Exploratory factorial model of collaboration in the COVID-19 era

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Abstract.
The pandemic impacted the educational systems through anti-COVID-19 policies that are based on the distancing and confinement of people. In this sense, academic collaboration has been reported by the literature from 2019 to 2022 as an asynchronous Internet user strategy. It is a dual factorial structure that explains entrepreneurship and innovation, but does not anticipate scenarios of high risk and intensive use of Internet technologies, devices and networks in synchronous or asynchronous mode. Therefore, the objective of the study was to establish an explanatory model of the impact of the pandemic on academic collaboration. A cross-sectional, psychometric and exploratory study was carried out with a sample of 177 women from a municipality in central Mexico, considering their participation in social services and professional practices. A structure of four factors was found: Internet user, face-to-face, synchronous and asynchronous, which explained the total variance. In reference to the state of the art that exalts a two-factor model, its extension is recommended to anticipate scenarios of increasing risk.
Keywords. Agenda, Collaboration, COVID-19, Exploratory Factorial Analysis, Model.

1. Introduction:

In a scenario of health and economic crisis such as the pandemic, it would be expected to have an impact on the collaborative relationships of cooperative communities (García, 2022). In this sense, the literature from 2019 to 2022 suggests relationships between the variables of values, support, recognition, stimulation, solidarity and collaboration (Sánchez et al., 2017).

Cooperative communities that are distinguished by managing customer service values reach collaboration standards that allow them to anticipate conflicts (García et al., 2021). In this sense,

solidarity emerges once cooperative groups establish self-management systems centered on traditional leadership. In addition, values affect behaviors of social support (Carreon et al., 2017). This is the case of communities that, faced with the risks of contagion, illness and death from COVID-19, decided to establish solidarity support networks that allowed them to finance their grieving members.

If the risk event intensifies, as is the case with the pandemic, the support and social recognition of the productive and health sectors is crucial to predict a community that is preventive of COVID-19 (Figueroa et al., 2017). Such an issue is visible in occupational health (Carreon et al., 2022). The prevention of accidents and diseases was consolidated from infections and deaths from COVID-19 (García et al., 2016). It is vicarious learning that involves social support and the recognition of health professionals in promoting self-care.

The cooperation system has its barrier in the stigma associated with those who interact the most with other people (Hernández et al., 2019). In this sense, the bias attributed to the type of work inhibits collaboration, but it is the recognition of exposure to risk that anticipates a collaborative decision (García et al., 2014). In fact, when the stigma is clarified through the recognition of health functions, the parties involved collaborate to a greater extent than when the stigma persists.

However, microfinancing or credit stimulation is the factor that affects cooperative societies (García, 2016). If it is considered that cooperatives depend on the competition of financing sources, then it will be possible to notice that collaboration is a management means to achieve liquidity (García, 2019). Once the cooperative is solvent, the collaborative networks dissipate and reproduce the solidarity system of credit to the word.

Solidarity predicts collaboration, although in a crisis scenario stigma inhibits both. If the contagion attribution bias dissipates, then both emerge as a response to the crisis, but it is financing that defines cooperative solidarity and collaboration in the face of the pandemic (Sánchez et al., 2018). In both cases, the diversified financing explains the collaboration as a solidary management instrument.

According to the established relationships, the mediating relationships between the variables have not been established (García et al., 2017). The risk context has not allowed us to observe the mediating functions, although theoretically it is possible to see that recognition would be a factor influencing the independent variable with respect to collaboration (Carreon et al., 2013). Therefore, it is necessary to establish the structure of relationships between the variables mentioned, although the literature reduces all the functions around the labor stigma (García et al., 2015). In this sense, the demonstration of the relationships between the six variables can be carried out assuming that the survey sample has reduced the stigma to a minimum.

The objective of this work was to establish the psychometric properties of reliability and validity of an instrument for measuring female coffee entrepreneurship, considering a review of the literature in the period from 2019 to 2022, as well as the search by keywords: " entrepreneurship" and "coffee farming". Are there significant differences between the theoretical structure of formative collaboration reported in the literature with respect to the observations of the present study?

The premises of relationships between the reviewed variables that guide this study suggest: The pandemic impacted collaborative relationships, inhibiting them through stigma towards those who attribute greater chances of contagion to them. As collaborative management intensified along with the pandemic, support and social recognition emerged that translated into diversified and supportive financing. Once the financial and moral solidarity appeared, the collaboration was visible. In both cases, solidarity and collaboration, in the face of the health and economic crisis, the state generated financing that was diversified and impacted the dependent variables. Therefore, the exploratory factorial model to be tested will reveal significant differences between the revised theoretical structure and the observations made in this study.

2. Method.

A non-experimental, cross-sectional and exploratory study was carried out. A non-probabilistic selection was made of 117 women coffee growers from central Mexico, specifically from the municipality of Xilitla, who are young (M = 26.34 SD = 0.014), have a higher secondary education (M = 11.23 SD = 0.12 years of study) and an income just above the minimum (M = 3,641.23 SD = 0.034).

On this occasion, the Carreon Female Collaboration Scale (2016) was used, which includes 41 items related to the balance between the world of work and the domestic, family and emotional spheres. Each item is answered with one of five options: 0 = never, 1 = almost never, 2 = sometimes, 3 = almost always and 4 = always. The literature reports a reliability that ranges between .723 and .856, which is corroborated in the present work by reaching a value close to the established threshold (Valdés et al., 2018). The validity of the construct is verified with the factorial weights that range from .300 to .600 and suggest a structure of three factors related to solidarity, values and recognition (García et al., 2018). The García Social Management Scale (2018) was used. Include the dimensions of support, innovation and collaboration considering a five-point scale where totally disagree has a value of zero to totally agree with a value of five (García, 2018). The reliability reported by the literature ranges between 0.70 and 0.88, although in the present study it reached a value that was barely sufficient for validity, which ranged between .332 and .612 according to the threshold established in the state of the art (Hernández et al, 2018).

The Delphi technique was used for the homogenization and clarification of the concepts included in the reagents, as well as the response options (Elizarraraz et al., 2018). Confidentiality and anonymity of the answers were guaranteed in writing, warning the respondents that the findings would not negatively or positively affect the economic, political and social status of the respondents (Aldana et al., 2018).

The surveys were applied in the home prior to telephone agreement. The information was processed in the Statistical Package for Social Sciences (SPSS version 13.0). Crombach's alpha reliability parameters were estimated to establish the consistency of the instrument in other contexts and study samples (Espinoza et al., 2018). The validity was carried out with adequacy and sphericity tests, as well as an analysis of principal axes with promax rotation. Adjustment and residual statistics were weighted for the contrast of the model and hypothesis (Cabañas et al., 2018).

3. Results

Figure 1 shows the structure of relationships between the four factors related to collaboration with respect to the indicators. The prevalence of factors alluding to Internet, face-to-face, synchronous and asynchronous collaboration is appreciated. The face-to-face factor is opposed to the synchronous factor and this to the asynchronous one. In other words, the exploratory structure of the collaboration distinguishes the traditional factors from the emerging ones as evidence of the impact of the pandemic in the classroom.
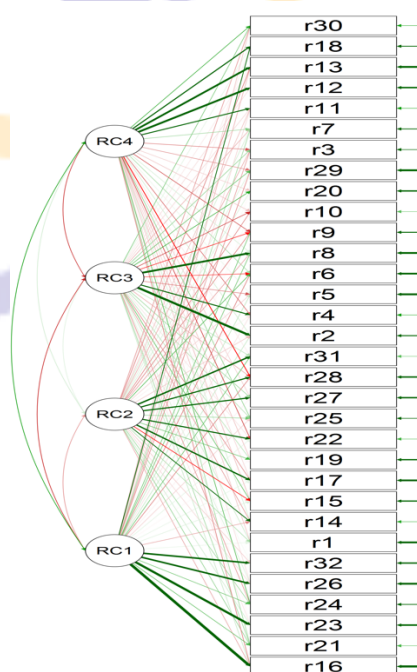

Figure 1. Exploratory factorial model of collaboration in the COVID-19 era
Source: Elaborate with data study.

Figure 2 shows the recommended factors to solve the algebraic equation that calculates and is recommended for a factor analysis. The inclination of the curve can be seen both in the real and simulated data based on two factors that are identified in the literature as normative and dissuasive collaboration.
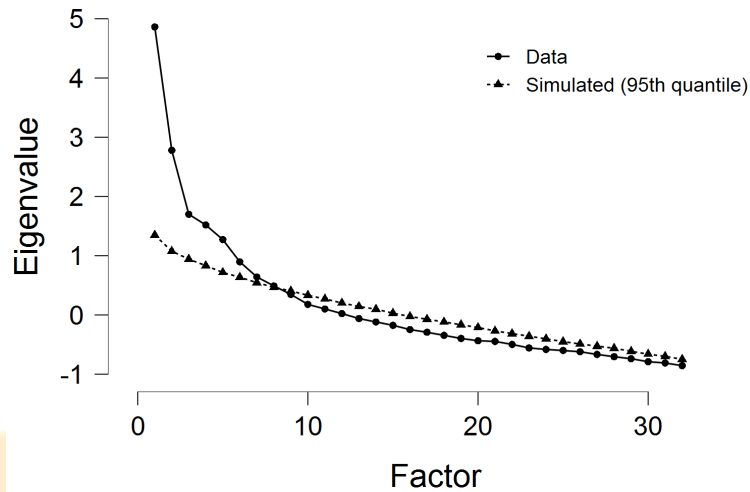

Figure 2. Scree plot
Source: Elaborated with data study.

The four established factors can be reduced to two factors by means of a second-order factor analysis. In this sense, the literature supports the two-factor structure, although in this paper four factors have been found that explain an ambivalent structure. It is possible to extend the model reported in the literature by the model found in the present work. If the collaboration is observed in a risk scenario, then the ambivalent model would explain a higher percentage of the variance.

3.1 Discussion

The contribution of this work to the state of the art consists of establishing a four-factor model that explains collaboration in a scenario of high risk of contagion, illness, and death from COVID-19. In relation to the prevailing model reported in the literature that includes two factors, this paper suggests its extension in order to explain the transition from the traditional to virtual classroom. The implications of the results for anti-COVID-19 educational policies translate into the dissemination of risk communication in each of the four established dimensions.

In relation to the collaborative structures reported in the literature in which models of two explanatory dimensions of collaborative work prevail without risks that limit them, the present work warns of the coexistence of four dimensions in a context of contingencies. Therefore, the model reported in the literature can advance towards the explanation of ambivalence in order to be able to anticipate high-risk scenarios.

Specifically, in extreme situations, collaboration intensifies as the risks continue. In the case of the pandemic, its extension forces us to investigate its effect on collaborative groups and not only from a positive resilience of virtualization and synchronization of teaching and learning, but also from the coexistence of both factors with the confinement and distancing of people. In this way, subsequent risk communication can encourage collaboration as long as risk scenarios are distinguished. In this sense, the epidemiological traffic light served to guide anti-COVID-19 educational policies and teaching-learning strategies. Therefore, lines of study related to the impact of the traffic light on the pedagogical sequences will open the discussion around the edition of the risks that produce educational ambiences.

Conclusion

The objective of this work was to establish the factorial structure of collaboration in the COVID-19 era. Four factors related to Internet user collaboration, presence, synchronous and asynchronous were found. In comparison to the models reported in the literature where Internet users, synchronous and asynchronous factors are not included, the present work suggests its modeling to explain the impact of COVID-19 on educational policies that are based on distancing and confinement of people.

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