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## **Recursos didácticos virtuales en proyectos de ciencias naturales en período de confinamiento por COVID-19**

### **Virtual teaching resources in natural science projects during confinement period by COVID-19**

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## **ABSTRACT**

The objective of the research is to analyze the virtual didactic resources planned for the approach of educational projects in natural sciences during period of confinement by COVID-19. A non-experimental descriptive type work was generated, with a population made up of 30 teachers and a sample of 6 teachers who met the inclusion criteria at San Francisco Sales School, located in the Province of Manabí-Ecuador. The results were approached from these areas: audiovisual teaching resources in social networks, virtual classrooms, learning method, and natural science platforms. The virtual didactic resources projected by the teachers to be implemented in the educational project of natural sciences, are ideal to promote significant learning in students, however, it is necessary to have a training process for both teachers and

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students in order to avoid disadvantages that impair learning, as well as school performance.

**Descriptors:** Active learning; distance education; educational technology; epidemiology. (Words taken from the UNESCO Thesaurus).

## INTRODUCTION

Based on the pedagogical approaches, didactics in its essence has been in charge of facilitating students' learning, that is, it seeks to create a direct connection between educational theory and practice through the application of appropriate strategies in order to promote an education in harmony with the social reality of such students (Abreu, Gallegos, Jácome & Martínez, 2017). In addition, it allows designing various educational planning models in correspondence with the epistemic approach addressed (Vallejo Valdivieso, Zambrano Pincay, Vallejo Pilligua & Bravo Cedeño, 2019).

Being necessary to consider that the world has become a global village where the didactic trend is emerging towards the implementation of virtual resources (Pando, 2018), the implementation of virtual education, as well as the use of didactic resources associated (Rama, 2016), has increased considerably in Latin America, and has intensified dramatically due to the emergency of the COVID-19 pandemic. This reality has forced teachers to take virtual education as an alternative to correct the academic planning of the online modality, in order to conclude or start a period and also to carry out productive and academic projects through ICTs (Lattá-Arias, 2019).

Due to the COVID-19 pandemic, the State of Ecuador has promulgated Ministerial Agreement No. MDT-2020-076, which is focused on the promotion of the telework as a mandatory option during the period of the health emergency (Ministry of Labor, 2020). In this way, the Ministry of Education (2020a) has assumed the remote modality, managing the compulsory implementation of virtual-based teaching resources.

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In this sense, teachers who have traditionally worked inside classrooms have faced the challenge of taking virtuality imperatively. Due to this emergency, they have felt disconcerted respect to managing learning from this educational view; so they have formed work teams that could benefit their performance in achieving this pedagogical process; to this end, they have become the representatives of an allied factor (Hernández, 2018).

Based on such arguments, it has been pertinent to know the impressions of the educational actors respect to the use of didactic resources in order to assume, from virtuality, the programming they had planned in person for the fulfillment of educational goals in the times of the pandemic.

The ideas previously proposed, seek to ensure that the teachers of the in person classes, assume the development of learning from the virtual approach effectively; being pertinent to contextualize the various virtual resources to the needs of each subject. In the case of natural science projects, the planning has to consider that the students work at home with everyday tools and generate meaningful learning. To this proposal, the teacher must innovate educationally and create the appropriate conditions for carrying out the projects with the support of the virtual strategies; taking into account references such as the one presented by the Ministry of Education of Ecuador (2019), in relation to a didactic guide that carry out projects on a virtual platform.

Concerning the above, added to the educational plan COVID-19 of the Ministry of Education of Ecuador, the teacher has the opportunity to design and implement teaching resources in line with the development of natural science projects developed by students. In this way, meaningful education is promoted by articulating the pedagogical significance of the teacher (Herrera-Miranda & Horta-Muñoz, 2016).

In this sense, the project-based learning modality (PBLM) is an alternative that allows the student to learn by doing from the social reality in which he is immersed (Travieso-Valdés & Ortiz-Cardenas, 2018); therefore, the teacher can plan learning situations based on the construction of natural science projects taking into account the context of the student and providing virtual and in person tools available in the

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midst of the health emergency. As a result, the process would contribute to forming research competence, as well as critical thinking, and also to promoting students' metacognitive abilities when building their learning (Muñoz-Morales, Barrientos-Oradini, Araya-Castillo & Reyes-Saavedra, 2019 ).

In this context, it is essential for the teacher to carry out a planning process thinking about the virtuality (Pástor, et al., 2018), which must also consider the sociological aspects of the student, such as demography, internet access, among others, (Valverde-Berrocoso & Balladares-Burgos, 2017). Therefore, planning must be adjusted according to the resources of the students' families, assuming that the economic part plays an important role in financing the tools to be used in the project. Another important aspect to be assumed when planning is how to generate socialization among students despite not having face-to-face contact, being essential because education has historically been a process where values of social integration are promoted (Touriñán-López, 2019). This allows us to reflect that it is not only about teaching or fulfilling certain contents, but also about the implementation of student peers integration necessary to promote teamwork and cooperation in spite of virtual distance education.

In this pandemic period, teachers should consider academic stress as a factor that could intervene during the learning process, especially, when it is linked to anxiety (Castillo-Pimienta, Chacón-de-la-Cruz & Díaz-Veliz, 2016), reason why educational projects in natural sciences must be designed regarding the integration of students with their peers and family members (Lastre-Meza, López-Salazar & Alcazar-Berrio, 2018), for the achievement of better academic performance (Calvo, Verdugo & Amor, 2016).

Continuing with what has been proposed so far, in the San Francisco Sales School, the educational policies of Ecuador have been complied, assuming the virtual modality as the setting to start the school year in the Costa - Galapagos regime 2020 - 2021 (Ministry of Education of Ecuador (2020b), so it is necessary to know the impact of the teaching resources implementation by teachers who are responsible for directing the natural science project, with the purpose of describing, in a certain way,

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their pedagogical experience because they have traditionally worked in the in-person modality. Because of this, it is pertinent to present the results of the research based on its objective, that is, to analyze the virtual educational resources planned to tackle educational projects in natural sciences in times of confinement by COVID -19.

## METHOD

The research was based on a non-experimental descriptive work (Hernández, Fernández & Baptista, 2014), and the use of STROBE guidelines scheme for observational studies. (Cartes-Velasquez & Moraga, 2016). The population consisted of 30 teachers belonging to San Francisco Sales School, located in the Province of Manabí-Ecuador and the sample was made up of 6 teachers who met the following inclusion criteria: being a teacher in the area of natural sciences in the educational institution, be working under the virtual or telework modality and be willing to freely participate in the research through the online survey response.

Regarding the technique, the online survey (Google form) was used to provide information about the sample by applying a Lickert scale questionnaire consisting of 16 items with five response alternatives ranging from 1 to 5, which allowed data to be collected based on the research topic in compliance with the preventive measures against COVID-19.

The validation of the instrument was carried out thanks to the content review by experts and by the calculation of Cronbach's alpha, for which it was necessary to apply a pilot test. The collected data was calculated in the SPSS V25 data processor, obtaining a reliability result of 0.87 of the Cronbach coefficient, which is classified as reliable for its application.

## RESULTS

Regarding **audiovisual teaching resources on social networks**, 10% of the population highlighted implementing Video on YouTube, 20% used Video on Facebook, 30% used Video on Instagram, and 40% implemented Video on WhatsApp as a didactic resource to promote learning.

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Regarding the use of **virtual classrooms**, 19% used the Google classroom, 23% Edmodo, 27% indicated that they implemented Zoom and 31% affirmed that they used Moodle as educational platforms for the design of virtual learning environments. In relation to **the learning method**, 22% relied on National Geographic “Learn at home”, 24% did so through the Santillana educational platform, 26% indicated that they planned to use Discovery at school and 28% preferred to design their own educational platform for the purpose of teaching about natural sciences.

## DISCUSSION

Regarding audiovisual teaching resources on social networks (Barros-Bastida & Barros-Morales, 2015) indicate that “audiovisual media are of transcendental importance from a didactic point of view, since they must be used by each academic who should take them into account for their teaching process” (p. 31). Therefore, they may implement them as tools to promote meaningful learning in the natural sciences, being the video the fundamental resource for this purpose (García-Matamoros, 2014), since it allows students to collect and analyze information based on documentary material that promotes mental processes in accordance with a lasting learning.

This, in addition to the fact that the student also has the opportunity to record videos where he must demonstrate understanding of a certain topic, in order to provide relevant information, which must also be structured for an effective transmission of the message. This is consistent with (Rodríguez-Licea, López-Frías & Mortera-Gutiérrez, 2017), who highlight in their research that through the use of such a strategy, students achieve a better conceptual and procedural apprehension of the topics addressed in class.

The segment related to virtual classrooms is of utmost importance because it allows the micro curriculum to be designed with the purpose of establishing a meaningful learning process (Islas-Torres, 2017). In this sense, considering that the world has changed and the implementation of remote classes is urgent in a scenario where the educational system is necessary in spite of the COVID-19, it is relevant the moral

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family support during the students' learning process, due to it promotes motivation for achievement (Páez, 2018).

Likewise, it is convenient to alert about the need for training both teachers and students on the use of virtual classrooms, and even family members who accompany the learning process, since (Monroy, Hernández & Jiménez, 2018), indicate that there could be predisposition to use them, which could negatively impact academic performance, even more, when the actors involved come from the in person classes modality, not being accustomed to the remote classes for academic purposes. So, the transition process must be assumed by the teachers to promote meaningful teaching and avoid dropouts and school failures.

The learning method to be implemented permits the students to take greater responsibility in their learning process, since they may perform a deeper study by means of research. (Silva-Paim, Thauana-lappe & Brandalize-Rocha, 2014). Likewise, this approach focuses on the students, a situation that contributes to having more participation than in the traditional model (Hernández-Silva & Tecpan-Flores, 2018).

The student-centered approach allows promoting greater responsibility to the student in order for the teacher to become an advisor to the process (Burgos-Briones, Alvarado-Pino & Valdez-Guerrero, 2019), promoting investigation as fundamental strategy for the construction of learning, thus being consistent with the social constructivist paradigm of knowledge.

The teaching of natural sciences must be generated through the interconnectivity of platforms that contribute to the promotion of inclusive learning, promoting the link between the theoretical and the daily life that surrounds the student. In this way, knowledge constitutes a fundamental axis for an adequate conformation of a thoughtful person (Jaramillo-Naranjo, 2019), however, teaching under this modality regarding the natural science project, is a challenge because it constitutes a process that generates uncertainty but also determines new processes to achieve better learning (Busquets, Silva & Larrosa, 2016).

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## CONCLUSION

The virtual didactic resources to be implemented by the teachers in the educational project of natural sciences, are ideal to promote students' significant learning, however, it is necessary to have a training process for both teachers and students in order to avoid hesitations that impair learning, as well as school performance.

This research presents important advances, however, it requires the continuation of a second phase to determine the impact of online classes on students and teachers due to the COVID-19 pandemic, since it will allow to get comparative results in relation to this research, having as a limitation so far that the new school period has just begun, so as mentioned, it is necessary to measure the effectiveness of the resources in the middle or end of the didactics implemented.

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