

Delphi method as a didactic strategy in the hotbeds of research

Método Delphi como estrategia didáctica en la formación de semilleros de investigación

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DOI: <https://doi.org/10.35622/j.rie.2020.01.005>

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Received 18/12/2019/ Accepted 20/01/2020 Published 31/01/2020

ORIGINAL ARTICLE

KEYWORDS

Experts, strategy, training, scientific integration, hotbeds of research.

The objective was to analyze the contribution of the Delphi method in the research seed formation process. The work was carried out under the qualitative approach, analytical method, explanatory design and document review technique. It was noted as a result that the aforementioned method should be considered as a didactic strategy because it contains formative, multidisciplinary, finalist and methodological feasibility, being necessary to promote it for the purpose of academic integration between senior and junior teachers. It is concluded that the aforementioned method encourages active participation in the teacher-student relationship and contributes to the training process as researchers from the university classrooms.

PALABRAS CLAVE

Expertos, estrategia, formación, integración científica, semilleros de investigación.

El objetivo fue analizar la contribución del método Delphi en el proceso de formación de los semilleros de investigación. El trabajo se realizó bajo el enfoque cualitativo, método analítico, diseño explicativo y técnica de revisión documental. Se advirtió como resultado que el citado método debe ser considerado como una estrategia didáctica porque contiene viabilidad formativa, multidisciplinaria, finalista y metodológica, siendo necesario promoverlo con fines de integración académica entre docentes seniors y juniors. Se concluye que el citado método fomenta la participación activa en la relación docente – estudiante y contribuye al proceso de formación como investigadores desde las aulas universitarias.

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1. INTRODUCTION

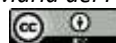
The generation of knowledge should not only be reflected in an exhibition of the university classroom or in a specific research work, since the scientific production is verified in the interaction of spaces that generate research culture; which is why, according to Lavalle & De Nicolas (2017) cited in Mayta-Tristán, Toro-Huamanchumo, Alhuay-Quispe & Pacheco-Mendoza (2019), they stated that “universities have started to work more seriously in research, they have implemented in addition to the vice-rectors for research, research capture / research retention, stimuli and research funds, and a greater link with formative research”; the situation described is public knowledge, since it is related to Condition IV established by the National Superintendence of Higher Education (SUNEDU), which has been verified in the licensing process of peruvian universities.

Current research developed as characteristics to be collaborative, multidisciplinary and teamwork; that is, egocentrism was not considered when considering an alternative solution to the problems of reality, especially as stated by Magaña, Aguilar, Argüelles & Quijano (2015) cited in Cantú, Medina & Martínez (2019) “the majority of graduates will perform in the areas of his discipline; so it is necessary that they have the training and capacity to carry it out from the different work scenarios”, evidencing the commitment between teachers and students.

On the other hand, the absence of scientific production could represent a setback in the quality demand guidelines, by categorizing research in the background, although it constitutes one of the purposes of any higher education house, which is why the importance of the present investigation was manifested, being that, from the review of the state of the art, work with similar characteristics was not appreciated.

The hotbeds of research are in implementation and consolidation in the provinces of Peru, a situation that must be exploited, since participation, continuous learning and methodology in relation to scientific research should be encouraged; its existence could be related to the future of science, since as Rojas & Méndez (2017) cited in Guerrero, Lagunes, Torres & Lau (2019) pointed out “the problem is the lack of knowledge of students as central actors in the training process and of the lack of pedagogical resources to claim meaningful learning”.

In that sense, the following curiosity arises: would the Delphi method contribute to the process of training research seedlings? the solution of this problem could represent an indication



for teachers and students to opt for scientific integration through a certain work of investigation, taking into account the advantages that characterize the referred method.

Likewise, it is necessary to mention that the present investigation could originate future issues related to the application of the Delphi method in legal investigations, complementarity between the expert judgment and the Delphi method, among others.

For this purpose, the research team set out to “analyze the contribution made by the Delphi method in the process of training the hotbeds of research”.

2. METHOD

This research has been developed under the qualitative approach, analytical method, explanatory design and document review technique.

The research was mainly distributed in the following activities: a) Search of the state of the art, b) Analysis, argumentation and relation of the Delphi method, c) Feasibility of applying the Delphi method in the hotbeds of research.

3. RESULTS AND DISCUSSION

It warns of the review of the state of the art, which according to Numa-Sanjuan & Márquez (2019) “(...) Research has always been one of the most difficult areas to implement in universities”, which is why the seedbeds of research represents one of the spaces for research training (Oquendo, 2009, cited in Suárez, Ceballos & Obispo, 2013); However, in order to achieve what is described, the role of the leading teacher as a facilitator and not as an obstacle to learning is essential (Vega-Monsalve, 2019), which would demonstrate “lack of culture of publication, lack of training, lack of training, lack of opportunities, deficiencies in the quality of research, minimum teaching support and lack of incentives” (Cvetkovic-Vega, Inga-Berrosipi & Abel, 2017).

One of the ways to promote research culture is through hotbeds of research, which according to Herrera (2013) cited in Carvajal, Otálora & Bohórquez (2018) “are integral training scenarios aimed at the student, who makes their first approaches in the field of research”; nevertheless, apparently there would be a distance between the subject and the methodology, a situation that increases the myth towards support through thesis.

In this regard, it should be taken into account that the teaching work is not only related to the transmission of knowledge, repeated and generated by other authors, but also represents the opportunity to innovate with their own knowledge and motivate students to develop research skills; To achieve this, Muñoz & Garay (2015) argue that "the research professor must be distinguished

by his ability and expertise to make possible in his daily work the domain of professional, basic and practical knowledge".

Rodríguez (2017) cited in Hernández & Infante (2017) emphasized that educational communication “is a reality impossible to ignore, with such importance in the links between the teacher and his students in the teaching-learning process in particular and in the teaching process - educational in general”; in this way, it can be seen that the interaction establishes mechanisms that make teamwork viable, especially when the same language is mastered, that is, when the method to work is internalized.

Well things, the Delphi method arises; to which, according to Varela-Ruiz, Díaz-Bravo & García-Durán (2012) pointed out that it is the english translation of Delphi (ancient city of Greece), considered “source of moral teaching”; its first use dates back to 1948 in relation to the prediction of results in horse races. Also, according to Cabero & Infante (2014) “it was created in the fifties in the United States by the research and development organization Rand Corporation of Santa Monica (California), based on the research of Dalkey and Helmer in 1963”; this method was used as a defense strategy in case of a nuclear war.

To a greater extent, it is essential to take into account the contextualization outlined in Table 1, in order to lay the foundations for understanding the essence of the Delphi method, as detailed below: (See table 1)

In that order of ideas, it is necessary to attend to the above, since according to Powell (2002) cited in Charro, Charro-Huerta & Plaza (2017) it is argued that “(...) as main limitations and strengths of Delphi studies we can highlight the time it consumes and the prejudices and preconceived ideas of the experts”; therefore, the quality of the results would be directly related to the quality of selected experts and whose participation represents a reference (Martínez-García, Padilla-Carmona & Suárez-Ortega, 2019); however, an important factor to take into account highlights that the result will materialize in a consensus, which is based on the median obtained (according to Arquer, 1995, cited in Escobar-Pérez & Cuervo-Martínez, 2008), since the result obtained will be the product of at least thirty experts (Rodríguez, 2001).

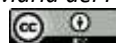


Table 1. Characteristics of the Delphi method.

Authors	Characteristics
Cabero & Infante (2014)	It is used in a qualitative approach.
García & Suárez (2013)	It presents a systematic structure and feedback.
López-Gómez (2018)	Organize the experts in a panel group.
Ortega (2008) citado en (García-Ruiz & Lena-Acebo (2018)	It is a reliable, consistent and non-arbitrary model.
Mercado-Caruso, Puerta & Pérez (2017)	Successive and anonymous rounds.
Muruais & Sánchez (2012)	Reduce the uncertainty of the future.
Hernández & Robaina (2017)	There is feedback.
González-Muñoz, Palomino-Camargo, Pérez-Sira & Hugo (2018)	It facilitates decision making.
Varanda & De Freitas (2018)	Knowledge of arguments
Ouariachi, Gutiérrez-Pérez & Olvera-Lobo (2017)	Clarification of the evaluation criteria or analysis categories is required.

In the framework of the Social Sciences, according to Flores (2011) cited in Huitraleo, Calisto, Mansilla & Gutiérrez (2019), the Delphi method was considered as “appropriate” for qualitative research, especially if the prospective approach was sought, which is why which, through this method, proposed to unite “knowledge”, which was increased by the participation of the different specialists (Varela-Ruiz, Díaz-Bravo & García-Durán, 2012, cited in Andrés et al., 2019), being this group of people, who will comment on a specific research objective (Gil-Gómez & Pascual-Ezama, 2012), in this way, reliability will be increased (Rosas, Sánchez & Chávez, 2012, cited in George & Trujillo, 2018) and reliable (Pozo, Gutiérrez & Rodríguez, 2007, cited in Gutiérrez-Artacho & Olvera-Lobo, 2017), the intersubjective judgment will be reduced (Reguant-Álvarez & Torrado-Fonseca, 2016), the autonomy of the participants will be verified (Veliz, Berra, Jorna & Sabina, 2013), using statistical procedures (Zartha, Montes, Vargas, Arias & Hoyos, 2015).

On the other hand, it should be borne in mind that researchers interested in using this method will be characterized by the “identification of problems, which will be the subject of debate (Romero, Román, Alducín & Díaz, 2011) and selection of variables (Calero, 2014, cited in López, Bernal, Leiva & Martín, 2018) through multiple duly feedback questionnaires, exposed anonymously (Cabero & Llorente, 2013) and controlled (Rowe & Wright, 1999, cited in Cruz & Rúa, 2018), with systematic use (Astigarraga, 2005, cited in Colocho, 2016), associated with the forecast Escorsa et al. (2017).

Thus, from the documentary review, it is appreciated that the Delphi method to be applicable in the Social Sciences, will be analyzed if its use in research seedbeds is feasible.

In this regard, it should be taken into account that according to Silva, Torres & Sarmiento, 2008, cited in Saavedra-Cantor, Antolínez-Figueroa, Puerto-Guerrero, Muñoz-Sánchez & Rubiano-Mesa (2015): “(...) at present, the research seedbeds have become a tool to project from the undergraduate the future researchers that the country needs”, which is why an exchange of knowledge and experiences between teachers and students is generated that contribute together to improve a community in particular, as expressed by González (2008) cited in López & Toro (2017).

Well things, the research team considers it appropriate to mention that at this point the multicriteria analysis that contributed to this discussion was used, in order to configure the skills necessary to be an expert in the Delphi method, as detailed below:

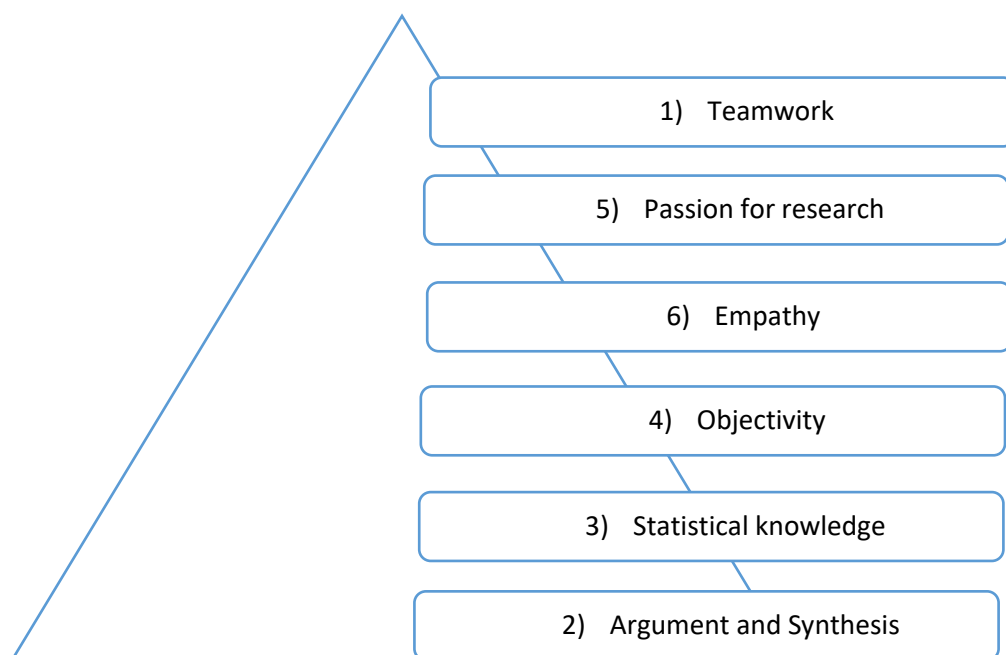


Figure 1. Multicriteria analysis applied to the experts of the Delphi method.

Likewise, it is appropriate to analyze and argue the proposal of phases to be implemented in universities that promote research seedbeds through the incorporation of the Delphi method:

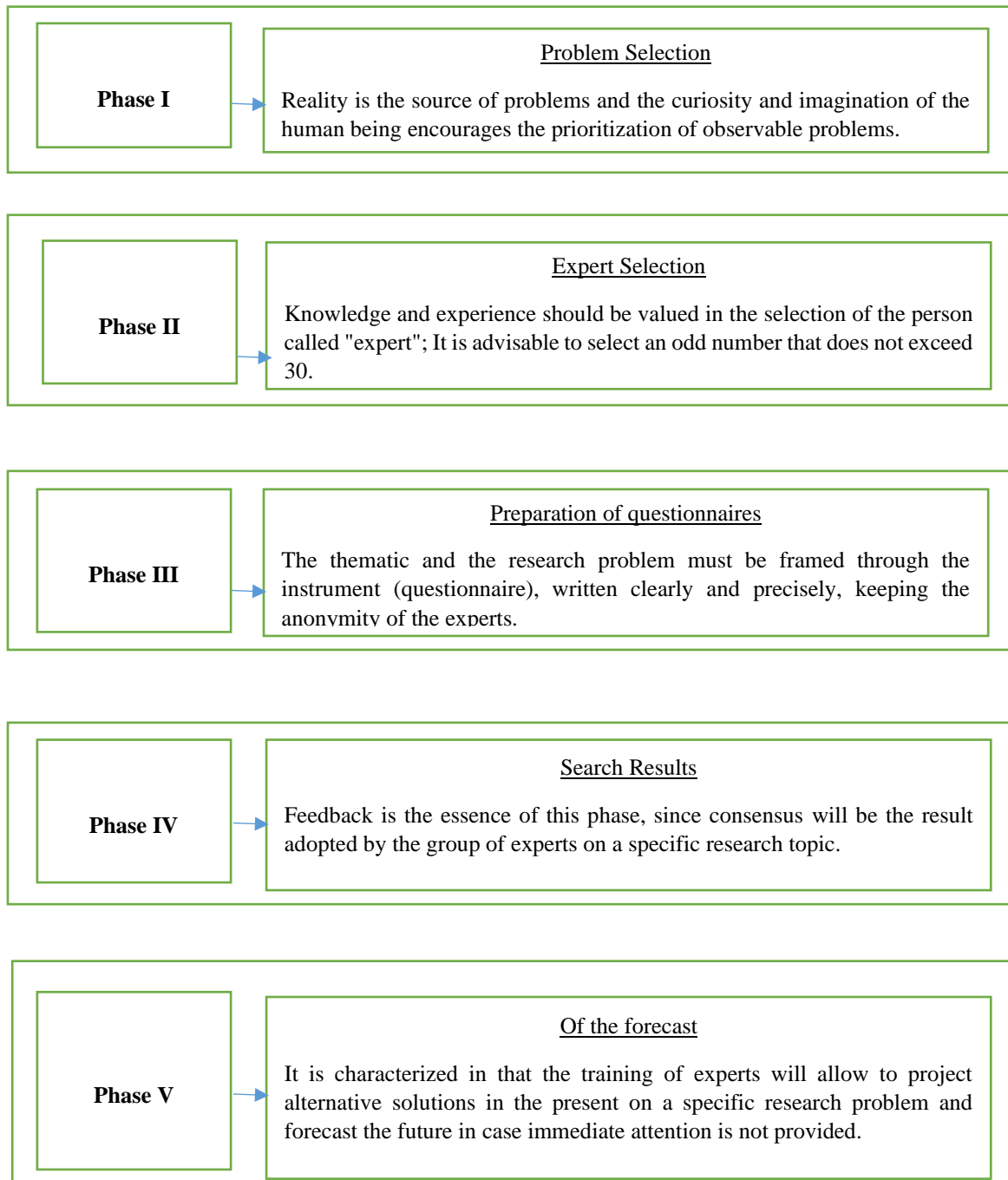


Figure 2. Proposal of phases of application of the Delphi method in research seedbeds

From the above, it is necessary to analyze the feasibility of applying the Delphi method in research seedbeds, as detailed below:

Formative viability	This method will allow future researchers to be trained, from the university conception; in this way, the active participation of students would be promoted.
Multidisciplinary viability	Because this method would encourage the integration of students from the perspective of the social sciences; in this way, the analytical and transversal criteria would be encouraged by studying and delimiting a research problem.
Finalist viability	Because this method contributes to the consolidation of the research topic, through the consensus of the experts, granting the respective security during its process.
Methodological feasibility	Because this method is identified with qualitative research; in this way, it would allow the development of the subjective factor in the development of research work.

Figure 3. Proposal of feasibility of the application of the Delphi method in research seedbeds.

In that order, it follows that the Delphi method has an argument to be incorporated into the hotbeds of research since it would contribute to the process of training students from a multidisciplinary perspective, a situation that must be promoted in universities for the purpose to have more evidence of the aforementioned method from the present investigation.

4. CONCLUSIONS

From the review of the state of the art, it is noted that the Delphi method should be considered as a didactic strategy in the training of the hotbeds of research, since its essence would encourage student safety, proven in its training process as researchers from university classrooms.

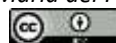
This method encourages academic integration among teachers of the same university, this would reduce knowledge gaps and encourage the inclusion of opinions between senior and junior teachers.

The Delphi method is constituted as an alternative to encourage active participation between teachers and students around a research topic. Therefore, it must be promoted from the research units of the universities, through administrative and financial support to the hotbeds of research.

The Delphi method is related to the process of consolidation of the hotbeds of research in peruvian universities, expressing the conception that teamwork is comfortable during the thesis process.

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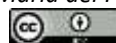
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Conflicto de intereses / Competing interests:

Los autores declaran que no incurre en conflictos de intereses.

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Guillermo Quezada: conceptualización, curación de datos, análisis formal, adquisición de fondos, investigación, metodología, administración del proyecto, recursos, software, supervisión, validación, visualización, escritura - preparación del borrador original, escritura - revisar & edición.

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Fuentes de financiamiento / Funding:

Los autores declaran que no recibió un fondo específico para esta investigación.

Aspectos éticos / legales; Ethics / legals:

Los autores declaran no haber incurrido en aspectos antiéticos, ni haber omitido aspectos legales en la realización de la investigación.

