



Covid-19 Literacy as a Modulator of Emotions Linked to the Pandemic

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An inquiry-based teacher training proposal concerning covid-19 was implemented during lockdown with Pre-Primary Education Degree students. The objective was to analyse how the workshop changed the students' emotions and their knowledge linked to the pandemic. To this end, the participants responded to an open-ended questionnaire passed out before and after the workshop, and to a Likert-type questionnaire on emotions when they handed in their responses. The results show that, in the case of learning, the students modified their covid-19 literacy to a greater or lesser extent and, in the case of emotions, they felt less fear, anger, concern, and insecurity, and greater tranquillity and optimism. In conclusion, an emotional modulation is perceived in which scientific literacy participates.

Keywords: emotions, experimental sciences, covid-19, higher education, project-based learning

INTRODUCTION

The World Health Organization (WHO) declared COVID-19 a pandemic on 11 March 2020 (WHO, 2020). They indicated that the said declaration should not be taken rashly since it could cause irrational fear or the false feeling that nothing could be done, which would then cause great suffering and unnecessary deaths.

In this worrying context, future science teachers have acquired great relevance for various reasons. In the first place, they are affected by the pandemic the same as other citizens. Secondly, according to Vera-Villaruel (2020), factors linked to COVID-19 such as emotions and cognition have fostered a certain risk or disease prevention

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behaviour, and have acquired a relevant role in the fight against this pandemic. So, as that author indicates, with their scientific knowledge and emotions they are participating with one type of behaviour or another to the evolution of the pandemic. And, finally, they are responsible for working on all these aspects with their future pupils. For all these reasons, it is essential to train prospective teachers from a critical perspective of science (Mazas & Bravo, 2018), even more so at a moment as complicated as the current one.

Consequently, an experience is presented here that had the goal of investigating the learning achieved through the implementation of an inquiry-based didactic proposal about COVID-19 and the effect of the said learning on the students' emotions towards the pandemic.

Emotions and Scientific Knowledge

The relationship between behaviour and cognition in the case of diseases is established through various aspects, for example, what people think about a disease, their knowledge of the said disease and its risks, etc. Emotions, in addition to influencing the state of health and well-being, are responsible for a person's predisposition to modify their behaviour and even their lifestyle (Vera-Villarroel, 2020).

With respect to society's scientific knowledge about COVID-19 at the start of the pandemic, there had been no research data reported along this line. What has become clear at this point is the need for science literacy in society and for this scientific knowledge to be available to everyone (Gil & Vilches, 2006). In this sense, and taking as base the importance of knowledge in behaviour, as has already been mentioned, at present there is no doubt that the best way to acquire that knowledge during the teaching and learning process is through inquiry-based proposals (Cañal et al., 2005; Couso, 2014). Not only should prime importance be given to motivation towards the process, but also to the development of cognitive achievement (Romero-Ariza, 2017). It has also been recognized by the European Union as the best method for teaching science, as Abril et al. (2014) show.

But, although an inquiry process is fundamentally based on the formulation of one or more research problems for which an attempt is made to respond to them through a series of activities guided by the teacher (Yuningsih. & Susilo, 2022), the range of perspectives of this inquiry is very extensive, as described by Rivero et al. (2017). Nonetheless, all of them converge in being centred on the pupils, with the idea of achieving the development of their skills (García et al., 2008). As Trujillo (2016) describes, "to design a project is to face a significant challenge for the students" (p.3). But in addition, as Romero-Ariza (2017) proposes, there should be a tendency to achieve quality inquiry, marked by a "greater role for argumentation and modeling, not only as essential components of science, but as catalysts of the pupils' cognitive activity and meaningful learning" (p.293).

Nonetheless, all this is impossible without trained teachers. According to Jiménez-Tenorio & Oliva (2016), this training is achieved both by involving the prospective teachers in previously designed sequences and by them developing their own proposals.

Both cases favour their acquisition of specific teaching skills to guide their future pupils' inquiry process (Ariza et al., 2016).

From the emotional perspective, in most situations people experience a process denoted "appraisal" in which they evaluate the environment in adaptive terms prior to their feeling an emotion (León, 2000). Specifically, according to that author the factors that are most determinant for the emotion will not be the objective characteristics of the stimulus. Rather the determining factor will be the person's subjective assessment in relation to their objectives and ability to face those circumstances, thus potentially causing an emotion to arise, and if one does then it will be of one type or another. Consequently, when faced with the same event, two people may appraise it differently, and experience different emotions and degrees of intensity (Bisquerra et al., 2015). In this sense, various research studies have ratified the existence of appraisal (Lazarus, 1966; Lazarus & Smith, 1988; Lazarus, 1991), therefore turning this process into a relevant aspect within the study of emotions (León, 2000).

The evaluation process carried out by the person when receiving a stimulus consists of various phases (Lazarus, 1991). According to that author, the first phase consists of a rapid, automatic, and generally unconscious assessment. Specifically, this first phase evaluates whether the survival or well-being of the person or those in their immediate environment are threatened or not. This evaluation is influenced by various factors such as the meaning of the event, causal attribution, previous experience, learning, context, etc. (Bisquerra et al., 2015). Finally, a cognitive or secondary assessment takes place in which it is determined whether or not the person is able to face the situation (Lazarus, 1991). In this sense, not all types of information will generate an emotion since there exists a type of knowledge that will help create a representation of the environment and its circumstances, but is not a direct cause of the emotion (León, 2000). Lazarus & Smith (1988) indicate that there has to occur a process of assessing the model represented in relation to personal well-being, so that, in the appraisal, the person's objectives and beliefs as well as their circumstances must be assessed.

In relation to the emotions linked to COVID-19, although studies are beginning to publish their results, that carried out by Shigemura et al. (2020) has shown that fear and uncertainty are the two emotions that first manifest themselves, followed by anguish and anger. On the other hand, it has been found that Public Health measures such as quarantine have provoked emotions such as anger (Brooks et al., 2020), while Arias et al. (2020) found that the people they studied presented anxiety, depression, and high levels of stress.

Taking into account all of the above, the present work has a double objective. Firstly, it is intended to show how the students of the Degree in Early Childhood Education build scientific knowledge by making a research workshop on a relevant problem, in their immediate context. Secondly, it aims to show how the acquisition of this knowledge influences the emotions that are experienced in said problematic situation. The pandemic linked to COVID-19 was specifically selected because, as indicated above, in addition to suffering from this problem like any other person, they are prospective teachers who will have to deal with it with their own pupils. The objective was for them

to acquire scientific literacy about COVID-19 to cover their training and emotional needs.

In this study, we intend to answer the following questions: What is the knowledge the participants declare they have about the Pandemic, and how does that knowledge evolve after the workshop? What emotions do the participants experience in the face of the Pandemic caused by COVID-19, and how do those emotions evolve after the workshop?

METHOD

The methodological approach of this research study was both qualitative and quantitative, with the intention of describing a case study through the application of tools built for that purpose, and thus show their usefulness.

Participants and context

The study was carried out in accordance with the ethical principles of the American Psychological Association (APA, 2010) at the University of XXX, within the Pre-Primary Education Degree. Specifically, this study was contextualized in the subject of Education for Health & Consumption in Education from 0 to 6 years old, during the 2019/20 academic year, in the midst of a period of social lockdown. There were 45 participants. They were an incidental sample.

Creation and implementation of the Sequence

Among the objectives of the subject of Education for Health & Consumption are being able to critically analyse and incorporate the most relevant issues of today's society that affect family and school education, as well as designing strategies of teaching and learning in which to use scientific knowledge in contexts of social relevance. To achieve this, the students work by means of various workshops about current socio-scientific problems in their environment, which is why the pandemic linked to COVID-19 becomes an unquestionable problem to take to the classroom. Likewise, due to lockdown, the intervention proposal was designed to be carried out online for three weeks, with two weekly online classes of two hours each.

Specifically, the Science in Times of COVID-19 workshop is an inquiry proposal that was designed following the indications of Cañal et al. (2005) and has the pandemic as its centre of interest. This proposal was presented at the V International Online Congress on Education, Innovation and ICT (EDUNOVATIC) that was held in December 2021 by the Educational Research and Innovation Network (Redine).

Data collection instruments

To answer the first research question, an open-response questionnaire was chosen. Specifically, it included 3 questions related to scientific content (for example "What contagion prevention measures do you know against COVID-19? What do you think is the scientific basis of each of them?"). Likewise, the different productions made by the students throughout the process were evaluated. Specifically, these productions were the responses to the activities of the workshop (for example, the preparation of a poster

or video with 4 prevention measures and their scientific basis). Both the questionnaires and the evaluation rubric were validated by four specialists in Experimental Sciences and their didactics. They filled out a template in which they rated language clarity and relevance from 0 (minimum pertinence or clarity) to 5 (maximum pertinence or clarity). The template included the definition of the two criteria (Relevance: degree to which the question/level of the evaluation rubric is appropriate for the evaluation of learning; Clarity: degree to which the question will be easily understood by the students surveyed, given its clarity and precision/degree to which the level of the rubric is clear and precise). In addition, a space for comments denoted "Observations/alternative formulation" was enabled where they could make any suggestions for improvement. Once the evaluations had been received, the mean of each of the questions in the questionnaires and levels of the evaluation rubric were calculated. All the questions initially considered and the levels of the rubric were maintained since the mean score was greater than 3.5, the reference value according to Abad et al. (2011). In addition, all the suggestions of the experts were studied and incorporated, especially those of a semantic type, which helped to improve understanding and relevance.

To resolve the second research problem, a 5-point Likert scale questionnaire was used, in which 1 meant low intensity of the emotion and 5 meant high intensity. By this way, 8 emotions were evaluated: fear, vulnerability, anger, confidence, tranquillity, insecurity, worry and optimism. Likewise, they were asked to reason about the intensity indicated for each emotion. The said emotions were taken from the Universe of Emotions of Bisquerra et al. (2018). Those emotions that initially could have more presence in a pandemic situation and that had already been determined in previous research were selected (Brooks et al., 2020; Shigemura et al., 2020). The definitions of these emotions were included in the questionnaire to facilitate the participants' understanding.

The questionnaires were completed by the students during class time, both at the beginning and after completion of the workshop. Likewise, the productions were elaborated by the students for the three weeks of the workshop.

Data analysis

A rubric was prepared to evaluate the students' responses in both the questionnaire and their productions (Table 1). First, each answer of the initial questionnaire was categorized at a level with respect to a category. Afterwards, the level of the productions and answers of the final questionnaire were evaluated. Finally, the different levels are represented by frequencies in order to evaluate the evolution in relation to scientific knowledge about the pandemic.

Table 1
Evaluation rubric

	Baseline or improvable level	Intermediate level	Reference or desirable level
Virus	Does not know what viruses are, their characteristics, or the peculiarities of SARS-CoV-2.	Knows what viruses are and their characteristics, but does not know the peculiarities of SARS-CoV-2.	Knows what viruses are, their characteristics, as well as the peculiarities of SARS-CoV-2.
The characteristics of COVID-19	Does not know the symptoms of COVID-19, the way in which the contagion of this virus (zoonosis) occurred initially, the forms of contagion between people, incubation time, or characteristics of the most vulnerable people.	Knows about the symptoms of COVID-19, the forms of contagion between people and characteristics of the most vulnerable people, but does not know how this virus's initial infection occurred (zoonosis) or its incubation period.	Knows about the symptoms of COVID-19, the way in which this virus was spread initially (zoonosis), the forms of contagion between people, incubation time, and characteristics of the most vulnerable people.
Public Health and COVID-19	Does not know what Public Health consists of or the effect that COVID-19 has on it.	Knows what Public Health consists of but does not identify the negative effects that COVID-19 has on it.	Knows what Public Health is and the effect of COVID-19 on it.
Preventive measures	Knows the preventive measures but neither expresses any scientific reasoning linked to them nor applies them in their day to day life.	Knows about preventive measures and applies them and some of the scientific reasoning that supports them in their day to day life.	Knows about preventive measures and their scientific basis and applies them in their day to day life.
Vaccines	Neither identifies vaccines as a Public Health measure nor knows how they work.	Recognizes vaccines as a Public Health measure and links them with a promotion of immunity through a simple causal relationship.	Recognizes vaccines as Public Health measures, knows what they are, and establishes a causal relationship between them and the immunity in which antibodies intervene.
Information processing	Does not share information about COVID-19 on social networks.	Does not check before sharing.	Checks the information before sharing it with other people.
Environmental awareness	Does not show environmental awareness. Thinks that no change in the model of relationship with nature is necessary, and does not relate it to the current pandemic.	Shows some environmental awareness. Thinks that a change in the model of relationship with nature is necessary, but does not relate it to the current pandemic.	Shows environmental awareness. Thinks that a change in the model of relationship with nature is necessary and relates it to the current pandemic.

In relation with emotions, the questionnaires before and after the workshop were analysed where the students indicate the degree of intensity with which they experience each emotion considered in the study. Two categories were created: (1) students who experienced an increase in the intensity of the emotion, and (2) students who

experienced a decrease in the intensity of the emotion. For example, a student has fear with an intensity of 5 at the beginning of the workshop and then marks a 3, this student will be in category 2 (students who experienced a decrease in the intensity of the emotion). The percentage (%) of students in each category was calculated. Likewise, their arguments were analysed in order to determine the causes of the change in the emotions.

All data analyses were performed with the SPSS.22 program.

FINDINGS

Next, the results obtained based on scientific knowledge and emotions will be presented.

Scientific knowledge

Because the intention was to analyse whether a change in scientific knowledge about the pandemic can be perceived, the results obtained before and after the workshop are compared and discussed.

Initial scientific knowledge

All except one of the students consulted information sources to understand the different scientific aspects related to the health alert situation. The main information needs they showed were related to virus, pandemic and hygiene habits (Figure 1, left). Less frequently, terms such as vaccine, public health, immunity, or pneumonia were also searched for. Among the causes the students described, there stands out that 40% relate it to lack of knowledge, 33% to the need for information to avoid contagion, 17% to the need to keep up to date in relation to the health situation, and 8% to checking the information received (Figure 1, right).

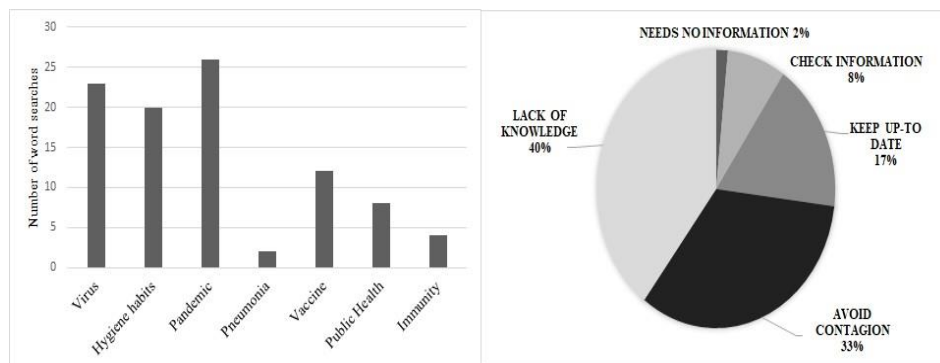


Figure 1

Number of searches by word carried out in different information sources (left). Percentage of the causes for their performing the search (right)

In relation to the prevention measures and their scientific basis, before the workshop the students knew many of these measures (Figure 2, left). Nonetheless, they did not argue

for their scientific basis. Only 9% were at the reference level (Figure 2, right) in which their response included some allusion to correct scientific knowledge. On the other hand, 7% of the students were at an intermediate level, and the rest of the students (87%) were at the improvable level. These results show the need to work from a scientific perspective on the basis of the preventive measures that they already know about.

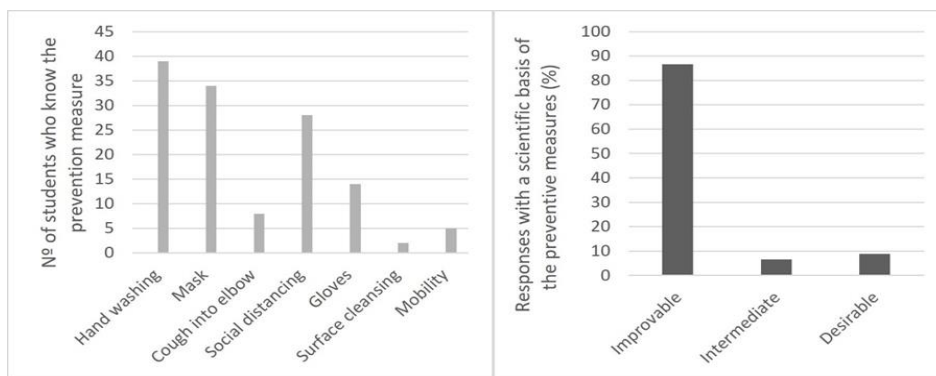


Figure 2

Number of students who knew each prevention measure (left). Percentage of responses with a scientific basis of the preventive measures (right)

In the case of the treatment of the information received through social networks, 61% stated that they checked the information before sharing it with other people, compared to almost 14% who did not, and 25% who indicated that they do not share information about COVID-19 on social networks.

Final scientific knowledge

Figure 3 shows the results linked to the content worked on in the proposal.

In relation to viruses, more than half (57.8%) of the students were at the intermediate level. They knew the characteristics of SARS-CoV-2 but were unaware of its peculiarities. The rest were at a reference level because they knew both aspects. One notes that no student had knowledge of viruses at the baseline level.

The majority (71.1%) knew the characteristics of COVID-19 such as its transmission, incubation, symptoms, and vulnerable people, thus reaching a reference level. The rest, 28.9%, were at a lower level because there was some aspect that they did not fully dominate.

With respect to Public Health, more than half (60%) reached the reference level since they knew what it is and how it is impacted by COVID-19, while 40% were at an intermediate level. It can be seen that none remained at the improvable level.

In relation to prevention measures, it was detected that only a small proportion, 11.1%, still remained at the baseline level, at which they only knew the measures without their

scientific reasons. The majority (55.6%) were at an intermediate level where they knew the preventive measures and some of their scientific foundations, while 33.3% reached the reference level. With respect to vaccines, 38% fell within the baseline level since they neither identified them as a Public Health measure nor knew how they work. In turn, approximately 24% were at an intermediate level, while 38% reached a reference level at which vaccines are recognized as Public Health measures, it is known what they are, and a causal relationship is established between them and immunity involving antibodies.

Finally, most of the students (53%) were at a reference level in terms of environmental awareness, since they expressed the need to change the model of the relationship with nature and its link with health problems such as the current pandemic. Some 44% reached the intermediate level, showing some environmental awareness. Only 2% were at an improvable level, since they thought that it is not necessary to change the model of relationship with nature, and furthermore they did not relate it to the current pandemic.

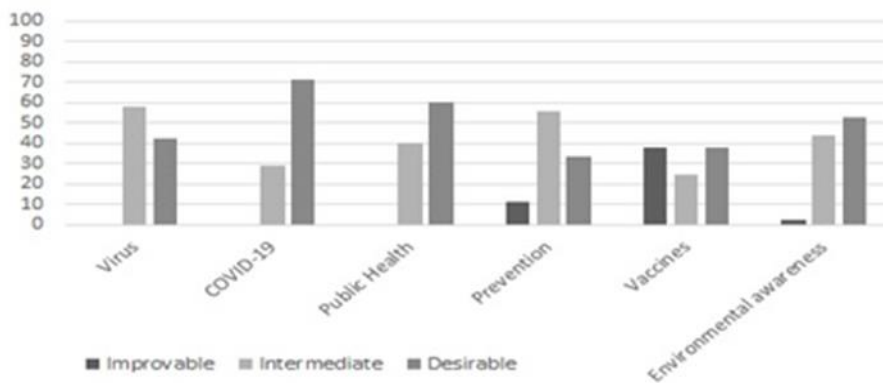


Figure 3
Categorization of the responses (%) about the scientific knowledge worked on

The results linked to the treatment of the information received through social networks (Figure 4) showed that the majority chose to share information on social networks after having checked it. Only 2% said they shared it without analysing it.



Figure 4
Percentage of responses linked to the processing of information after the implementation of the proposal

Emotions

The results in relation to emotions are shown in Figure 5. This represents the change in emotions experienced by the students once the workshop proposal had been worked on, indicating the percentage of students who experience an increase or decrease in the intensity of the emotions that were studied. As an overall result, once the proposal had been worked on, the students felt less fear, anger, worry, and insecurity, while tranquillity and optimism increased. On the other hand, they felt just as vulnerable.

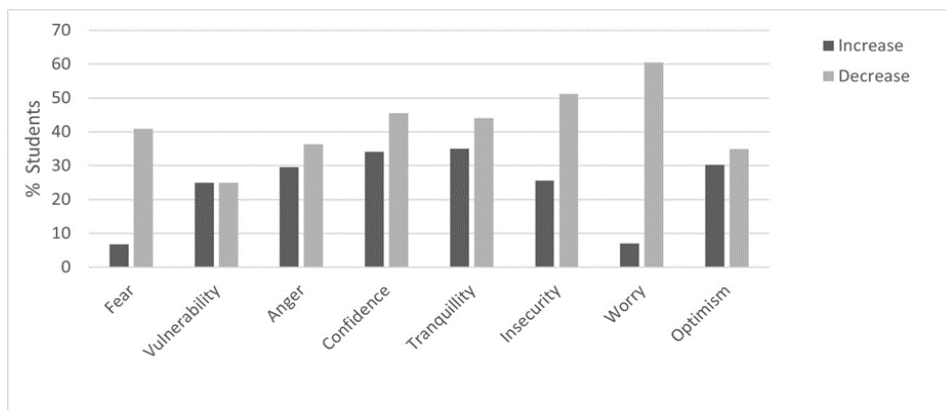


Figure 6
Figure 5
Percentage of students who experienced an increase or decrease in the intensity of the emotions that were studied

As can be seen, the majority of the students experienced a decrease in fear once the workshop proposal had been completed (40%). They alluded to their being more aware of preventive measures and found more reliable information available to them (Student

3: "Although I have obtained more information about the virus, I still have that fear I had at the beginning"). Nevertheless, they continued to experience fear since they knew that they themselves or their relatives could contract the disease (Student 41: "Now I know that there are more means to combat this virus, so I am not so afraid, although I am still afraid of what may happen to the older people around me").

Nonetheless, practically no change was observed in the emotion of vulnerability. This persisted in the face of the risk of contagion (Student 6: "I still feel vulnerable because at any moment I may catch the virus and not only have a bad time myself, but everyone around me"). But it was also compensated by having more information about how to prevent it (Student 12: "If people don't break the established social norms, they shouldn't feel vulnerable").

With respect to anger, a greater decrease was also perceived (36%). The anger they feel is mainly due to the fact that other people do not comply with the sanitary norms (Student 12: "I feel anger for those people who do not comply with the established measures").

In the case of trust, a high percentage of the students (45%) experienced a decrease in the intensity of this emotion. Some statements suggest that they had become more critical of the information they receive through the different media, which translates into a decrease in trust (Student 6: "Little trust because almost nothing they tell us on television is true and I no longer trust what they say").

After finalizing the proposal, there was also an increase in the emotion of tranquillity in the face of the pandemic situation (44%). This increase in tranquillity is in many cases associated with the improvement of the situation, since the data collection coincided with the first de-escalation when the lockdown measures were relaxed. It may also be associated with the work on the content of the proposal such as prevention measures (Student 29: "My peace of mind has increased, because I know more about protection and prevention measures, so I feel calmer, since I know better how to use these measures").

Like the emotion described above, the majority of the students (51%) experienced a decrease in insecurity. It should be noted that some explain that working on certain contents in the proposal, such as prevention measures or the search for and selection of reliable information, made them less insecure (Student 7: "Having more information, the insecurity is not the same").

As for optimism, they were more optimistic since, as their statements show, they accessed information that they believe to be relevant to resolving the problem (Student 23: "After consulting some sources, I have been able to verify how research is already being done on the vaccine. I feel optimistic because I think that when they bring it out, everything will change for the better").

Like the other negative emotions, the students' concern decreased over the course of the proposal. The majority (66%) felt less worried (Student 29: "My degree of concern in

general has decreased, although I am still worried about the most vulnerable people in my environment").

DISCUSSION

In summary, a relevant evolution in the students' scientific knowledge is perceived through the research proposal that was carried out. Also, they became more critical of the information they receive through social networks. In this sense, the research proposals are shown to favour learning and research skills (Arantes do Amaral & Lino dos Santos, 2018; Baran et al., 2018; Lazonder & Harmsen, 2016; Sigit et al, 2022). Specifically, it is the activities that promote reasoning and the elaboration of arguments based on evidence which favour the students' scientific understanding of inquiry-based learning (Minner et al., 2010; Setiawan & Supiandi, 2018).

Likewise, the fact that it is an instructor-guided research proposal is another aspect that adequately affects learning, as various studies have shown (Furtak et al., 2012). And last, but not least, the learning to learn competency is favoured. As indicated by Bolívar (2009) "Learning to learn is the ability to start learning and continue learning in an ever more effective and autonomous way in accordance with their own objectives and needs" (p.71). In short, in assessing the overall results, one appreciates an improvement in the students' literacy towards COVID-19.

On the other hand, and as Taylor (2019) points out, in any pandemic it is to be expected that people feel fear, anxiety, anguish, irritability, stress and annoyance, recall of traumas, concentration difficulties and/or sleep problems. Nonetheless, the experience presented allowed the students to explain their emotions related to the health alert situation, and, above all, an emotional change was detected that can be linked to, among other aspects, the learning they achieved since the process of appraisal that gives rise to an emotion is influenced by various factors, including learning (Bisquerra et al., 2015; Lazarus, 1991). Specifically, this learning is likely to generate an emotion, since, on the one hand, the knowledge acquired allows them to create a representation of the environment (León, 2000), in this case generating an interpretive model based on scientific evidence about the pandemic and its consequences, and, on the other, this learning occurred at a time when the students were totally immersed, like any other person, in the pandemic. So the next phase that is necessary for the emotion to manifest itself, which Lazarus & Smith (1988) describe as the one in which an assessment of the model represented in relation to well-being takes place, occurs favoured by the context itself and, in a certain way, due to the reflections that they carry out in the didactic proposal.

More specifically, the work on scientific knowledge about the pandemic, attending to the training needs declared by the students at the beginning of the workshop, favoured the positive emotions that were studied, while decreasing the intensity of the less pleasant emotions. In this sense, the students started experiencing with less intensity the emotions of fear, anger, insecurity, concern, and trust once the proposal had been worked on. Fear and insecurity were mainly linked to a situation of ignorance, so the decrease in the intensity of both of them could be linked to greater scientific knowledge

(Maffia, 2005), which helped them interpret the pandemic situation and evaluate it accordingly in relation to their well-being in a more adequate way. Likewise, according to the students the investigative treatment of the proposal through the search for, selection, and treatment of information from reliable sources (WHO, 2020) also favoured reducing their insecurity. Therefore, not only the conceptual knowledge acquired but also the procedural knowledge helped them feel secure about what they had learnt, thus managing the levels of insecurity. In this sense, it becomes clear that the reflexive, analytical processes aimed at elaborating information favour the reconstruction of reality, and therefore the evaluative process linked to a possible threat (Sánchez & López, 2008), causing a lower level of involvement in the emotion and its better management (Retana & Sánchez, 2016). Therefore, the way in which one can intervene to make it easier for a person to regulate fear and insecurity is through self-awareness, knowledge, and abilities linked to the said emotion (Bisquerra, 2000).

Likewise, concern decreased since, from knowing the preventive measures and their scientific foundation, people have the tools necessary to avoid becoming infected. As in other similar studies (Wang et al., 2020), concern at the beginning of the pandemic was very high due to the danger of contagion and the lack of knowledge about how to act.

The emotion of anger is related to the annoyance they feel when seeing that other people do not comply with preventive measures. This cause is closely related to the definition of this emotion that can be felt when someone does not treat us as we think we deserve. The knowledge that was worked on about the pandemic has perhaps made the students more critical of the behaviour of others, knowing that it is a public health problem in which we all depend on each other. Its decrease may be due, as in other contexts (Johnson et al., 2020), to the positive aspects that COVID-19 has had at a social level, such as solidarity, social awareness, and empathy in the population, as values that contribute to the acceptance of and compliance with prevention measures.

In parallel, most of the students experienced an increase in tranquillity mainly because, after the workshop, they had knowledge that allowed them to understand the situation and act accordingly. Nonetheless, they felt less optimistic and confident since, despite being literate about the pandemic, they are aware of the importance of the situation and the lack of a real solution at the time of the end of the proposal in June 2020. As authors such as Lasa et al. (2020:134) point out, "the changes from «better to worse» are associated with a growing awareness of the seriousness of the situation".

These results show, as Mellado et al. (2014) note, that emotions are a way of regulating life and fulfill a function of adapting our body to what surrounds us, in this case the COVID-19 pandemic. Hence, the importance of having an emotionally informed population (Extremera, 2020) since, as Matthews et al. (2017) point out, emotionally intelligent people could implement more effective coping strategies in the face of stressful and/or threatening events, either through direct management of the stressor or through the possibility of finding opportunities for personal development and learning in such adverse circumstances.

For all that has been contributed above, it is our belief that this type of workshop is necessary and can help generate new initiatives to alleviate the psychosocial effects of the pandemic. In addition, it may help achieve that society advances and emerges strengthened.

CONCLUSIONS

This study has described in detail a didactic proposal about COVID-19, and the results of applying that proposal at both the learning and the emotional levels. This proposal arose from the need to address with students of the Pre-Primary Education Degree content linked to health issues in their immediate context, applying an inquiry-based method. In this way, an attempt was made to foster, on the one hand, their scientific literacy and, on the other, a more adaptive emotional modulation in the face of the pandemic based on the knowledge they acquired.

Among other conclusions, one can highlight that the results support the importance of working using interesting problems that are close to the students. In this case, as the pandemic had great social relevance and was of such intensity, the students were immersed in the proposal in a totally natural way. Likewise, the investigative activities that involve scientific understanding, the elaboration of arguments based on evidence, and collective reflection seem to have favoured that, on the one hand, the students' involvement was maintained over time and, on the other, there was a significant evolution in their scientific literacy by improving their research skills and their becoming more critical of the information they receive.

Finally, on the emotional level and during the development of the proposal, the students were able to express and recognize their own emotions linked to the pandemic situation. It can be concluded that working on the science content that during those moments of the first social lockdown in March 2020 flooded our day to day lives, with a good scientific foundation and with an investigative methodological approach based on their real needs, helped the students to modulate their emotions.

In sum, the workshop not only increased the students' scientific literacy about a socio-scientific problem they were experiencing, but it also facilitated their emotional management, with an increase in positive emotions and a decrease in negative ones. At the same time, they were aware of their vulnerability by now having knowledge with a scientific vision of the current health crisis caused by COVID-19.

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