Investigación y acción participativa: una herramienta metodológica para la comprensión y transformación de la práctica universitaria

Participatory research and action: a methodological tool for the understanding and transformation of university practice

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Resumen

La presente investigación se centra en el estudio de la metodología de Investigación–Acción Participativa (I-AP) como parte de la formación académica de los estudiantes de la Carrera de Educación Inicial. No se evidencian estudios que fundamenten la aplicación de la I-AP a nivel superior, por tanto, es un objetivo de la presente investigación que permita determinar si la I–AP es una metodología que mejora la práctica educativa de los estudiantes de la Carrera de Educación Inicial de la Universidad Técnica de Machala (UTMCH), en vista que, esta metodología hoy en día está dando a la comunidad educativa respuestas que van encaminadas a la solución a los problemas que surgen en la investigación. Dentro de su aplicación se combinan dos procesos importantes en el aula de clase, el de conocer y el de actuar, involucrando en ambos a los estudiantes. Al igual que otros enfoques participativos, ésta proporciona a las comunidades un método para analizar y comprender mejor la realidad de la población, sus problemas, necesidades, capacidades y recursos; y, les permite planificar acciones y medidas para transformarla y mejorarla. Se aplicó un diseño de investigación no experimental descriptivo con enfoque cualitativo. Posteriormente, se hizo un análisis descriptivo de la información recogida a través de una entrevista semiestructurada de siete preguntas abiertas. Los resultados obtenidos evidenciaron un mayor interés y expectativa de lo que se les enseñará en la asignatura de Investigación y Acción Participativa: Lesson Study dentro de la Carrera como parte de su formación académica.

Palabras clave

Investigación educativa, investigación acción participativa, metodología, práctica educativa, sistematización.

Abstract

This research focuses on the study of the Participatory Action Research (PAR) methodology as part of the academic training of students in the Early Education Career. There is no evidence of studies that support the application of the I-AP at a higher level, therefore, it is an objective of this research to determine whether the I-AP is a methodology that improves the educational practice of students in the Early Childhood Education Career at the Technical University of Machala (UTMCH), given that this methodology today is giving the educational community answers that are aimed at solving the problems that arise in the research. Within its application, two important processes are combined in the classroom, that of knowing and that of acting, involving students in both. Like other participatory approaches, this one provides communities with a method to analyze and better understand the reality of the population, its problems, needs, capacities and resources; and, it allows them to plan actions and measures to transform and improve it. A descriptive, non-experimental research design with a qualitative approach was applied. Subsequently, a descriptive analysis was made of the information collected through a semi-structured interview of seven open questions. The results obtained showed a greater interest and expectation of what will be taught in the subject of Participatory Research and Action: Lesson Study within the Career as part of their academic training.

Keywords

Educational research, participatory action research, methodology, educational practice, systematization.

1. Introduction

The objective of this article is to determine whether the Participatory Research-Action methodology has an impact on the academic training of students in the Initial Education Career at the Technical University of Machala (UTMCH). Taking into account that, the I-AP is an active methodology that allows to innovate and improve the university educational practice, from a successful relation of theory with practice, in order to guarantee quality standards that higher education demands to generate knowledge as a different educational culture. In this regard, Revelo-Rosero and Carrillo Puga (2018) consider that:

> All teaching is of an educational nature, which means that education must provide human beings not only with the conditions for their cognitive formation, the development of their thinking, their abilities and skills, but also for the formation of the various aspects of their personality (p. 71)..

Therefore, today's education must provide answers to the great changes that society has experienced, due to the high "impact of technological information, globalization, the dizzying growth of economies generated by the digital revolution" (Revelo-Rosero et al, 2018, p. 199) of increasingly specialized Information and Communication Technologies (ICTs); facts that are related to the diversity of worldviews, identities, knowledge and expressions to such an extent that it has substantially transformed what is called the knowledge society in a complex and constantly changing universe, that is, in the ways of teaching, learning, communicating and working.

In recent decades, research in the field of the social sciences, and especially in the education sciences, has produced great changes that mark significant differences in the ontological, epistemological, Åetic, and methodological dimensions for approaching the object of study. "This implies that we are faced with the presence of diverse research approaches that make it possible to achieve different viewpoints, angles, appreciations, or assessments of the same situation or subject of study" (Colmenares, 2012, p. 102). Therefore, research has contributed substantially to improve innovation processes that seek to generate changes that mark significant differences in the development of humanity, and particularly in university teaching.

In this sense, new approaches have arisen in scientific research that seek greater participation and appropriation of the process and the results by the participating community. Therefore, I-AP is located in one of these new approaches, which represents a qualitative and quantitative leap that significantly strengthens the modes of communication and knowledge generation of the scenarios involved. Thus, scientific research is developed from the perspective of three approaches: quantitative, qualitative and mixed, each of which involves transversal research designs with explanatory, descriptive and correlational levels of study, which contribute to the evolution of scientific knowledge from the university classrooms.

The present research work is structured in such a way that, firstly, a review of the literature related to concepts and definitions related to I-AP: SL is made. Next, the methodology used for the research design is presented, which was of a descriptive non-experimental type with

a qualitative approach and applied the interview technique for the collection of information, followed by the results; and, finally, the conclusions obtained are presented. The objective of this research is to determine whether the Participatory Research and Action: Lesson Study (I-AP: LS) is a methodology that improves the educational practice of students in the Early Education Career.

2. Literature review

The continuous training of teachers can be carried out through different models that not only inform, but also accompany the process of implementing innovations in education. In this sense, teacher training, through processes of participation, reflection and action, is considered fundamental in order to carry out innovative transformations in the teaching-learning process in the classroom. Similarly, if they are done collectively with other teachers or between schools, these transformations will not only occur in the classroom, but will occur throughout the educational context.

For Barba-Martin et al.(2015) one of the ways to be able to carry out a continuous and collaborative training of students is through Participatory Action-Research groups, considering it as a set of ethical practices whose characteristics allow participants to be trained according to their needs and, through support with other teachers, with the aim of transforming higher education in its context.

From an epistemological point of view, the I-AP first proposes that the experience allows participants to "learn by learning", breaking with traditional teaching-learning models in which individuals play a passive role, accumulating the information that the teacher gives them. Second, the research process allows community members to learn how to conduct research and to value the role that research plays in their lives. Third, I-AP participants learn to understand their role in the process of transforming their social reality, as central actors in the process of change. Finally, promoting the development of critical consciousness among participants becomes a liberating process (Balcázar, 2003).

The I-AP is a very rich methodology, since, on the one hand, it allows for the generation of new knowledge, and on the other, it generates concrete responses to problems posed by researchers on questions or topics of interest that produce new knowledge. Similarly, the I-AP has been introduced not only as a methodology with a qualitative approach, but also as one that promotes social change, which "seeks to develop reflective, critical and emancipatory thinking to transform and solve problems of a social reality through the constant, collaborative and interactive work of all those involved" (Molina Olavarría, 2015, p. 152). That is to say, it implies a new way of investigating, which entails a change of attitudes to generate new knowledge.

Benalcázar and Hernández (2002) consider the I-AP methodology as a strategy for conducting research, offering guidelines that make it possible to adapt them to a specific situation according to the context in which the research is implemented. In this sense, I-AP models have been implemented so that students can use them as a framework for reflection and action in practice in order to solve problems in a society that is constantly changing.

Cáceres, García and Sánchez (2002), Latorre (2003) and Pereyra (2008), among others, state that I-AP is characterized by being collaborative, participatory, democratic, self-evaluation, interactive, allows for continuous feedback, facilitates immediate application, takes place within a social context, and contributes to both social science and social change with a transformative capacity for both teachers and students. In the same way, for Lewin (1946), Kolb (1984) and, Carr and Kemmis (2003), the I-AP methodology is a process that

is integrated by four phases or moments interrelated to each other: planning, action, observation and reflection (See figure 1).
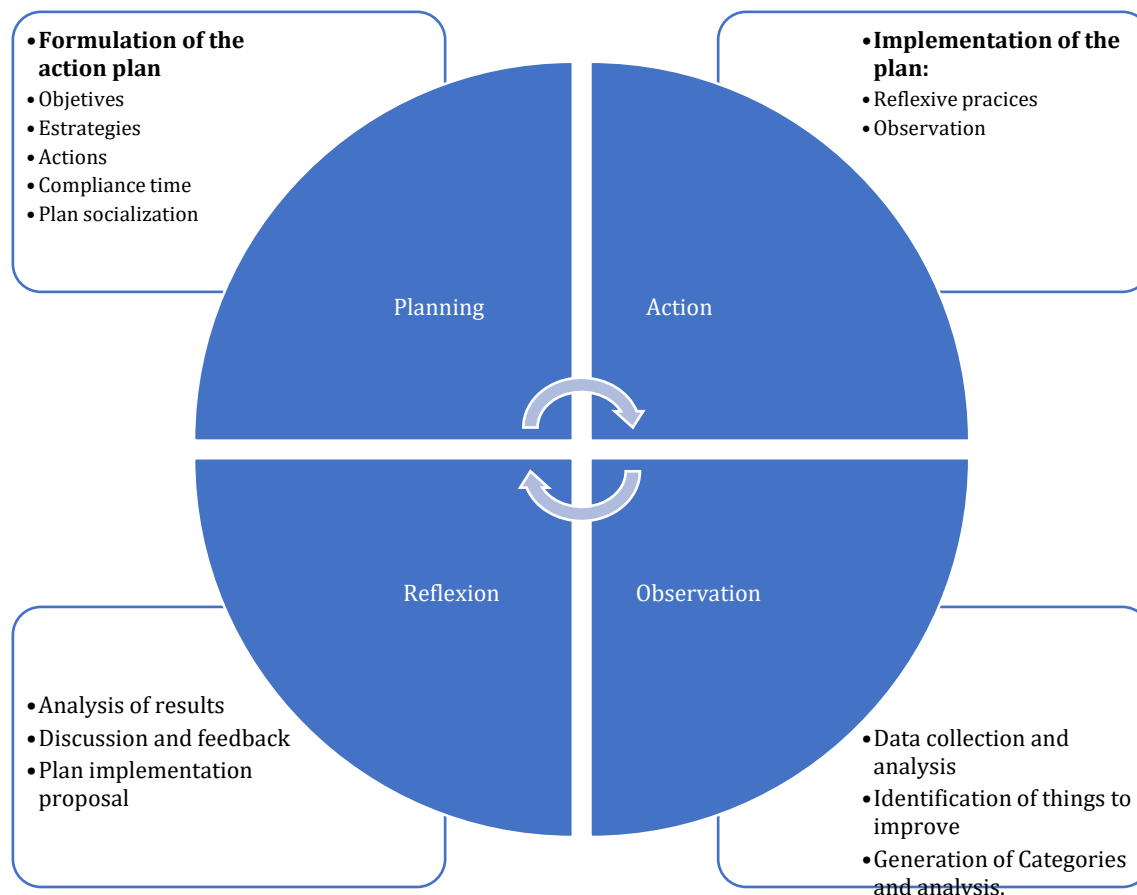

Figure 1. Phases of the I-AP methodology Adapted from: (Apiaries, 2012, p. 107)

Soto Gómez and Pérez Gómez (2015) state that the Lessons Study (LS) is a research methodology which replaces the traditional processes of reflection and improvement of educational practice, that is, it contributes to the construction of knowledge and teaching practices. The LS has its origin and wide diffusion in Japan and with great repercussion in Asian countries such as China, Singapore, Malaysia, Indonesia and Thailand, as well as in North America, and recently in Europe: Sweden and the United Kingdom, with pedagogues of renowned international trajectory, (...) In addition, it is necessary to highlight the contributions made by these authors, on the characteristics of the SL, which contribute significantly to improving educational practice in Eastern and Latin American countries, and which is currently used in Ecuador in the elaboration of the redesigns of all the careers, in which the importance of developing essential competencies in students to develop research processes is highlighted. In other words, the methodology of the SL establishes the relationship between a set of practices, habits, interpersonal relations and tools which help the teacher to work in a cooperative manner in a process of action and research focused on student learning which allows for the strengthening of the development of professional competencies in learning communities. In this regard, Greenwood (2000) states that "action research is a form of 'co-generational' research, in the sense that a group formed by the legitimate owners of the problem and a professional researcher meet to co-develop their

research goals and for social change" (p. 33). In the educational setting, the use of research form is important, especially in situations where there are practical problems, inconsistencies and gaps between what is being pursued and what is actually being pursued.

The I-AP: LS being a tool that has a research methodology that seeks to relate theory with practice as a starting point for innovating education at all levels, becoming the axis of initial training in different spaces of the educational context, relating teachers and students in a cooperative and collaborative manner. On the other hand:

> Participatory Action Research is an inclusive methodology that makes students participants and protagonists of the teaching process from the first day of their training, providing a structure that supports and unites the group, contributing to the creation of a true educational community, something basic in the construction of the school we want (Pérez Gómez & Soto Gómez, 2011, p. 64)..

Similarly, Colmenares (2012) states that "I-AP is a very rich methodological option, since, on the one hand, it allows the expansion of knowledge, and on the other, it generates concrete answers to problems that researchers face when they decide to address a question" (p. 2). It is important to highlight that the author mentions that Participatory Action Research is a methodology that refers to specific procedures of a scientific study different from traditional research, since it is a concrete way of carrying out the steps of a scientific investigation.

In this sense, the I-AP constitutes an alternative to expand knowledge, supported by proven methods and techniques to give clarity to the research and to specify its results, likewise, it is generating reliable answers to the researchers about the researched groups, above all, it helps to take the necessary and adequate actions for the change and transformation of society.

1.1 Advantages and disadvantages of using the methodology

Researchers such as Díaz Méndez 1992, Pérez 2011, Castañeda 2013, among others, establish some advantages and disadvantages of using I-AP as a qualitative approach for the collection and analysis of information in order to provide solutions to the problems posed within a research project (See Table 1).

The following table summarizes some of the advantages and disadvantages of using the I-AP methodology.

ADVANTAGES	INCONVENIENTS
It generates an interesting, broad and creative process of self-learning.	It takes a long time to implement, and there are problems that need to be solved as soon as possible.
It generates answers to the researchers and the group investigated, to take adequate actions for the change and transformation of the community.	In many cases there can be manipulation of the results due to false and not very credible answers.
It favors the recreation of social networks and solidarity ties.	Difficulty in motivating the collaboration of the community, of the people, of certain social groups.
	It does not offer immediate results, therefore, it is not recommended for

It develops participative capacities and skills for teamwork and networking, allowing learning, consensus and negotiation.	medium and short term research and programs.
It allows for a high degree of commitment and co-responsibility on the part of the participants.	It generates impatience in the promoting team and the expectations of the working groups for the results.
It provides a great acceptability and richness of proposals and projects.	It is a long process, but it should be understood as a permanent and recurrent process.
It allows to describe primary social relationships with more depth and agility than other techniques.	Accumulation of data not related to the objectives proposed in the research.
It allows the researcher not only to know a certain reality or a specific problem of a group but also to want to solve it.	Lack of commitment to participation by the community for a longer period of time to collect the information than with other methods.
It contributes to the democratization of educational, social and community action.	The time taken in the development of the PRA is long, without taking into consideration there are problems that have to be solved as soon as possible.
It allows the massive integration of the community.	In some cases the people involved in the PRA process do not have the conditions and capacities required to carry out the process, without having full judgment of the role they will assume within it.
Through the participation of the people, it is possible to raise awareness of existing problems within the groups studied, if not of their solutions.	There is very little time to solve more complex problems.
It allows reflection on the real needs existing in the community.	
It not only understands the reality but also strives to improve it.	
It absorbs the greatest amount of information provided by the people, their beliefs and meanings.	
It is a cycle of self-reflection for the participants at the moment of giving solution to the problems raised in the investigation.	

Table 1. Advantages and disadvantages of using the I-AP methodology. Adapted from: (Perez, p. 4-5 and Castañeda, 2013, p. 9-10)

In this context, according to the study needs in the formation of future professionals in the Early Education Career, activities, strategies, techniques and instruments are selected for the collection of the necessary bibliography to be used at the most appropriate time in each of the subjects that contribute to the development of the Knowledge Integrator Project presented by the students at the end of the level. Therefore, it is imperative to emphasize that the subject favours the development of reflection, writing, analysis and synthesis in

students in relation to the processes that must be fulfilled to manage scientific research in and out of the classroom; this will allow them to develop skills and abilities starting from the writing of research reports, paraphrasing, designing descriptive paragraphs on topics of interest to academic writing.

In the processes of integral formation that we seek to develop in the university students, we must emphasize Research and Epistemology; the same that is framed throughout the Curricular Network of the Initial Education Career at UTMCH in the three units of professional formation: Basic, Professional and Degree Units. In this sense, the subject Research and Participative Action: Lesson Study (I-AP: LS), is located in the Basic Training Unit, of the students of the First Level; where it is presented with the objective of observing the educational problems through the I-AP: LS, to develop the capacity of prevention of future situations with the use of knowledge. It is organized into four learning units, where the student's research skills are highlighted in order to provide learning situations in the development of skills, attitudes and values in the management of scientific research.

2. Methods and materials

The design of the research is of a non-experimental descriptive type with a qualitative focus and was framed within the research - Participatory Action that allows to relate from an empirical and behavioral perspective, curricular reality and professional practice of students in the Early Education Career. The semi-structured interview technique was used to collect information.

The population we worked with were first-level students, parallel B the subject of Participatory Research and Action: Lesson Study (I-AP: LS) of the Early Education Career of the May-August 2018 semester. The sample was selected from a total population of 32 students, of which 29 (90.6%) were female and 3 (9.4%) were male.

Table 2 below summarizes the total sample classified by gender, frequency and percentage of male and female participants.

		Frequency	Percentage	Valid Percentage	Cumulative Percentage
Valid	masculine	3	9.4	9.4	9,4
	Femenine	29	90,6	90,6	90,6
	Total	32	100	100	

Table 2. Sample

With regard to the proposed objective, the following research question was raised: The Participatory Research and Action: Lesson Study (I-AP: LS) is a methodology that improves the educational practice of students in the Initial Education Career at the Technical University of Machala.

2.1 Instrument for information collection

For the collection of information, the interview technique was applied, with the application of a semi-structured questionnaire of seven open questions addressed to students of the First Level of the Initial Education Career of the Technical University of Machala in the subject of Research and Participative Action: Lesson Study (I-AP: LS).

In effect, it is projected that the students of the subject of I-AP: LS of the First Level of the Initial Education Career, of the Technical University of Machala, identify the steps for the search of scientific information, in the writing of documents and scientific-academic texts from the practice and that they give answer to the necessary formative needs in their professional development.

The methodology designed for this purpose is that of participatory action-research, as a guiding methodology of the research process. The organization is given by units previously organized at the level, generating in each unit, research processes. For which it is projected that the students:

- Identify types of texts with reading: Expository, Argumentative, Scientific-Technical and Academic.
- Take advantage of the learning spaces organized by the teacher to improve learning.
- Prioritize the necessary strategies for writing essays as a product of research.
- Organize research spaces for the execution of the Integrated Knowledge Project.
- Program academic writing scenarios for their professional training.

For this, it is necessary to develop skills in higher education students, which is gaining space within the university classrooms, where the teacher not only researches, but does so with his or her students. In this sense, Rivas (2011, p. 34), mentions that: "we live in a fierce world, where winning competitions has become synonymous with success". In this sense, by teaching the subject Participatory Research and Action: Lesson Study (I-AP: LS) to First Level students in the Early Education Career, the following learning outcomes were achieved as part of their academic training:

- It applies Art History to the research process.
- Designs strategies of commented reading, argumentation, analysis and synthesis.
- Develops writing skills and paragraph writing.
- Shows analysis and synthesis skills when writing scientific texts.

3. Results

Based on the previous section, it is demonstrated that students in the first parallel level "B" of the career in question decide to assume the commitment of fulfilling each of the activities in the themes and sub-themes programmed in the four teaching units, which will allow them to improve their learning processes. In view of this problem, the following questions were applied to the students:

1. What scientific literature search skills do you possess?
2. In your secondary education, did you have the opportunity to develop research skills and abilities?
3. From 1 to 10, how would you rate the learning obtained in terms of the development of the academic research methodology received?
4. Did your teachers provide you with websites where you could access information needed in your training?
5. Did they teach you how to write, analyze, synthesize and use these elements to develop reading texts?
6. Would you like to strengthen academic and scientific research skills for the benefit of your professional training?
7. Do you think that the subject Participatory Action Research will contribute to your professional training?

Summarizing the above questions you have to (See box 3):

Semi-structured questionnaire	Analysis of interview responses
Question 1	The total sample (n = 32) interviewed stated that in their secondary education they did not develop skills in the search for adequate scientific literature (...).
Question 2	Two thirds (n = 21) of those interviewed stated that at the secondary level, they had not developed research skills and abilities within the subjects they received (...).
Question 3	The majority of the sample (n = 25) states on a scale of 4, that the learning acquired in each of the subjects is due to the development of a scientific research methodology (...).
Question 4	Almost the total (n = 31) of the interviewees indicated that they had not been provided with websites to be able to access adequate information for reading and research; compared to a small group who indicated that on their own they researched and found sites where they found valuable information to support the subjects they received (...).
Question 5	Two thirds (n = 21) of the students interviewed indicated that the institution had not taught them compared to one third (n = 11) who said that they had been taught to write, analyze, synthesize and make use of these elements to develop reading texts (...).
Question 6	The total sample (n = 32) of students indicated that they would like to strengthen their skills and abilities in academic and scientific research going into professional training (...).
Question 7	Similarly, the total sample (n = 32) indicates that they are very enthusiastic and show great interest and expectation of what they will be taught in the subject of Participatory Research and Action: Lesson Study (...)

Table 3. Results of the interview with students in the first level of initial education

The I-AP is conceived as a learning-doing process in which the researcher must act as a facilitator, advisor and technical person who is consulted. To carry out a project based on the "Lesson Study", it is proposed from two basic perspectives, which are:

- **Bibliographic design or thematic research:** This design uses secondary data, this type of research is theoretical so we need enough evidence to support our project.

- **Field design or empirical research:** This design uses primary data that is mainly obtained from reality, for which the Experimental and Survey Design is used, as was done in this cycle to obtain real information about the problems of the project to be carried out.

The aim is to provide students with adequate tools to improve their learning in the search for new knowledge. It should be mentioned, that students are instructed to quote the authors and articles from which they obtained the information, and, on the other hand, the project needs to be verified using methods such as data collection, an interview or a survey. "At all levels of education it is required that teachers and students learn to investigate our own teaching processes within the framework of action-research models" (Figueroa Sandoval et al., 2012).

The students stated that the knowledge received and the issues raised helped them to carry out the project. In other words, they were productive since they all researched, read, analyzed, reasoned and synthesized each of the scientific readings (articles), on which they relied to develop project themes. This situation allowed them to appropriate the knowledge with topics of interest appropriate to their academic training, and necessary to improve their cognitive processes and to be able to decode, understand and interpret a text; becoming assiduous readers who will construct their own significant learning with the previous knowledge using the linguistic and textual keys coming from the text.

4. Discussion y conclusions

The I-AP is a methodology that contributes to the development of formative experiences in the students of Initial Education, under the qualitative, critical, reflexive and transforming approach, where each one of the students could approach their participation as a result of the understanding of what they were teaching in the classroom. This situation enabled them to put forward points of view, analyses of events, proposals for activities and strategies that were directly linked to the subjects of study. In addition, it was possible to see how the students developed skills to search for information that would allow them to develop their knowledge integration project (PIS), relating the experience of their pre-professional practices with the execution of the same, and what was most enriching was the sharing in the classroom of the experiences they obtained in educational centres when carrying out their professional practices.

The I-AP favors the integration of knowledge and action, together with each of their experiences and experiences as teachers-in-training, a situation that is extremely valuable and becomes the object to be systematized. By means of their actions, the didactic sequence was applied within the classroom in relation to the experience of their professional practices in the educational centers where they had the opportunity to develop them. The 32 students in the Early Education Career who took part in this research were distributed in groups of two students per classroom under the direction of the 16 teachers in professional practice at the Early Education and Nursery levels of the Ministry of Education, so that they could share their experiences and experiences related to the development of the I-AP methodology. Similarly, they will be able to observe the teaching-learning processes that the nursery schools developed with the children in the levels in question and bring this experience to the university classrooms and socialize with their fellow students.

UTMACH and the Research Center, in order to fulfill the objectives of their lines of research, consider it important to articulate research with local, regional and national problems, promoting the joint construction of knowledge between teacher and student. The above mentioned, places the teacher with the responsibility and commitment to seek spaces for professional improvement in the field of educational research and innovation, through participation in academic scientific events organized by the university, such as: congresses, symposia, forums, where teachers as results of research with their students, present their scientific work.

Bibliography

Balcázar, F. E. (2003). Investigación acción participativa (IAP): Aspectos conceptuales y dificultades de implementación. *Fundamentos en humanidades*, *7-8*, 59-77. https://dialnet.unirioja.es/servlet/articulo?codigo=1272956

Balcázar, F. E., y Hernández, B. (2002). Violencia y discapacidad: Un modelo de intervención basado en la investigación-acción participativa. *Psychosocial Intervention*, *11*(2).

Barba-Martín, R. A., Barba, J. J., y Martínez Scott, S. (2015). La formación continua colaborativa a través de la investigación-acción. Una forma de cambiar las prácticas de aula. *Contextos Educativos. Revista de Educación*, *0*(19), 161-175. https://doi.org/10.18172/con.2769

Cáceres, M., García, R., y Sánchez, L. (2002). Dificultades metodológicas y condiciones organizativas durante el desarrollo de un proceso de investigación-acción. *Revista Digital de Educación y Nuevas Tecnologías Contexto Educativo*, *4*(22).

Carr, W., & Kemmis, S. (2003). *Becoming critical: Education knowledge and action research*. Routledge.

Castañeda, J. (2013). *Investigación de Acción Participativa*. https://es.slideshare.net/joselyn091/accion-participativa1?next_slideshow=2

Colmenares, A. M. (2012). Investigación-acción participativa: Una metodología integradora del conocimiento y la acción. *Voces y Silencios. Revista Latinoamericana de Educación*, *3*(1), 102–115.

Figueroa Sandoval, B., Aillon Neumann, M., Herrera Chandía, J., Yáñez Monje, V., & Palavecino Bustos, M. (2012). « El estudio de aprendizaje», un modelo para el desarrollo del conocimiento pedagógico. *Estudios pedagógicos (Valdivia)*, *38*(2), 55–68.

Kolb, D. A. (1984). Experience as the source of learning and development. *Upper Sadle River: Prentice Hall*.

Latorre, A. (2003). *Investigación acción*. Graó.

Lewin, K. (1946). Action research and minority problems. *Journal of social issues*, *2*(4), 34–46.

Molina Olavarría, Y. (2015). Necesidades educativas especiales, elementos para una propuesta de inclusión educativa a través de la investigación acción participativa: El caso de la Escuela México. *Estudios pedagógicos (Valdivia)*, *41*(ESPECIAL), 147-167. https://doi.org/10.4067/S0718-07052015000300010

Pereyra, M. (2008). La investigación acción en educación. *Ministerio de cultura y educación de la nación*, 112–118.

Pérez Gómez, Á. I., y Soto Gómez, E. (2011). Lesson study: La mejora de la práctica y la investigación docente. *Cuadernos de pedagogía*, *417*, 64–67.

Revelo Rosero, J. E., Revuelta Domínguez, F. I., & González-Pérez, A. (2018). Modelo de integración de la competencia digital del docente universitario para su desarrollo profesional en la enseñanza de la matemática – Universidad Tecnológica Equinoccial de Ecuador. *EDMETIC*, *7*(1), 196-224. https://doi.org/10.21071/edmetic.v7i1.6910

Rivas Tovar, L. A. (2011). Las nueve competencias de un investigador. *Investigación administrativa*, *40*(108), 34-54. http://www.scielo.org.mx/scielo.php?script=sci_abstract&pid=S2448-76782011000200034&lng=es&nrm=iso&tlng=es

Soto Gómez, E. S., y Pérez Gómez, Á. I. (2015). Lessons Studies: Un viaje de ida y vuelta recreando el aprendizaje comprensivo. *Revista Interuniversitaria de Formación del Profesorado*, *84*, 15–28.

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