Scientific Competence in Preschool Education in Times of Pandemic: Theoretical Review.

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Abstract: The purpose of this review article is to know and reflect on how scientific competence is being developed in early childhood education, how teachers have been intervening to make the acquisition of competence in this area viable, contributing to the improvement of the community's progress. For the literature review, 26 articles were explored, being the database used Scopus, ESBCO and Scielo in English and Spanish. It was identified that the development of scientific competence in preschool age has lagged behind since before the beginning of the pandemic and is accentuated in this context; the need for teachers to renew themselves and fit into virtual teaching led to the training and empowerment of teachers on virtuality.

Keywords: Scientific competence, preschool teaching, Pandemic.

1. Introduction

Start of the pandemic

We are living in an unprecedented time, the COVID-19 virus that emerged in early December 2019 in Wuhan - China, soon spread throughout the world, being declared an international emergency situation by the World Health Organization on January 30, 2020 (Ramón &Chaple, 2020); Faced with this new disease, there was nothing written to know how to proceed, everything was built as time passed, it was a challenge for nations in all areas and it was no different in education.

Problems it generated

The impossibility of maintaining face-to-face classes forced governments to close educational institutions and led teachers to implement various distance strategies (Veglia et al., 2020).

Scientific research is an indispensable practice for the development of nations at different levels, science advances and largely determines the progress of groups, companies and countries, helping to improve the quality of life and making them more competitive, which makes the development of science competence in early childhood education is unfailing (Nigrini, 2013).

Intervention in this area is transcendental not only from college age, but it is also a requirement for teachers to use appropriate strategies to motivate and develop investigative thinking, essentially the scientific skills that people must develop from preschool age (Nieva& Martínez, 2016). Within the learning process, both teachers and students lack these competencies, becoming evident in the development of classes in this area, taught by teachers, resulting in minimal interventions in science spaces with little results. encouraging, neglecting the training of children to achieve science competence, being the basis for founding an essential research culture for the community (Arteaga Valdés et al., 2016).

Impact of the pandemic in the educational field at the global and local level

In China, nursery schools are gradually reopening, the attendance rate was low, especially in the youngest; As education at this age is not compulsory, but after the age of nine, so virtual education was not organized at this level, however guidelines were proposed to carry them out as a family, materials that included videos, books, crafts, were developed. instructions for conducting science experiments at home; Some teachers communicated online with their students organizing activities for families, when they returned to face-to-face, less structured schedules were offered, which helped to cope with anxiety (Park et al., 2020)

In the Peruvian context, education went through an uncertain scenario, it was necessary to design different pedagogical dynamics, where educational institutions saw the need to innovate and make use of technology to activate the teaching of their students, the curriculum by competences went through adaptations taking into account technology and its relationship with educational actors, where teachers had a different look at their role as educators, being necessary training to guide their work, likewise, feedback was a vital key to promote interaction

towards an assessment by competencies promoted by the national curriculum of basic education (Mollo-Flores & Medina-Zuta, 2020)

Teachers from home actively participate in the orientation and learning process, having to adapt the activities for the students, which can be synchronous or asynchronous, taking into account that both teachers and students may find themselves going through a series of often adverse conditions (Garcia, 2020). At the initial level, an important aspect to take into account is that children perceive through their senses what allows them to capture the world, it is worth mentioning that the capture of the outside world is closely related to the feeling that this perception provokes, being This context is a factor that reduces the adequate opportunities to investigate (Mateo et al., 2020). Family participation plays a preponderant role in student learning, starting with social motivation as an external element, because of their young age children depend on their parents or relatives, if they do not accompany and motivate in an adequate way then they do not the expected results will be achieved (Macián-González & Tejada Giménez, 2020).

Likewise, the use of technology is essential in virtual education, learning that is sustained through virtual means which have increased through various formats whose domains in many cases are very complex for teachers, parents and parents. For this reason, the possibility of abandonment or desertion constitutes walls for the continuity of training, likewise the failures or frustrations may be due to the scarcity of resources and the ignorance of the students' companions (Turpo-gebera et al., 2020)

In this sense, the purpose of this article is to know and reflect on how scientific competence in early childhood education has been developing, as has been the participation of teachers to enable the acquisition of competence in this area, contributing to the improvement of the progress of community.

2. Materials and methods

The method that was used in the study is analytical, since the context was described in a general way, this knowledge of everything that happened allows us to know and explain peculiarities of each of its basic components and the relationships that they preserve among themselves (Cervera, 2014). On the other hand, the interpretive paradigm whose investigative purpose is the understanding and reconstruction of previous reality through interpretation was taken into consideration (Guba & Lincoln, 1994)

The exploration was carried out between the months of February and April 2021, the articles were found in "open access" located in the Scopus, Scielo, and Ebsco databases. For the search, descriptors were used in two languages Spanish and English, in addition, Boléan connectors AND and OR and the equations: “competencia de ciencia y tecnología”, “niñosenedadpreescolar”, “competenciacientífica”,“pandemia”, “Enseñanzainfantil”and “educación virtual”, "science AND technology competence", "preschool children", "science competence", "pandemic", "Early Childhood Education" AND "virtual education".Likewise, an additional search was carried out in order to address the issue of scientific competence in early childhood education.

Exclusion criteria were considered as due to duplicity, because they were not scientific articles, inquiries that were far from the investigated topic and because they were not of interest. Within the inclusion criteria, all search tactics were taken into account: the title, abstract, methodology and results; Being the documents that were closest to the objective, selected to be downloaded in PDF and registered in the Mendeley web manager to develop the research in an orderly manner, linking the citations in APA format and placing the bibliographic references automatically in the document. 341 investigations were found in the aforementioned databases, of which 43 were excluded due to duplication, remaining 298, of this total 91 were excluded because they were not scientific articles, remaining 207, because they did not belong to the topic and interest, 201 were excluded, leaving finally 26 investigations for analysis.

3. Results

Scientific competence

The search for information from the literature on scientific competences was carried out in the Scopus database, in which 19 articles were found with the term "scientific competences", of which 11 articles that did not meet or correspond to the objectives were at different ages to the search, leaving 5 articles related to early childhood education for the final analysis.

Scientific competence presumes that the individual is capable of speaking, reading and writing in addition to creating and understanding topics about validated knowledge, these dissertations include processes of raising

information, problematizing it, discussing them and discussing the evidence to reach conclusions, it is also open to changes and advances demanding precision (Aragón et al., 2020).

The teaching of science in children must take into account mainly the innate curiosity of children, being a fundamental component the formulation of hypotheses in scientific logic, closely related to imagination and creativity, to enliven the interest of infants. requires the knowledge and sensitivity of the teacher (Del Valle Grisales&MejíaAristizábal, 2016).

The scientific competence for the Peruvian Ministry of Education shows that children can build knowledge about the function and structure of the surrounding natural and artificial world through appropriate science methods and how to understand it through attitudes such as curiosity and wonder, among others. , combining diverse capacities (Ministry of Education-Peru, 2016).

The scientific competences that infants acquire will depend on different aspects, both personal and on the research, methods used; Likewise, the different ways in which the child interacts with the study subjects influence (Rodríguez & Pérez, 2017). Another important aspect is the space and material available for the development of scientific activities in early childhood education, it is there, where children develop skills significantly increasing interest in inquiry, that is why schools have special corners conditioned for the work of this area (Cruz-Guzmán Alcalá et al., 2020).

Preschool education in times of pandemic

In the investigation of the topic of children's education, in the Scopus database, 55 documents were found; when making the cross between children's education and scientific competence, no results were found. However, the results on early childhood education include many aspects, when refining the results between the years 2018-2021 and with "open access" the documents were reduced to 14, however they were related to very dissimilar topics, leaving 6 due to their subject matter. The search shows that, although there is information on early childhood education, it can focus on teaching in various areas.

We can start by mentioning that many of the teachers come with a very low level of scientific training, without carrying out activities related to science that are not in some way mandatory, this training, far from an adequate development of scientific competences, has been going back for years, evidencing in teachers a previous negative experience with science (Cruz-Guzmán Alcalá et al., 2020). Despite this, one of the ways to improve early childhood education is to make the good practices of teachers perceptible, likewise it is necessary to understand that the classroom, where there are a variety of components and factors that interrelate and act with the child, is a primary factor as a learning environment that influences and can affect the teaching and learning processes that occur there, It must also be taken into account that the aforementioned is subject to the historical moment and the requirements of the society of the time (Vallejo -Ruiz & Torres-Soto, 2020).

The period of early childhood education offers opportunities to build the foundations of a comprehensive training, within its fundamental characteristics include social interactions, creativity, collaborative work, constructivist learning among others, which allows children to acquire digital skills and develop logical thinking (González-González, 2019)

Likewise, teachers as agents of early childhood education play an important role so that the teaching of science is adequate, there is a positive and significant relationship between the adequate development of scientific competence and the good performance of the teacher in the activities of this competence, demonstrated by using inquiry-based activities; Furthermore, good teacher performance will increase as knowledge of science content increases (Abu, 2021). The characteristics of a child in the face of virtual activities such as games or videos that they did before the pandemic have nothing to do with the child who is a student during the time of the pandemic, a child motivated by virtual entertainment activities can be distinguished being a student accustomed to face-to-face education to that of a child who becomes a student with some difficulties such as managing their times and spaces; In many cases, it has gone from being a child with certain technological skills to being a student with insufficient digital competence added to scarce connectivity resources (Saldaña Montero, 2020)

Preschool education in this period, even more, being about the development of scientific competence, needs the intervention of the family, who feel overloaded and do not consider themselves with the appropriate skills to assume a pedagogical and technological responsibility that are required in this context where education is shared between the teacher and the family, where the latter lacks adequate strategies to be responsible for the functions of teachers; In addition, they have difficulties in managing their time and space (Crescenza et al., 2021)

Challenges in a pandemic

In the exploration of information on preschool education in times of pandemic, we found in the EBSCO database 41 documents applying the formula "educational technology" AND "pandemic" by limiting the search to full text and between the years 2020-2021 it was reduced to 20 articles, reducing the articles to 3 for being of the same theme.

With the appearance of Covid-19, it became impossible to continue with face-to-face classes, the governments of the world responded to educational demands to face the isolation of students in their homes and continue with the academic year; Educational programs were implemented through technological means such as television, which is the one with the most arrival; There was similarity between the programs of some countries, especially those of the same regions, however they presented various difficulties, among them, the most important were pedagogical (Garduño-Rubio, 2020).

Technology is thought not only as a tool to gather information but also as a resource to achieve the creation of something innovative, learning where the child is the protagonist of their own learning, even more, in a remote education context (Fernández Chávez et al., 2020).

According to the UN, in the world the closing of educational gaps has affected almost the entire child population, this is even more evident in countries that lack resources, The crisis caused by the pandemic can lead to the irreversible loss of learning, influence In school dropout, make it difficult to restart face-to-face school activities, in addition to economic problems, however, this pandemic has nurtured innovative spirits that manage to support the exploration of new alternative solutions to educational problems in this context, the pandemic has served to gather forces, opinions and feelings so that educational institutions worldwide investigate and seek innovative alternative solutions in a short period of time, millions of students unable to attend their educational centers in person, have managed from their homes to carry their studies seeking approach what it was before the pandemic, The same goes for it Undoubtedly, for a group of them, teachers have been very complex to carry out this mode of teaching, but most of them have been empowered and strengthened with the use of tools. governments who developed various distance education programs with the use of the web, radio and television; The countries responded in different ways, always oriented towards non-face-to-face methodologies (García Aretio, 2020).

4. Discussion

Without a doubt, the world has been facing difficult times since the appearance of Covid-19 at the end of 2019, which spread rapidly from China to the world, for which it was declared an international emergency by the World Health Organization, the world is found for a short time without knowing what to do, the authorities of each country, analyzing the situation, were creating, together with specialists from different sectors, alternative solutions as a trial. In the education sector, the first measure taken by the rulers was the suspension of face-to-face classes, which led teachers to initiate a great change in their way of teaching (Ramón &Chaple, 2020; Veglia et al., 2020)

One of the educational levels that presents the greatest difficulties in virtuality is undoubtedly the preschool level, when developing the different areas it is observed that there is a greater problem in the development of science and technology competence, this being an essential practice for the development of nations, so it is necessary to carry out appropriate work in accordance with the characteristics of students at this level, in this process it is observed that both teachers and students lack these skills, manifesting themselves in the few spaces intended for development of this competence, being transcendental intervention in this area from the preschool level to promote an investigative culture in society, in this way, students at the university level will be empowered to do research (Nigrini, 2013; Nieva& Martínez, 2016; Arteaga Valdés et al., 2016)

The impact of the pandemic on preschool education was similar in all countries, except those where this educational level is not compulsory, in which other levels were prioritized, leaving more direct attention to the private sector, as is the case in China. Initially, the scenario was uncertain, both teachers, families and students were not in the capacity to carry an education in its virtual totality, it was seen the need to innovate in the use of technology, adapting the curriculum and coordinating with all educational entities, being necessary teacher training, those who guide learning from their homes either synchronously or asynchronously (Park et al., 2020; Mollo-Flores & Medina-Zuta, 2020; García, 2020).

It is necessary to take into account that the characteristics of preschool-age children in face-to-face education are not the same as in the virtual modality since it goes from a recreational activity to activities that require solving difficulties related to digital skills, as well as time and space management; The same occurs with families,

to which must be added the problems of scarce connectivity resources, lack of technological tools, also assuming work overload, leaving them little time to assume pedagogical and technological responsibilities, an essential requirement in this teaching modality (Garduño-Rubio, 2020; Fernández Chávez et al., 2020)

The crisis caused by the pandemic can cause irreversible damage to learning, accentuate school dropouts, make it difficult to restart face-to-face school classes and cause economic problems.However, this context has served to motivate creativity in the search for solutions, an issue that It has not been much investigated, the same happens with teachers, most of them have been empowered and strengthened in the use of tools and methodologies for the achievement of competencies of their students.

5. Conclusions.

Definitely the beginning of the pandemic by Covid-19 was the starting point for the transformation of the way of life around the world, generating various problems for everyone, without distinction of race, social class or economic level, with education being one Of the most injured aspects, it has been possible to verify the deficiencies in different areas, which has caused reactions, some more successful than others, teachers have been forced to reinvent themselves, which has cost some more than others.

It is observed that the world was not prepared to carry a total virtual education, problems with the use of virtual tools, connectivity and lack of teacher training was the constant, especially at the beginning of the pandemic, accentuated with the problems of managing time and spaces, as well as bear the workload among others.

This pandemic will leave us empowered in virtual education, although there is still a lot to learn, the gaps are so distant, likewise, interest in science is awakening, lagging for so long, especially in preschool age; it is in the hands of teachers to find a scientific culture in society from preschool education where, taking advantage of the innate curiosity of children, the spirit of understanding the things that surrounds them will be created in them, inclining their interest in research.

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