Resilience of early childhood education teachers in handling new technologies in virtual education due to the COVID-19 pandemic

Resiliència dels professors de nivell inicial en l'ús de les noves tecnologies en l'educació virtual a causa de la pandèmia de la COVID-19

Oliver Rolando Peñafiel Muñoz,[a] Sergio Orlando Velasco Muñoz,[b] Liz Stefani Rubin de Celis Chávez,[c] Hanna Patricia Medrano Romero[d] i Anderson Roy Calle Mamani[e]

[a] Director i fundador del Centre Especialitzat en Psicologia, Hipnosi i Resiliència (CEPSHIR) a La Paz. Doctorand en psicologia dedicat a la resiliència. Universitat Catòlica Boliviana (Bolívia).
A/e: *olicho@hotmail.com*

[b] Comunicador. Centre Especialitzat en Psicologia, Hipnosi i Resiliència (CEPSHIR) (Bolívia).
A/e: *hipnoresiliencia@gmail.com*

[c] Directora acadèmica i psicòloga. Centre Especialitzat en Psicologia, Hipnosi i Resiliència (CEPSHIR) (Bolívia).
A/e: *hipnoresiliencia@gmail.com*

[d] Psicòloga. Centre Especialitzat en Psicologia, Hipnosi i Resiliència (CEPSHIR) (Bolívia).
A/e: *hipnoresiliencia@gmail.com*

[e] Llicenciat en psicologia. Centre Especialitzat en Psicologia, Hipnosi i Resiliència (CEPSHIR) (Bolívia).
A/e: *hipnoresiliencia@gmail.com*

Abstract

In this research we set out the resilient strategies adopted by early childhood education teachers at a State education facility in the city of La Paz, Bolivia in handling new technologies and report on the limited access children and their families have to technologies for virtual education. Thanks to insight into the experiences of teachers through in-depth interviews and online questionnaires

about the Covid-19 pandemic, it has been found that adaptation to requirements in different areas – taking into account the vulnerability brought about by the pandemic and the new challenges this entails; namely, recording of classes, use of virtual platforms, adaptation of teaching materials and the new medium of connection between teachers, students and parents – led to outcomes that made efficiency possible whereby new bonds were strengthened which foster the education of students, enabling them to adapt optimally, and allowing all of them to develop resilient strategies.

Keywords

Resilience, teachers, early childhood education, virtual education, COVID-19, adaptation, Bolivia.

Resum

En aquest estudi descrivim les estratègies de resiliència adoptades pel professorat d'educació infantil en una institució d'educació estatal a la ciutat de La Paz, Bolívia, a l'hora de gestionar les noves tecnologies, i també informem de les limitacions d'accés a les tecnologies per a l'educació virtual que han patit els infants i les seves famílies. A partir de les percepcions del professorat, a les quals hem tingut accés gràcies a entrevistes exhaustives i a qüestionaris en línia sobre la pandèmia de la COVID-19, hem constatat que el procés d'adaptació als requisits en diferents àrees —tenint en compte la vulnerabilitat provocada per la pandèmia i els nous reptes que comporta, com l'enregistrament de les classes, l'ús de plataformes virtuals, l'adaptació dels materials didàctics i el nou mitjà de comunicació entre professorat, alumnat i famílies— ha donat resultats que han fet possible l'eficiència i el reforç de nous vincles que enriqueixen l'educació dels alumnes i han permès que tots s'adaptin de manera òptima i desenvolupin estratègies de resiliència.

Paraules clau

Resiliència, professorat, educació infantil, educació virtual, COVID-19, adaptació, Bolívia.

Introduction

The essence of this work consists of identifying the circumstances imposed by the COVID-19 pandemic as an opportunity to research difficulties faced by teachers when dealing with an unexpected, adverse situation compelling them to adapt. In addition, it also seeks to contribute to the identification of resilience as an act of teaching that conveys to students the attitudes, thoughts, emotions and behaviours that encourage generative resilience for personal, social and community development (Román *et al.*, 2020).

Resilience is one of the main dimensions associated with psychological wellbeing and academic success (Kristjánsson, 2012). In particular, the study of resilience arose from the interest in discovering the traits of children who had been exposed to various

adverse or risky situations and, despite this, did not develop psychological disorders but rather became stronger as a result (Garmezy, 1991; Vizoso-Gómez & Arias-Gundín, 2018).

Resilience is the ability exhibited by human beings to overcome situations that are contrary to what is desired and that cause traumatic stress in daily life. It is how the individual is able to prevail over these situations naturally and move forward, transforming the difficulties into something positive in order to continue with their normal life.

According to Sambrano (2010), resilience is defined as "the ability that people have to react satisfactorily to adversity" (p. 17); therefore, it is appropriate to point out that all human beings are able to develop the ability to overcome every obstacle in life (Arrillaga, 2018).

The process of developing resilience is, in fact, the process of life since every person needs to overcome adverse episodes of stress, trauma and breaks in the circle of life, without being marred forever and while trying to remain happy. Along these lines, the same is true of pedagogy when it is acknowledged that the latter is the science that teaches people how to live a good life (Torres, 2017).

Resilience in education characterises those people who, despite being born and living in high-risk situations, evolve successfully and with good psychological health, without negative or disturbing long-term consequences. Accordingly, they develop their own inner self-regulation rather than being subject to the authority of external rules (Torres, 2017).

Schools with administrators and teachers who have developed resilience are successful and tend to maintain high academic standards to provide effective feedback that helps students by offering them positions of trust and responsibility. In every educational institution, the teacher plays the role of a guide, mediator and facilitator of significant learning. Resilience is directly related to learning environments and how these environments affect student development. If the teacher creates a friendly, pleasant learning environment imbued with a human quality, it will ensure that students are motivated and able to experience personal fulfilment in their daily work (Torres, 2017).

In the educational field, this capacity is paramount when it comes to promoting or activating resilience processes in educational subjects and within educational communities. To build more resilient environments, it is essential to invest in the human capital underpinning these environments – whether this is the children themselves or the teachers – to enable those who work in them to make the impossible possible and generate resilient, sustainable responses over time (Roman, 2020).

The education professional must focus on protective factors, i.e., the resources available to those with whom they intend to work, rather than on risk factors. This will allow people to acknowledge their ability to help themselves and view the teacher or teaching professional as a source of effective support, guidance and accompaniment so that they can advance; indeed, it is based on the strengths and opportunities the students are offered and their reality – ensuring they are motivated to act for their own benefit – that

Resilience of early childhood education teachers in handling new technologies in virtual
education due to the COVID-19 pandemic

54

they will be in a position to be filled with hope and have high expectations regarding the recovery and learning process (Torres, 2017).

Resilience in education is a process of overcoming adversity and accepting social responsibility. The pedagogical task involves the conception of individual, group and institutional preventive actions – prevention that takes into consideration people's perception – using means to develop one's own resilience and acting as a support for others (Torres, 2017).

On 11 March 2020, the World Health Organization (WHO) declared the outbreak of the new coronavirus (SARS-CoV-2) a pandemic, since the epidemiological situation on an international scale required the adoption of immediate measures to tackle the emergency. The world surprisingly found itself faced with a "disruptive event on a global scale" unprecedented in history.

The OMS recommended "social isolation" as a preventive measure, which involves minimising interaction with others. This decline in the extent and quality of social interaction may implicitly carry a risk for the most vulnerable populations (Román *et al.*, 2020).

This pandemic not only changed the education systems in all countries, it also had a direct, intense and surprising impact on teachers (Román *et al.*, 2020).

Based on the situation the world is going through and the new normal we are experiencing, it is necessary to resort to resilient strategies which help to cope with this type of situation. This pandemic not only affects teachers, who have had to come up with new didactic strategies, organising their home to enable virtual classes, it likewise affects the children and their families who have encountered the need to adapt to a new way of learning, which requires a good Internet connection, among other needs.

In the field of education, a large proportion of the measures the countries of the region have adopted in the face of the crisis are related to the suspension of face-to-face classes at all levels, giving rise to three main areas of action: the implementation of distance learning modes through the use of a variety of formats and platforms (with or without the use of technology); support from and the mobilisation of educational staff and communities; and focus on the health and integral wellbeing of students (CEPAL-UNESCO, 2020).

The virtual education mode conceives learning environments that do not unfold in physical classrooms, but rather via digital devices connected to public and private networks. When it comes to virtual education, several advantageous conditions are supposedly evident: flexibility in terms of time (as opposed to fixed hours); individual interaction in digital environments (instead of concentrations in physical classrooms); use of information and communication technologies in order to facilitate learning; and effective communication and mutual help between interlocutors as a requirement to successfully stay on track with courses (Durán *et al.*, 2015; Parra Castrillón, 2020).

Virtual teaching is a high-impact strategy in improving educational coverage, relevance and quality at all levels and for all types of education due to its multimedia, hypertextual and interactive characteristics (Morales Saldarriaga *et al.*, 2016). Technology-mediated

learning has been the subject of different analyses. It may be acknowledged as an enhancement of distance education and a transformation (Crisol-Moya *et al.*, 2020).

Virtual education has been defined as distance education through cyberspace, made possible via a connection to and use of the Internet. It does not need a specific venue or moment in time, meaning a new communication scenario is established between teachers and students (Gutiérrez Bonilla, 2016; Expósito & Marsollier, 2020).

Online education presents flexible schedules – one of its greatest advantages – but this is countered by the sudden change from face-to-face education to virtual education, "compelling" students to participate in classes, forums, conversations, virtual schedules and spaces planned in advance by the teacher (Cáceres-Piñaloza, 2020).

"Virtual education" or "e-learning" seeks to allow educational processes to unfold through cyberspace (Gutiérrez Bonilla, 2016), doing away with the limitations of location and time. Nevertheless, increasingly new demands and challenges begin to emerge. One of them is the creation of an ideal setting, ready for the unfolding of the academic process, which should meet technical and procedural requirements, and must also consider functional or non-functional components that contribute to the effectiveness of the process (Melo-Solarte & Díaz, 2018).

According to Blanco (2016), the virtual environment must begin to take into account all factors that may affect the performance of students and the continuity they benefit from while following the educational process, always in order to meet the objectives in terms of education and seeking high academic performance. It may be said that the success of the educational process through online settings depends largely on the acceptance by students of the virtual environment and the educational model (Melo-Solarte & Díaz, 2018).

Several research projects seek to define the key elements that virtual learning environments must incorporate in order to consolidate the process. They include quality of content, flexibility, scope for personalisation and identification of progress as stated by Esteban *et al*. (2016). However, it must also be taken into account that these environments must also consider human factors such as psychological or sociological components that directly or indirectly affect the process, as suggested by Hernández *et al*. (2016). Indeed, it is clear nowadays that the development education is witnessing via electronic mediums leads us to envisage elements that may contribute to an educational process that delivers excellent outcomes for all.

The importance that online education has acquired in 2020 is an unprecedented event that will mark a turning point in pedagogical practices and in present-day education systems globally. Likewise, the social, cultural and economic inequalities existing in the more than 180 countries that have been victims of the COVID-19 pandemic have been highlighted (Bravo-García & Magis-Rodríguez, 2020). The need and urgency brought about by the current health crisis led governments to close the doors of educational institutions as a measure to mitigate the effects of the pandemic, affecting 94% of students worldwide (UNESCO, 2020; Expósito & Marsollier, 2020).

However, the flame of education must not be extinguished and, even in this context of extreme emergency, it must be guaranteed as a fundamental human right

(Amuchástegui *et al.*, 2017). For a virtual education approach to be of optimal quality it must contemplate certain requirements, such as: having the appropriate technological resources and the required service to access the education programme; benefitting from a virtual course structure and content that delivers educational value; and providing effective learning where the environment is satisfactory for both students and teachers (Marciniak & Gairín-Sallán, 2018; Expósito & Marsollier, 2020).

In this situation marked by fear and uncertainty in the face of health events and the social, labour and economic consequences resulting from them, the figure of the teacher has played a fundamental role that has gone far beyond pedagogical aspects. Teachers have transformed their face-to-face teaching into remote teaching from their home and provided didactic materials in order to foster the learning of students (García, 2020). Opting for a virtual setting in education offers a more flexible teaching and learning model where best teaching practices can spur educational processes on through the use of ICT (information and communication technology) (Durán *et al.*, 2016; Expósito & Marsollier, 2020).

Online education not only consists of uploading and downloading files from a virtual platform, it lies in the search for didactic strategies, which must be easy to understand, enabling students to be closely acquainted with the contents.

In addition, coexistence between students and teachers is limited to the use of digital media, which tend to be employed highly frequently. The use of programmes or applications for videoconferencing, such as Zoom, Skype, WhatsApp, Facebook Live and others, can bring together virtual learning communities – in this case in a classroom – allowing students to share ideas, experiences, suggestions, doubts and knowledge about the virtual setting (Cáceres-Piñaloza, 2020).

Pedagogical and emotional accompaniment is fundamental, but always on the basis of appropriate rules for coexistence in the virtual space. These rules do not seek to allow teachers and classmates to socialise in real time when the current situation would not be entirely conducive to it. In our capacity as teachers, even if the conditions seem adverse, emotional and learning environments are to be fostered for students (Cáceres-Piñaloza, 2020).

The purpose of this article is to identify the resilient strategies adopted by early childhood education teachers at a State education facility in the city of La Paz, which have been emerging due to the handling of new technologies. We examine these strategies, which have undergone changes in this new stage of education, with the adaptation of homes and teaching, and above all we consider what feelings have been emerging throughout these virtual classes as time has elapsed.

Materials and methods

Design

A descriptive analysis of case studies focussed on recognising the resilient strategies adopted by early childhood education teachers for handling new technologies in virtual education due to the COVID-19 pandemic.

Population

This case study was made up of the entire early childhood education teaching staff from Juan Herschel C. State education facility – namely, six members who participated in the research. It was necessary for them to have access to an Internet or data connection and to complete the questionnaire and in-depth interview using a computer or mobile phone.

The participating teachers are in the age range from 40 to 60 years with more than fifteen years of service in regular education, although each of them is also responsible for performing domestic duties. Access to an Internet connection at their home address was initially non-existent because, in view of their financial means, they had decided to buy daily data plans with their mobile phone, which later entailed an additional cost. When they secured a landline Internet service at their home, they all purchased the same service allowing them to connect with their students, parents and the educational community without interruptions.

The technological resources of each one of them had to be adequate for the class platforms. They all had a laptop that was provided by the Bolivian government several years ago, and basic mobile phones. As they needed access to a mid-range or high performance mobile phone, this represented a financial expense in their monthly budget that had been planned for sharing between family and work requirements.

The educational context in which the teachers work involves students from families with informal jobs, who are in receipt of benefits from the Bolivian State and supplementary food at the education facility from the local authority in the city of La Paz.

Research techniques

Questionnaire

The online questionnaire was prepared by the researchers beforehand. The participants were asked to complete it anonymously, with each one being assigned a code. The questions focussed on recognising the strategies they had adopted in the handling of new technologies due to the pandemic. The study began on 1 July 2020 and remained online for fifteen days. Each research participant was allowed to complete the questionnaire – structured in three sections including open and multiple-choice questions – only once.

Section A: Informed consent
Before filling in the questionnaire, participants were informed about the characteristics of the study via the consent form, specifying that the survey complies with all the ethical specifications required for research based on international standards. Each teacher had to read and agree to take part in the research.

Section B: Sociodemographic data

In this section comprising ten items, the following details were requested: date of birth, marital status, gender, occupation, academic degree, address, place of residence, mobile telephone number, email address and the number of family members living at their home.

Section C: Research-specific data

This section comprised twelve items, referring to: educational facility(ies) where they work, length of service in the teaching profession, Internet connection at home, status regarding receipt of updates for managing online classes, platforms they use to teach classes, class preparation time, class duration time, whether they have all the materials needed to prepare their class, number of students attending per class, difficulties encountered adapting to new technologies, methods of learning and additional comments.

In the online questionnaire, the first part collects relevant data according to the personal and family circumstances of each of the research participants, while the second part set out personal and socio-educational research data of relevance. Subsequently, the process moved on to the in-depth interview.

<u>In-depth interview</u>

In this stage, the interviewer guided the conversation trying to gain an understanding of cognitive adaptability, feelings and skills developed in the use of technology within the setting used for the conversation with the interviewee, which lasted an average time of 40 to 70 minutes per interview.

By incorporating guidance questions prepared by the researchers which centred on thoughts, feelings and an account of circumstances, the in-depth interview allowed for fluent dialogue with each of the participants leading to enhanced quality of answers and providing a thorough insight into each of the experiences encountered by the teachers.

Interview Question Guide

Category A: Cognitive adaptability

What personal feelings did you experience during the initial moments of approaching technologies?
What types of difficulties did you encounter when planning your classes?
How did you adapt your teaching strategies?
What did you think might happen if you or someone in your family contracted COVID-19?

Category B: Feelings

How would you describe your feelings during your first experiences in front of the class?
How did appearing on camera make you feel at first?
How have you felt in front of the camera since?
What feelings did you experience when one of your students was absent?
What emotions did you go through when you felt you could contract COVID-19?
How important was it for you to overcome these stages of adaptation?

Category C: Skills developed using technology

How have your first experiences in handling technologies been?

How did you manage to generate adequate interaction between your home and the virtual classroom?

Data examination: thematic analysis

Subsequently, the results were interpreted using a thematic analysis.

The examination method used is called a thematic analysis since it is a method that makes it possible to identify, organise, analyse in detail and provide patterns or themes based on a thorough reading and re-reading of the information compiled. Consequently, results may be inferred that encourage suitable understanding or interpretation of the phenomenon under study (Braun & Clarke, 2006).

In addition, thematic analysis offers a thorough process to identify numerous cross-references between the issues arising and the overall information. As a result, several concepts and opinions from the participants can be linked to and compared with data that has been compiled in different situations during the research (Alhojailan, 2012).

The examination of the responses obtained from the participants using the epistemological and methodological framework for thematic analysis constitutes phenomenology: a comprehensive, interpretive theory of social action which explores subjective experience in the daily lives of women. In this respect, it is considered that people who live in the everyday world are capable of attributing meaning to a situation; therefore, it is the subjective meaning of the experience that constitutes the subject of study (Mieles *et al.*, 2012).

Thematic coding is applied as a multi-step procedure, again in terms of comparability of analyses. Accordingly, it produces a brief description of each case, which is continually re-checked and modified if necessary during subsequent interpretation. This description of the case includes a statement that is standard for the interview. It consists of a brief description of the person with respect to the objective of the research, in such a way that the thematic analysis makes it possible to identify the essence of a phenomenon, transforming the experience into a textual expression of its essence (González & Cano, 2010).

Results

At this point in the research, the results of the interviews conducted with early childhood education teachers at a State education facility in the city of La Paz, Bolivia were compiled. To do this, efforts focussed on understanding the resilient processes arising out of the pandemic situation and how pedagogical processes have been adapted to information and communication technologies in education. It has been pertinent to focus particularly on the arguments arising from the identification of meanings in order to explore interpretations.

Based on the arguments of the interviewees, certain polysemic levels of interpretation may be revealed, which have been systematised based on three categories that mark the relevant methodological parameters.

The first category to consider is cognitive adaptability, in which the parameters for adaptation of the teaching praxis to the contextual situation are systematized and contextualised based on the direct experiences of our research participants. The second makes it possible to analyse the feelings triggered in early childhood education teachers arising out of the stages of adaptability in the pedagogical processes. The third category enables us to link the previous two to the various emotions generated in the research participants with a view to understanding verifiable resilient parameters based on the skills developed in terms of use of technology.

Cognitive adaptability

To understand the processes of cognitive adaptability of the group, it is important to recognise that there have been external and internal factors in the dynamics of adaptation of each teacher.

By analysing each experience, a common denominator has been discovered in the responses based on the initial stages of the adaptability process arising from the lockdown enforced due to COVID-19. The responses demonstrate a constant state of conflict and insecurity, all related to context, technology, and teaching and learning processes.

By conducting an analysis of meanings from frequent words in the responses, certain difficulties faced by students were identified. In this respect, participant 1 stated: "I thought I was not going to be able to. I was afraid of being wrong, my computer was very old and I could not connect; we no longer do the class on one day, we do it on two days; we have given each other leeway, but still we did not reach one hundred percent." Along the same lines in terms of difficulties, participant 2 said: "Another difficulty was making the videos. I love acting, dancing, singing and all that and we have done it, we recorded, but we couldn't edit the videos, it was hard for us." In addition, participant 3 stated: "I was thinking about how I could do it, we were all surprised and many of us did not know how to handle the platforms or edit videos."

Based on the analysis of responses from each participant, it was observed that verbs were used in the past perfect, determining that it is a state that has been overcome or changed in the present. This is a constant observation in the discourse of each response obtained in the interviews.

Adaptive needs have been supported by State and institutional training programmes which, based on practice, have been executed in a collective and highly collaborative way with the community of early childhood education teachers. On this aspect, participant 2 answered that: "It has been deemed appropriate to start with the simplest thing and I have been learning little by little. We successfully completed the classes delivered by the Ministry; that has helped us a lot. My experience has been gradual, and it has been difficult for us." According to participant 5, it was: "Difficult [the situation] because we did not know how to handle [the Internet], and neither did many parents, but it was the only way to reach the children, then we got used to it." "[We had problems] more than everything with the Internet, handling it. I was afraid that I would

be wrong and that my pupils would not understand; now we communicate via WhatsApp if they have questions that we cannot get to in class." Moreover, participant 2 added: "I think one important thing has been the parents because they were not used to this [pedagogical work through digital means]. [We said to parents:] talk to them [the children], tell them that we love them very much, that from now on we are going to see each other through a camera, that they have to listen to us attentively, as they did in kindergarten."

On analysing the responses from participants, it is evident that in the initial processes the difficulty in adaptation became apparent and constituted the preponderant factor for the development of teaching and learning. Later it became evident that teachers had put aside the difficulties, prioritising well-being and the transfer of knowledge. In this respect, a very close bond has existed and exists between teachers and students. This can be seen in the statements of participant 5: "I am worried, but we take care of ourselves, we do not have contact with third parties and we buy various things just in case, nobody is completely safe, but we are always attentive to any symptoms." Participant 1 added: "Very scared; if it happened, I don't know what face I was going to put on to get through classes. We didn't want anyone to come out or to the door; there is always fear, stress, worry and sometimes the association with pain." Participant 2 additionally stated: "I have had somewhat sad experiences with my students and I am always aware of everyone; I notice when there have been cases, which caused them to miss classes or not hand in their homework".

In the responses it is recognised that fear is a common factor in the initial stages of adaptation. It emerges progressively as COVID-19 infections become increasingly evident and cases gradually creep closer to the participants in this research. This is because one of the foremost difficulties has been dealing with situations associated with the pandemic.

Secondly, it has been possible to observe that given the difficulties surrounding coordination for educational processes between parents, teachers and the institution, it has been crucial to ensure effective communication and unfolding of activities. This stage was decisive to promote and motivate teachers so as to prevent them from abandoning their work.

In terms of the application of didactic strategies, these have been incorporated to the extent that each teacher – regardless of age or socioeconomic background – had access to new platforms with different characteristics. It was observed that none of them had managed to adapt on their own, at all times doing so in a collaborative environment between themselves, the parents and the institution. For instance, participant 2 affirmed: "Despite so many beautiful things that can be found, and so many ways that children can be taught, I think that, as we know, it will never be the same. But I was delighted, for example, that now we are spending physical education classes apart, and since I love dancing I do Zumba, when in former classes I taught my children Zumba, I loved the fact that their mums were also moving as well."

Analysis of feelings

In the interviews it was possible to confirm that there are two definitive stages for understanding resilient adaptation processes. In the first stage, referred to as the initial

stage, arguments were observed in which feelings of sadness, anguish, discomfort and powerlessness stood out. These states changed hugely in the second stage, where terms such as achievement, well-being, peace of mind and adaptability were frequently identified. In this regard, participant 5 claimed: "It worries me, but I have communication with the parents, via calls or messages, sometimes they don't connect because they don't have time or extra credit on their line. They also had connection problems, and many of the children's parents did not know how to handle the video; it was difficult for us." Along the same line of thinking, participant 6 affirmed: "It helped me a lot [being with the children through classes] in quarantine, I have not felt it. As I said before, it is more work [to give virtual classes], [to create] a set design for each theme, for example, the title, if a story had to be told, the fact that it was going to be pasted on the wall or it was going to be on the TV or music. Interesting, first we recorded for me and then for my sister, my nephews helped me because they are young, they loved helping me, they were happy, it was a beautiful situation, to come together as a family and with all that love we have given to the children".

The crucial aspect in demonstrating this qualitative change based on verbal parameters took place at moments when the intermediate stages of the process were discussed, since adverse periods have been fundamental in bringing about change. To a large extent, the high levels of insecurity regarding health, job security, access to virtual tools for educational work and joint cooperation between students, teachers and parents have enabled an evolutionary development of skills to take place, which could only stem from the adversity of the situation, and this sped up the process of adaptability and consolidation of positive feelings, thereby increasing security and confidence.

In answer to the question of how you feel now when teaching classes, participant 2 said: "It is normal for me; the children wait for class, and I prepare myself every day, we also send kisses and hugs on camera." It is interesting to note what participant 5 stated in this respect: "As well as being a teacher, one is also a mother, a housewife, a grandmother and we often want to do everything at the same time. In that respect, it is quite difficult for me. I share my place with a puppeteer who helps me with classes so I know the class feels better." Participant 3 added: "It seemed strange to me but good at the same time because it connects us and it helps us too. I think we have done well. The parents and children are happy."

Skills developed in the use of technology

In this part of the research, it has been possible to acknowledge that the arguments expressed were based on anxiety and uncertainty since the teachers interviewed, as well as the parents and children, had encountered complications in access to virtual tools for pedagogical development: Internet access, cost of the service and volume of work involved in the planning and implementation of teaching and assessment strategies. This becomes evident from the answers of participant 1: "It has happened to me that parents apologise and say they don't have much money to connect, and the task was sent to them using another means." Participant 4, for instance, stated: "I think it has been so difficult to convince parents to go online in the end, it has been difficult for the children to get used to not going to face-to-face classes because many asked me or told me: why are you there? And why don't we go to kindergarten? Because then they questioned why I was even teaching them to deactivate and activate their microphones. So it has

been a long process, and now they think that they are slowly getting used to it because I told them that we would be seeing each other like this on the computer or on the mobile phone. So, well, now I've been teaching for a good time so let's enjoy that, though sometimes I would feel bad because I know, when something happened, it was not their fault or anyone's fault, or maybe we had encountered the odd setback or struggled due to a decision from the father not the child. This would make me feel bad for the child if he does not go online." Also, participant 6 said: "To give virtual classes is more complicated. Before there was more contact with the student in every way. There are things that cannot now be done with the student, but as far as possible we are trying to keep moving forward."

Lastly, it is possible to determine that one of the activities that initially entailed much complication later became the most highly valued, leading to the adaptation of the classroom, whereby the teacher's home was linked using virtual spaces for online classes.

Conclusions

The goal of this research is to recognise the resilient strategies adopted by early childhood education teachers as a consequence of handling new technologies in virtual education owing to the COVID-19 pandemic. Indeed, it is possible to conclude that the participants achieved optimal adaptation in line with the needs imposed by the circumstances. In particular, the three preponderant aspects are: pedagogical and technological adaptability, as well as adaptability from physical contexts to virtual ones.

The importance of recognising these three categories in the development of female educators can serve as a model for a resilient strategy in similar fields that have the following characteristics: technological resources are limited and difficult to access; knowledge about new technologies exhibits precariousness; and students possess scant technological resources and have limited support from tutors or parents. In similar contexts, the resilient capacity of teachers may be evidenced, whereby these limitations are transformed into protection strategies so that inadequate resources can become components of educational importance.

In Bolivia, securing the necessary technology and Internet access to deliver optimal classes at the different levels in regular and higher education in urban and rural contexts is limited to aspects relating to the acquisition of mobile phone equipment that supports the various educational platforms, and desktop or laptop computers with the minimum resources for continuous use of educational tools in the teaching-learning process.

The setting up of a domestic network that enables stable interaction for the educational process has a high financial cost; many families find it difficult to cope with this. This is because, given the expense of a monthly fixed rate service, they can only afford to meet their basic daily living needs. A high cost Internet service ceases to remain a sustainable option; hence, many children and young people drop out of school.

In the area of the Bolivian highlands, where the research is carried out, many families who rely on informal employment exhibit scant technological skills in order to be able to support their children with virtual education. Indeed, many of the children are strategic allies for the informal employment their parents or guardians rely on. Consequently, for early childhood education teachers the power to provide basic, intermediate and comprehensive school readiness – that is, the basics of reading, writing, arithmetic, social skills, communication and language, fine and gross motor skills, graphomotor skills, acquisition of cultural social habits – demonstrates that the resilient strategies they have implemented in certain classes have managed to transform the virtual environment into the learning channel that led to a decrease in absence due to deficiencies and factors previously running counter to this development.

The research carried out by Expósito & Marsollier (2020) "Virtuality and education in times of COVID-19. An empirical study in Argentina" shows that the implementation of technological resources and Internet connectivity in Latin American countries show a lack of foresight, revealing socio-educational inequality and putting teaching strategies for the use of technological resources and the Internet to the test. Accordingly, when compared to this research project on the resilient process for handling new technologies, it may be observed that by achieving control over cognitive adaptability, feelings and abilities in the use of the technology, teachers develop resilient tools that allow them to overcome adversity. Thus, these tools are transformed into skills that strengthen their self-confidence and self-worth in the face of all the demands posed by educational needs.

By serving as motivators for their students, teachers instigate a stable emotional bond that generates trust with families, producing a sense of connection with the educational institution whereby a space in their home is converted into the physical classroom that connects remotely to the place where the children are located.

By highlighting the fact that many of the previously analysed factors unfold differently in spaces where there is scope for technological interaction via the Internet, an alternative form of dynamics for the pedagogical process is generated. Adaptability to learning is facilitated as these dynamics support parents or guardians, creating suitable environments for the teaching-learning process.

There is a range of physical places in the home where learning is carried out. Therefore, the variation becomes evident, with different spaces in the house used as options to access classes, a factor that is counterproductive and sometimes a disincentive for children when it comes to the consolidation of skills.

Based on the study carried out by Román *et al.* (2020) in Latin America "Resilience of teachers in compulsory preventive social distancing during the COVID-19 pandemic", it is evident that it is possible to recognise that teachers possess adaptive capacities on account of them making changes in their lifestyle during social distancing, generating familiarity with their closest environment. In parallel to this study, it has been demonstrated that, apart from setting up part of their home as a virtual classroom, early childhood education teachers warmly invite their students to become part of their close family. This illustrates the importance of emotional bonds arising from the virtual

classroom where children feel welcomed while maintaining their sense of belonging to and identity with their educational facility.

The resilient strategies exhibited by early childhood education teachers for handling new technologies in virtual education owing to the COVID-19 pandemic emerge from the need for original, relevant adaptation. Indeed, cognitive adaptability, identification and handling of emotions, as well as the balance between working and family life become catalysts for the development of new skills which, in time, are consolidated to differing extents despite the internal and external difficulties arising.

The research "Holistic education at Venezuelan primary level: a resilient vision of education" conducted by Arrillaga (2018) emphasises the fact that family plays a decisive role in the education of future generations. The teaching role takes on importance by focussing on the sensitive, cooperative side of humans and, in particular, the educational facet channelled through affection for others. In this respect, this research demonstrates this behaviour by recognising that teachers express love, respect, empathy and altruistic interest for the well-being of students, generating adherence to the teaching-learning process among all students and their families alike.

Thus, we can conclude that the resilient strategies used by teachers are centred on the creation of protective networks; virtual spaces shrouded in a sense of belonging, selfless dedication to learning of students, and constant coordination between the institution and parents.

Accordingly, new technologies become an invisible oxymoron where the initial perception of threat from them is transformed into the perception of them as a channel for engagement between educators and the educational community. This has led to the emergence of virtual contexts of intra- and interpersonal evolution, encouraging the development of adaptive and sustainable technology skills.

Acknowledgments

References

Alhojailan, M. (2012). Identification of learners' attitudes regarding the implementation of read/write web, blog tools: a case study in higher education. In *7th DisCo Conference Reader: New Media and Education*. Prague: Centre for Higher Education Studies, 58-73.

Amuchástegui, G., Valle, M. I. D. & Renna, H. (2017). Reconstruir sin ladrillos: guías de apoyo para el sector educativo en contextos de emergencia. http://repositorio.minedu.gob.pe/handle/MINEDU/5592

Arrillaga, C. E. L. (2018). La educación holística en el nivel de primaria venezolana: una visión resiliente de la educación. *Revista Scientific, 3*(9), 297-310. https://dialnet.unirioja.es/servlet/articulo?codigo=7011944

Blanco Martínez, A. & Anta Fernández, P. (2015). La perspectiva de estudiantes en línea sobre los entornos virtuales de aprendizaje en la educación superior. *INNOEDUCES. International journal of technology and educational innovation*, *2*(2), 109-116. http://dx.doi.org/10.20548/innoeduca.2016.v2i2.1062

Gutiérrez Bonilla, L. A. (2016). Deliberación en torno a la educación virtual. *Interconectando Saberes*, *10*, 77-89. http://is.uv.mx/index.php/IS/article/view/1112

Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

Bravo-García, E. & Magís-Rodríguez, C. (2020). Qué aprendimos de la vigilancia epidemiológica del sida que podemos usar para el COVID-19. *Mundo de Hoy*. https://mundodehoy.com/2020/04/23/que-aprendimos-de-la-vigilancia-epidemiologica-del-sida-que-podemos-usar-para-el-covid-19/

Cáceres-Piñaloza, K. F. (2020). Educación virtual: creando espacios afectivos, de convivencia y aprendizaje en tiempos de COVID-19. *CienciAmérica, 9*(2), 38-44. http://dx.doi.org/10.33210/ca.v9i2.284

Parra Castrillón, J. E. (2020). Prácticas de docencia tradicional en ambientes de educación virtual. *Academia y Virtualidad, 13*(1), 93-106. https://doi.org/10.18359/ravi.4295

Crisol-Moya, E., Herrera-Nieves, L. & Montes-Soldado, R. (2020). Virtual education for all: Systematic review. *Education in the Knowledge Society*, *21*, article 15. http://dx.doi.org/10.14201/eks.2020210

Durán, R., Estay-Niculcar, C. & Álvarez, H. (2015). Adoption of good practices in virtual education in higher education. *Aula Abierta*, *43*(2), 77-86. https://www.sciencedirect.com/science/ar%C2%ACticle/pii/S0210277315000037

ECLAC & UNESCO. (2020). *Education in the time of COVID-19 pandemic*. CEPAL & UNESCO. (COVID-19 Report, 21).

Esteban, M., Bernardo, A., Rodríguez, L., Cerezo, R., Núñez, J. & Casaravilla, A. (2016). Claves para facilitar el éxito en entornos virtuales de aprendizaje. In *Congresos CLABES*. https://revistas.utp.ac.pa/index.php/clabes/article/view/1414

Expósito, C. D. & Marsollier, R. G. (2020). Virtualidad y educación en tiempos de COVID-19. Un estudio empírico en Argentina. *Educación y Humanismo, 22*(39). https://doi.org/10.17081/eduhum.22.39.4214

García, M. D. (2020). Teaching from home. A necessary alternative in times of COVID-19. *Pole of Knowledge: Multidisciplinary Scientific-Academic Journal*, *5*(4), 304-324. https://doi.org/10.23857/pc.v5i4.1386

Garmezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments. *Pediatric Annals*, *20*, 459-466. https://10.3928/0090-4481-19910901-05

González, T. & Cano, A. (2010, january-february) Introducción al análisis de datos en investigación cualitativa: concepto y características (I). *Nure Investigación*, *44*.

Hernández, S. J., Quejada, O. M. & Díaz, G. M. (2016). Guía metodológica para el desarrollo de ambientes educativos virtuales accesibles. *Digital Education Review*, *29*, 166-180. https://dialnet.unirioja.es/servlet/articulo?codigo=5580048

Kristjánsson, K. (2012). Positive psychology and positive education: Old wine in new bottles? *Educational Psychologist, 47*(2), 86-105. https://doi.org/10.1080/00461520.2011.610678

Marciniak, R. & Gairín-Sallán, J. (2018). Quality evaluation dimensions of virtual education: review of reference models. *RIED. Ibero-American Journal of Distance Education*, *21*(1), 217-238. https://doi.org/10.5944/ried.21.1.16182

Mieles Barrera, M. D., Tonon, G. & Alvarado Salgado, S. V. (2012). Investigación cualitativa: el análisis temático para el tratamiento de la información desde el enfoque de la fenomenología social. Universitas Humanística, 74, 195-225. https://www.redalyc.org/articulo.oa?id=791/79125420009

Melo-Solarte, D. S. & Díaz, P. A. (2018). El aprendizaje afectivo y la gamificación en escenarios de educación virtual. *Información Tecnológica, 29*(3), 237-248. http://dx.doi.org/10.4067/S0718-07642018000300237

Morales Saldarriaga, J. C., Fernández Morales, K. & Pulido, J. E. (2016). Evaluación de técnicas de producción accesible en cursos masivos, abiertos y en línea - MOOC. *Revista CINTEX*, *21*(1), 89-112. https://revistas.pascualbravo.edu.co/index.php/cintex/article/view/11

Román, F., Forés, A., Calandri, I., Gautreaux, R., Antúnez, A., Ordehi, D., Calle, L., Poenitz, V., Correa, K. L., Torresi, S., Barceló, E., Conejo, M., Allegri, R. & Ponnet, V. (2020). Resiliencia de docentes en distanciamiento social preventivo obligatorio durante la pandemia de COVID-19. *Journal of Neuroeducation*, *1*(1), 76-87.

Sambrano, J. (2010). *Resiliencia, transformación positiva de la adversidad*. Editorial Alfa.

Torres, E. (2017). *La resiliencia en la educación*. Universidad Panamericana. Facultad de Pedagogía.

UNESCO (2020, August 6). *The United Nations Secretary-General warns of a looming educational catastrophe and cites UNESCO's forecast that 24 million students could drop out*. https://es.unesco.org/news/secretario-general-naciones-unidas-advierte-que-se-avecina-catastrofe-educacion-y-cita

Vizoso-Gómez, C. & Arias-Gundín, O. (2018). Resilience, optimism and academic burnout in students. *European Journal of Education and Psychology, 11*(1), 47-59.