

Corrective Actions (P8):

Regarding corrective actions, 78.40 % have carried them out, including continuous monitoring, strengthening the methodological design and its structure, redefining group work strategies - collaborative - participative to detect weaknesses in the search for information and scientific writing, reducing activities, organising processes and times for their delivery, individual and group tutorials to guide students, planning activities and improving interdisciplinary coordination with other teachers; while 17.05% stated that no corrective actions had been taken and a low percentage indicated that no corrective actions had been taken at all, representing 4.55%.

Relevance of Results (P9):

56.82% consider that the results of the development of the formative research project are relevant to be socialised in scientific events because they allow to broaden the vision of educational processes, to develop research skills in students, through scientific posters; while 20.45% consider that a suitable product is not developed to be socialised and 22.73% doubt this process.

Dissemination of Results (P10):

A large percentage of teachers 85.23% consider it necessary to generate the dissemination of the results of the formative research project, as a motivational phase, among teaching - student peers at faculty level, since the exchange of findings of innovative practice is typical of educational communities at district level, they also consider that one could learn from other experiences and work in multidisciplinary teams; 10.22% stated that it is not appropriate to disseminate because of the limited time available for the development of the project, reaching a primary stage of the research, and 4.55% not at all.

Significant Patterns and Correlations:

Interdisciplinarity: The high preference for individual work (P3) contrasts with the expressed need to share experiences and collaborate (P6). This suggests that, despite recognising the importance of interdisciplinarity, teachers may feel more comfortable in an individual working environment, possibly due to a lack of experience in collaboration or an institutional culture that does not sufficiently encourage teamwork.

Relationship between Training and Perception of Relevance:

The need for more training (P5) and low perceived relevance of results (P9) could be interrelated. If teachers feel that they lack the necessary tools to conduct effective research, they are also likely to perceive their results as less meaningful.

Corrective Actions and Continuous Improvement:

The willingness to implement corrective actions (P8) suggests that, although there is a preference for individual work, teachers are open to reflecting on their practice and making adjustments. This is a positive indication of a continuous improvement approach that can be enhanced by greater collaboration.

In summary, most of the teachers consider that the formative research project should be developed through interdisciplinary work, and also that it is necessary to have clear guidelines, methodological orientations and training on its development. In addition, they also state the importance of socialising it not only internally but also externally as a strategy for motivation and dedication to its content and effort.

With regard to questions two and seven, the following results were obtained:

P2. With which subject do you have the greatest affinity in the development of the formative research project (FIP)? (Detail the full name).

Table 3. Subjects with the highest affinity in the development of formative research

Subject	Number of teachers	Percentage
Early development and stimulation	1	1,13%
Statistics	1	1,13%
Plant biology	1	1,13%
Research	12	13,64%
Advertising design	1	1,13%
International exam preparation	1	1,13%
Computer assisted language learning	1	1,13%
Modelling 3d	1	1,13%
Chemistry	2	2,27%
Didactics	5	5,68%
Models of education in gender, pluriculturality and interculturality	1	1,13%
Graphic production systems	1	1,13%
Screen printing and airbrushing	1	1,13%
Children's literature	1	1,13%
Health and nutrition	1	1,13%
Curricular adaptations	1	1,13%
School management	1	1,13%
Web design	2	2,27%
Language and communication	1	1,13%
Sociolinguistics	1	1,13%
Applied metal arts	1	1,13%
Initial education	1	1,13%
Pedagogy	3	3,41%
Philosophy	1	1,13%
Sculpture	1	1,13%
Environmental education	1	1,13%
Psychology of learning	1	1,13%
Language and culture	1	1,13%
Learning difficulties	1	1,13%
English methodology	1	1,13%
Understanding and using grammar	2	2,27%
Sociology applied to communication	1	1,13%
Multimedia editing tools	1	1,13%
Genetics and embryology	1	1,13%
Computer-aided technical drawing	1	1,13%
Corporate visual identity	1	1,13%
History of design	1	1,13%
Mathematics applied to computer science	1	1,13%
Administration of Children's Centres	1	1,13%

Subject	Number of teachers	Percentage
Academic reading and writing	1	1,13%
Basic elements of Kichwa	1	1,13%
Cultural studies	1	1,13%
Ethical training in professional development	1	1,13%
Neurobiological foundations of learning	1	1,13%
Academic writing	1	1,13%
Psychotechnics	1	1,13%
Psycho-pedagogical intervention	1	1,13%
Neuroeducation	1	1,13%
Drawing	1	1,13%
Methodological strategies	1	1,13%
Family and education	1	1,13%
Illustration	1	1,13%
Physical education	1	1,13%
Assessment	1	1,13%
Oral and written communication	1	1,13%
Teaching materials	1	1,13%
Music	2	2,27%
World literature	1	1,13%
Linguistics	1	1,13%
Literary studies	1	1,13%
Spanish history and literature	1	1,13%
Politics and geopolitics	1	1,13%
Phonetics	1	1,13%
Deontology	1	1,13%
Infopedagogy	1	1,13%
Social and cultural anthropology	2	2,27%
Total	88	100%

13.64% of the teachers surveyed said that the subject they teach is Research and have a greater affinity in the development of the formative research project, 5.68% teach the subject of Didactics and 3.41% choose this subject, 3.41% Pedagogy, there are 5 subjects which share a percentage of 2.27%, these being Chemistry, Web Design, Music, Social and Cultural Anthropology and Understanding and Using Grammar, and finally 65.90% of the teachers indicate different subjects which are specific to each of the degree courses to which they belong.

In P7. Identify the academic level where you have obtained the best results in scientific production (PIF)?

Table 4. Academic level with best scientific results

Semester	Number of teachers	Percentage
First	5	5,68%
Second	11	12,5%
Third	13	14,77%
Fourth	11	12,5%
Fifth	6	6,81%
Sixth	19	21,59%

Semester	Number of teachers	Percentage
Seventh	12	13,64%
Eighth	11	12,5%
TOTAL	88	100%

21.59% of the teachers surveyed chose the 6th semester as the academic level where they obtained the best results in developing formative research, 14.77% chose the third semester, 13.64% the seventh semester, the second, fourth and eighth semesters with 12.5% each, 6.81% opted for the fifth semester and a percentage of 5.68% of teachers selected the first semester.

5. Discussion

The findings of this survey align with existing literature on interdisciplinary work in education. Previous research has shown that collaborative work in academic settings can enrich the teaching-learning process, foster innovation and improve the quality of research (Klein, 2010; Repko, 2012). However, resistance to change and lack of training have also been documented as common barriers to implementing interdisciplinary approaches (Frodeman, 2017).

The results of the research project should be disseminated through interdisciplinary work, but it is necessary to receive the appropriate guidelines and orientations for its implementation. Furthermore, 85.23% consider it necessary to disseminate the results of the formative research project at degree and faculty level.

On the other hand, the literature review shows that in higher education, interdisciplinary and individual work in the development of the formative research project is intended to encourage the formation of the spirit and research entrepreneurship in the participants of the process (teachers and students) with the aim of forming research groups that, by teaching and learning to research, develop cognitive and analytical skills (...), from a multidisciplinary and individual perspective, and that are based on a multidisciplinary and individual approach.), from the multidisciplinary and interdisciplinary, with a complex approach to reality to provide creative solutions to problems (...) as established by the (Universidad Técnica de Babahoyo, 2016), from another perspective the Universidad Católica de Cuenca determines that it is essential to guide the actions of research towards an approach based on the search for intellectual quality, the thematic relevance of their contributions and a systemic, sustainable and interdisciplinary approach that reflects the mission and vision of the University (Quizhpi, Banegas & García, 2017).

Likewise, the National University of Chimborazo establishes that teachers must prepare learning environments that promote student participation through interdisciplinary research projects. The role of the teacher is fundamentally of a tutorial nature, (...) to accompany, facilitate, provoke, guide, redirect development, help students build their own life project and develop their scientific mind, their ethical and social mind and their personal mind... The teacher is a complex professional with two fundamental pillars, passion for knowledge and passion for helping to learn Pérez, 2012. Cited by (UNACH, 2020)

The study also identified that there is a need for training on the development of formative research, focusing not only on its structure but also on its procedure and methodologies to clarify doubts and concerns among teaching staff.

6. Conclusions

The survey reflects a clear need to strengthen training and collaboration between teachers in the Faculty of Education Sciences, Humanities and Technologies. Although there is recognition of the importance of formative research and interdisciplinary work, current practices show a tendency towards individual work and a lack of adequate training. To improve the quality of research and teaching, it is essential to foster an environment that promotes collaboration, continuous training

and dissemination of results. This will not only benefit teachers, but also enrich the learning experience of students.

The socialisation of formative research can be carried out in two modalities, virtual and face-to-face depending on the academic level (semester) and depending on the guidelines and organisation of each career; with the aim of promoting and motivating students and teachers in this process of formative research and its development can have as a nexus the interdisciplinary teacher-teacher work breaking borders between their disciplines or areas of learning.

Through the survey applied to the teachers of the Faculty of Educational Sciences, Humanities and Technologies of the UNACH it has been possible to know that the development of research generates better results in the intermediate academic levels, so it is necessary to promote the development of research skills in the students of the basic levels and at the same time strengthen this process in the higher levels, thus promoting a quality education as established in the institutional regulations.

The development of this research was fruitful because it allowed us to carry out a self-analysis of the teaching staff by means of the survey, allowing us to reflect on the importance of formative research, what do we do and what can we do to improve this process. At the same time, it raised awareness of the importance of interdisciplinary work as part of the teaching activity.

There is interest among a representative percentage of teachers in carrying out formative research in a cooperative, collaborative way, i.e. through interdisciplinary work as a contribution to obtaining a product that can be socialised in scientific events, due to the contribution of the different subjects in the development of a quality project in terms of content.

7. Recommendations

Create spaces and opportunities for teachers to meet and share experiences and ideas to strengthen formative research. This may include interdisciplinary working groups, research days where the results of ongoing research are presented and discussed.

Implement modalities of socialisation of formative research, both virtual and face-to-face, adapted to the academic level (semester) and to the guidelines of each degree programme. This will promote and motivate students and teachers in the formative research process.

Promote the development of research skills in students at basic levels, while strengthening this process at higher levels. This will contribute to quality education, as established by institutional regulations.

Encourage interdisciplinary work among teachers, breaking down boundaries between their disciplines or learning areas. This will raise awareness of the importance of interdisciplinary work as part of the teaching activity and promote formative research in a cooperative and collaborative manner.

Establish an ongoing evaluation system to measure the impact of the initiatives implemented. This would include periodic surveys, focus groups and analysis of formative research results, which would allow for the adjustment of strategies according to the changing needs of teachers and students. By implementing these recommendations, the Faculty will not only strengthen teacher training and collaboration, but also enrich the educational experience for students, promoting a more dynamic and effective learning environment.

8. Limitations

One of the limitations identified in this research relates to the challenges inherent in interdisciplinary work among teachers. Although the importance of the interdisciplinary approach for the development of effective formative research is recognised, in practice there are still some difficulties that need to be addressed. On the one hand, there is a tendency among teachers to develop formative research on an individual basis, due to the lack of spaces and communication channels that allow for

an adequate coordination of time and joint efforts. In addition, there is a need to strengthen the capacities and skills of teachers in terms of the implementation of collaborative and interdisciplinary work methodologies. Another limiting factor is the scarcity of resources to promote this type of initiative, which hinders its proper development. However, it is important to highlight that this research has allowed us to identify these challenges, which lays the foundations for implementing actions that promote greater synergy and teamwork among teachers within the framework of formative research.

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