

Confirmatory Factorial Model of Searching for Information on the Internet During COVID-19

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To cite this article:

Minerva Isabel Perez Ortega, Cruz Garcia Lirios, Jose Alfonso Aguilar Fuentes, Gabriel Perez Crisanto, Victor Hugo Meriño Cordoba, Francisco Espinoza Morales, Juan Antonio Garza Sanchez, Hector Daniel Molina Ruiz, Javier Carreón Guillen, Jorge E. Chaparro Medina, Isabel Cristina Rincón Rodríguez. Confirmatory Factorial Model of Searching for Information on the Internet During COVID-19. *International Journal of Science, Technology and Society*. Vol. 11, No. 3, 2023, pp. 95-102. doi: 10.11648/j.ijsts.20231103.12

Received: June 12, 2022; **Accepted:** June 29, 2022; **Published:** March 31, 2023

Abstract: The pandemic directly impacted the educational system by moving from the traditional classroom to the electronic blackboard. In this transition process, an educational habitus emerged that consisted of facing the health, economic, social and educational crisis in a self-management of opportunities. In this sense, the search for information was a fundamental tool to promote self-knowledge. The objective of the present was to establish the reliability and validity of an instrument that measures the intention to search for information in digital networks with a non-probabilistic selection of 253 students from a public university in the State of Mexico. The results show the establishment of eight factors among which the intention to select information explained 21% of the total variance. Lines of research are noted regarding the construction of an agenda with central information processing axes and issues to anticipate discussion scenarios and shared agreements. In relation to the state of knowledge in which stigma prevails towards the proximity of people and distancing as well as confinement as central strategies of anti-COVID-19 policies, the establishment of an agenda focused on the self-management of knowledge is recommended. The management, production and transfer of knowledge is recommended from the self-management of resources and opportunities, as well as from the interrupted collaboration between the parties involved in the public education system.

Keywords: Governance, Internet, Digital Networks, Intention to Use, Information Selectivity

1. Introduction

The freedom of access to information and the processing of personal data supposes differences between the parties involved [1]. In this way, as analysis, the controversy is part of corporate governance. In addition, it is susceptible to mediation, conciliation and arbitration aimed at consensus and agreements.

The system in which conflicts, disagreements, controversies and vicissitudes between the parties are settled based on criteria and protocols for negotiation, mediation, conciliation, arbitration and prosecution is known as governance [2]. In the case of society interested in processing and disseminating information, governance involves a series of institutional and civil guidelines around which citizen participation is encouraged to observe, report and censure the performance of the authorities in the face of any asymmetry.

In the case of the Internet, governance operates based on criteria of openness, tolerance and respect for the dignity and prestige of Internet users in the face of any problem related to their freedom and right to access information, as well as their guarantees of scrutiny and initiative management and administration of information, digital networks and electronic devices [3]. If we consider the internet as an intentional information search network, it would highlight a digital divide between those who use social networks for entertainment and fun versus those who search for information on magazine pages.

Social psychology, through the models of reasonable action and planned behavior, has influenced the construction of an information psychology [4]. Both models start from the assumption that behavior is determined by the relationship between beliefs, attitudes, perceptions and intentions [5]. In the framework of the information generated on the Internet, it is a process that explains consumption decisions based on rational, deliberate, planned and systematic processing.

However, psychosocial models have been modified to adjust their relationships to the processing of information on the Internet [6]. They are the cases of the model of acceptance of the model making trade and consumption. These models have incorporated the psychosocial variables of beliefs, attitudes, perceptions, and intentions that were proposed to explain efficient, effective and effective behavior.

Psychology of information has merged psychosocial variables with other organizing constructs such as training and training, although psychology education, with the proposal of computational self - efficacy and clinical psychology including anxiety and addiction, are active participants in the construction of informational psychological models [7].

However, in a context in which capacities are indicators of sustainable human development, skills, knowledge and motivations are fundamental to explain the emergence of entrepreneurship and happiness as the main proposals, as well as psychology in general and positive psychology, in particular, to the issues relating to resource scarcity and its impact on public services, which make it more vulnerable to marginalized and excluded [8].

Precisely in the context of today's society, human development involves skills and knowledge that generate the skills of processed and systematization of all formation of knowledge networks and information exchange [9].

The relevance of beliefs about general categories of information extends to the formation of attitudes defined as specific categorizations of information, risk perceptions usefulness of that given as will allows anticipate scenarios most likely to process the information generated [10]. It is these relationships between the psychosocial variables that make their inclusion in the informational psychological models relevant since they explain the processing of information from events far away or close to the daily lives of Internet users [11]. Thus, receiving information in real time is a preponderant factor in planning strategies or lifestyles that reduce the impact of catastrophes.

However, the tendency of informational psychological studies is to specify psychosocial variables since beliefs are very general categorizations and could not anticipate specific behaviors, and although attitudes are more delimited categorizations, they require perceived information to activate decisions of immediate action [12].

Indeed, while the intentions are decisive likely to carry out a rational, deliberate, planned and systematic actions that predicts the emergency of information generated in favors a more emotional than rational process [13].

Therefore, the study of intentions with emotional and rational dimensions seems to be more relevant in an unpredictable and immeasurable scenario such as environmental catastrophes. It is the case of risk communication: as the warnings of droughts or floods increase, the Internet not only accelerates the emotional processes of evacuation, but also generates a scenario of uncertainty that leads to mistrust towards the authorities and the attribution of responsibility to migrant group [14].

The research which records a relationship between attitudes and habits in the use of information technologies and communication with respect to entertainment rather than the development of investigative competences, supposes that anxiety in the search for information to develop jobs, tasks, exhibitions or thesis affects the use of internet, good entertainment, and good for fun, it generates an addiction that would not be linked to academic performance [15].

In the work compulsiveness was a major factor in addition to the use of social networks because, pathologies in Internet are the result of perceptual distortions about virtual events regarding academic commitments [16]. That is, around the fantasy of cybersex, students opt for a probable compulsion to seek virtual sexual relationships, while if we reverse the objective to seek information to carry out a thesis, respondents show a high degree of anxiety since [17]. They would not be willing to spend enough time developing a research project.

Finally, in work, computational self- efficacy, an indicator of high academic performance, once negatively correlated with anxiety, the latter reflected the intention to use the internet to search for information for academic and research purposes [18].

The psychological studies of information have established eight dimensions related to the intentions to use the information generated on the internet [19].

The first dimension corresponds to informational selectivity as a decision to carry out a search for delimited information [20]; the second dimension refers to the similarities and differences of the information sought in reference to the lifestyles and information consumption of netizens [21]. The third dimension is due to the probability of encoding information and its storage in any electronic device [22]. The fourth dimension refers to the decision to search for information free of filters [23]. The fifth dimension suggests that Internet users make information search decisions considering the versions of different sources regarding the same phenomenon [24]. The sixth dimension assumes that the information can be reproduced, but above all produced from and by the user of the network in order to build a group version of events [25]. Finally, the informational psychological dimensions of the intention to process information are anxiety and addiction, pathologies to which Internet users are exposed [26].

The objective of the present investigation was to establish the reliability and validity of an instrument to measure the intention to search for information considering the selection, processing and exchange of academic contents available on the Internet.

Are there significant differences between the theoretical structure of the search for information on the Internet with respect to the observations, analyzes and discussions carried out in the present study?

The premises that support the present work suggest that the pandemic exacerbated the differences between Internet users [27]. In the case of the information search, the contents were concentrated in open access repositories, even though the repositories opened their contents related to COVID-19, the open access repositories had competitive advantages due to the volume of their offer [28]. Consequently, information seekers oriented their choices, preferences and expectations towards open access repositories and stigmatized those with limited access [29]. To compare the differences, the limited access repositories did not compete with the open access repositories, directing the search for content from intermediate repositories [30]. In this way, the competences of the users were oriented towards the access of information in intermediate repositories [31]. Therefore, the differences are significant between the findings reported in the literature with respect to the analysis of the surveyed sample.

2. Method

Design. A quantitative and exploratory cross - sectional study was carried out.

Sample. A non-probabilistic selection was made of 253 students from a public university in the state of Mexico. The inclusion -exclusion criterion was to have been in written in the computer lab, to belong to a social network and to seek information for the preparation of tasks, papers, practices,

exhibitions, dynamics, thesis or research reports. There were 120 women ($M = 19.5$ years of age and $SD = 3.15$ years) and 133 men ($M = 22.5$ years of age and $SD = 4.26$ years).

Devices. 230 showed an electronic device ($M = 3.45$ hours of use per day and $SD = 0.46$ hours of daily use); 240 showed their mobile phone (0, 57 hours in Internet to day and 0.25 hours on the network), 45 showed a laptop or portable computer (1.35 hours a day and $DE = 0.16$ hours at the day) and 15 showed a tablet at ($M = 1.46$ hours a day and $SD = 0.57$ hours a day).

Selectivity. The topics and / or reasons for searching for information are: tasks ($M = 1.46$ hours a day and $SD = 0.25$ hours a day), exposures ($M = 0.37$ hours a day and $SD = 0.09$ hours a day) and jobs ($M = 0.68$ hours a day and $SD = 0.15$ hours a day).

Compatibility. 157 stated that the information sought is related to their lifestyles ($M = 2.46$ hours a day and $SD = 0.25$ hours a day). However, 81 indicated that they seek information unrelated to their private life, but essential for their academic development ($M = 1.47$ hours a day and $SD = 0.62$ hours a day).

Computability. 45 users declared that they save their information on USB ($M = 1.29$ hours per day and $SD = 0.59$ hours per day), 22 on compact disc ($M = 2.47$ hours per day and $SD = 0.70$ hours per day), 170 save information on their mobile phone ($M = 2.05$ hours a day and $DE = 0.93$ hours a day) and 16 save information in their email ($M = 1.46$ hours a day and $DE = 0.68$ hours a day).

Accessibility. 201 users are willing to upload their work to the Internet ($M = 2.35$ hours a day and $SD = 0.48$ hours a day) and 45 warned that they would not upload their work to avoid plagiarism ($M = 1.35$ hours a day and $SD = 0.12$ hours per day).

Extensionality. 140 would agree to share their work with other students from their university ($M = 1.36$ hours a day and $DE = 0.25$ hours a day), 62 would share information with students from other universities ($M = 1.25$ hours a day and $DE = 0.46$ hours a day), 33 would not share information with other students ($M = 0.47$ hours a day and $SD = 0.12$ hours a day).

Cumulativeness. 67 indicated that they will use the information they sought for other jobs ($M = 1.46$ hours a day and $SD = 0.47$ hours a day) while 159 stated that they would discard the information once they turned in their work ($M = 0, 38$ hours a day and $SD = 0.10$ hours a day).

Anxiety. 167 recognized anxiety when the network is slow ($M = 1.49$ hours a day and $SD = 0.39$ hours a day), 57 agreed to become anxious when they cannot find the information they are looking for ($M = 1.46$ hours a day and $SD = 0, 26$ hours a day) and 22 felt anxious when the information they found is incomplete ($M = 1.35$ hours a day and $SD = 0.25$ hours a day).

Addiction. 170 reported that they spend many hours online ($M = 2.35$ hours a day and $SD = 0.65$ hours a day) while 66 indicated that they must spend more time searching for information for their academic activities ($M = 1.38$ hours daily and $SD = 0.26$ hours per day); finally, 17 considered that they use a search time similar to that used by their partners ($M = 1.30$ hours a day and $SD = 0.28$ hours a day).

Instrument. An intentional network scale was constructed, which included 32 items around selectivity, compatibility, computability, accessibility, extensionality, accumulation, anxiety and addiction (see table 1).

Table 1. Operationalization of variables.

Dimension	Definition	Items	Measurement
Selectivity	Level of selection in the search for information to carry out work, tasks, exhibitions, thesis or practices [32].	r1, r2, r3, r4	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Compatibility	Degree of relationship between the search for information and everyday lifestyles and academic activities [33].	r5, r6, r7, r8	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Computability	Amount of information storage sought to carry out academic work [34].	r9, r10, r11, r12	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Accessibility	Degree of information exchange from the search for information for the preparation of tasks, papers, exhibitions or thesis [35].	r13, r14, r15, r16	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Extensionality	Level of influence of the works, tasks or thesis uploaded to an electronic page by information seekers [36].	r17, r18, r19, r20	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Cumulativeness	Number of times that the information sought to carry out tasks, papers, expositions or thesis is reused to share it with other users or in other academic activities [37].	r21, r22, r23, r24	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Anxiety	Degree of recognition of anxiety when searching for information, storing files or reviewing documents in order to carry out tasks, papers or thesis [38].	r25, r26, r27, r28	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely
Addiction	Degree of perception around the amount of time that is used to search for information that is useful in the preparation of tasks, works, exhibitions or thesis in reference to other users [39].	r29, r30, r31, r32	0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely

Procedure. From the instrument is built in judges Delphi content analysis technique and establishment of consensus in each of the categories weighted the difference between the average time and self-reported use Internet. The corresponding permission was requested for the application of the instrument in the classroom. Once it was explained to the students that the study would neither positively nor negatively affect their partial or final grades, they proceeded to deliver the survey advising them that they had a maximum of 20 minutes to answer it. Whenever there was an absence of answers, or the same answer was repeated in each statement, the case of statistical analysis was eliminated. The data were captured in the package and Social Sciences (SPSS, for its acronym in English) and software called analysis (AMOS, for its acronym in English) in versions 10 and 6.0, respectively.

Analysis. Multivariate analyzes were performed prior to normal distribution, reliability and validity requirements, for which the parameters of kurtosis, alpha and factorial weight

were used. Once the psychometric properties were established, the correlations between each of the eight factors with respect to themselves were estimated using the phi statistic. The dependency relationships were calculated with the parameter between the factor and the indicators, as well as the use of the epsilon statistic, for the relationships between estimation errors of the manifest variables. Finally, the structural model contrast was carried out with the chi square, goodness of fit and residual parameters.

Normal. The kurtosis values close to unity were assumed as evidence of normal distribution. In contrast, those values higher than the two units were considered as evidence to rule out the items for subsequent analysis.

Reliability. Alpha values greater than 0.60 and less than 0.90 were considered as evidence of internal consistency between the scale and the items, as well as between the subscales and the items that comprise it. On the contrary, values lower than 0.60 and higher than 0.90 led to the

elimination of the items for subsequent analysis.

Validity. The factorial weights, established by the KMO and Bartlett tests, as well as the exploratory factorial analyzes of main axes with pro max rotation and maximum likelihood, greater than 0.300 and less than 0.900, were accepted as indicators of the corresponding factors; but those values below 0.300 and above 0.900 were discarded from the following analyzes.

3. Results

The values of kurtosis close to unity show a trend of normal distribution, although the averages of the answers to the items indicate that so shows considers it very likely the relationship between information seeking and life s everyday s and academic activities (see table 2).

Table 2. Psychometric properties of the instrument.

Items	M	SD	K	F1	F2	F3	F4	F5	F6	F7	F8
<i>Selectivity subscale (alpha = 0.69)</i>											
R1 I would choose information from magazines to prepare my presentation.	1.03	0.49	2.03	0.381							
R2 Any information would help me to elaborate my thesis.	1.06	0.39	2.06	0.382							
R3 You would find up-to-date information to perform tasks.	1.07	0.29	2.15	0.392							
R4 I would look for any information to do my jobs.	1.19	0.31	2.16	0.391							
<i>Compatibility subscale (alpha = 0.70)</i>											
R5 I would adapt my activities to the search for information on the web.	3.10	0.52	2.46		0.390						
R6 I would adjust my priorities to the search for information on the net.	3.04	0.39	2.37		0.491						
R7 I would assimilate any information to apply it in my life.	3.17	0.69	2.33		0.330						
R8 I would look for information on the net that I can put into practice.	3.47	0.25	2.01		0.410						
<i>Computability subscale (alpha 0.72)</i>											
R9 I would back up the information on my PC to facilitate plagiarism.	1.06	0.51	2.83			0.482					
R10 I would vaccinate my devices to avoid spy viruses.	1.01	0.83	2.04			0.482					
R11 I would use any device to spread plagiarism.	1.83	0.93	2.81			0.410					
R12 I would store information in the mail to avoid spam.	1.27	0.62	2.93			0.441					
<i>Accessibility subscale (0.64)</i>											
R13 I would spread my work for others to quote me.	1.20	0.63	2.32				0.518				
R14 I would do exhibitions with other users to save time.	1.17	0.84	2.04				0.529				
R15 I would use a technology that allows me to network.	1.28	0.85	2.83				0.502				
R16 I would trade my tasks with other users to save time.	1.62	0.19	2.01				0.481				
<i>Extensionality subscale (alpha 0.78)</i>											
R17 Disseminate my tESIS for others to criticize.	1.69	0.29	2.46					0.518			
R18 I would publish my work so that others would recognize me.	1.30	0.38	2.32					0.382			
R19 I would sell my exhibitions so that my ability is rewarded.	1.64	0.41	2.37					0.493			
R20 I would upload my assignments for others to use.	1.02	0.62	2.83					0.513			
<i>Cumulative subscale (alpha = 0.75)</i>											
R21 I would use my work to write my thesis.	1.29	0.47	2.06						0.391		
R22 I would modify my exhibitions to turn them into works.	1.63	0.35	2.83						0.495		
R23 I would look for additional information to what I have.	1.03	0.25	2.49						0.405		
R24 I would use my homework to do jobs again.	1.83	0.38	2.04						0.506		
<i>Anxiety subscale (alpha = 0.68)</i>											
R25 I would accept my anxiety if Twitter pointed it out to me.	0.38	0.05	2.17							0.381	
R26 I would reject any network restriction warning.	0.49	0.07	2.16							0.406	
R27 I would abide by Google * restrictions for my excessive searching.	0.16	0.08	2.71							0.591	
R28 I would acknowledge my anxiety if Facebook warned me.	0.39	0.04	2.10							0.471	
<i>Subscale of addiction (alpha = 0.79)</i>											
R29 It would use the search time that other users take.	0.82	0.04	2.03								0.595
R30 I would adjust my search to the criteria of other users.	0.95	0.05	2.07								0.405
R31 I would sail less time than the average of the others.	0.71	0.08	2.05								0.591
R32 I would look for more information if others did.	0.39	0.05	2.06								0.606

General kurtosis = 2.47; Bootstrap = 0.000; KMO = 0.601; $X^2 = 12.35$ (24gl) $p = 0.000$; F1 = Selectivity (21% of the variance explained); F2 = Compatibility (18% of the explained variance); F3 = Computability (15% of the explained variance); F4 = Accessibility (13% of explained variance); F5 = Extensionality (11% of the explained variance); F6 = Cumulative (9% of the explained variance); F7 = Anxiety (7% of the explained variance) and F8 = Addiction (6% of the explained variance). All the items have response options: 0 = not likely, 1 = very unlikely, 2 = unlikely, 3 = likely, 4 = very likely.

Regarding the validity of constructs, the factorial weights of the items in each of the eight specified factors indicate that there are enough correlations to support the eight multidimensional assumptions of the intentional information search network (see Table 3).

Table 3. Relations between factors.

	F1	F2	F3	F4	F5	F6	F7	F8	F1	F2	F3	F4	F5	F6	F7	F8
F1	1,0								1,9	,34	,45	,54	,51	,64	,54	,43
F2	,32*	1,0								1,8	,41	,47	,58	,66	,58	,58
F3	,35*	,45*	1,0								1,7	,48	,58	,60	,51	,43
F4	,45**	,41**	,51***	1,0								1,9	,62	,52	,37	,37
F5	,34*	,53*	,53*	,62*	1,0								1,8	,48	,54	,54
F6	,36**	,57*	,56*	,63**	,54*	1,0								1,9	,37	,64
F7	,46**	,58*	,58*	,54***	,58*	,41*	1,0								1,7	,59
F8	,44***	,47**	,61*	,62*	,48*	,38**	,45*	1,0								1,6

Source: Elaborated with data study; F1 = Selectivity, F2 = Compatibility, F3 = Computability, F4 = Accessibility, F5 = Extensionality, F6 = Cumulative, F7 = Anxiety, F8 = Addiction; * $p < .01$; ** $p < .001$; *** $p < .0001$

The structure of relationships revealed the structure of axes, trajectories, and relationships between factors and indicators, both in relation to a second-order construct that the literature identifies as the intention to search for information (see Figure 1).

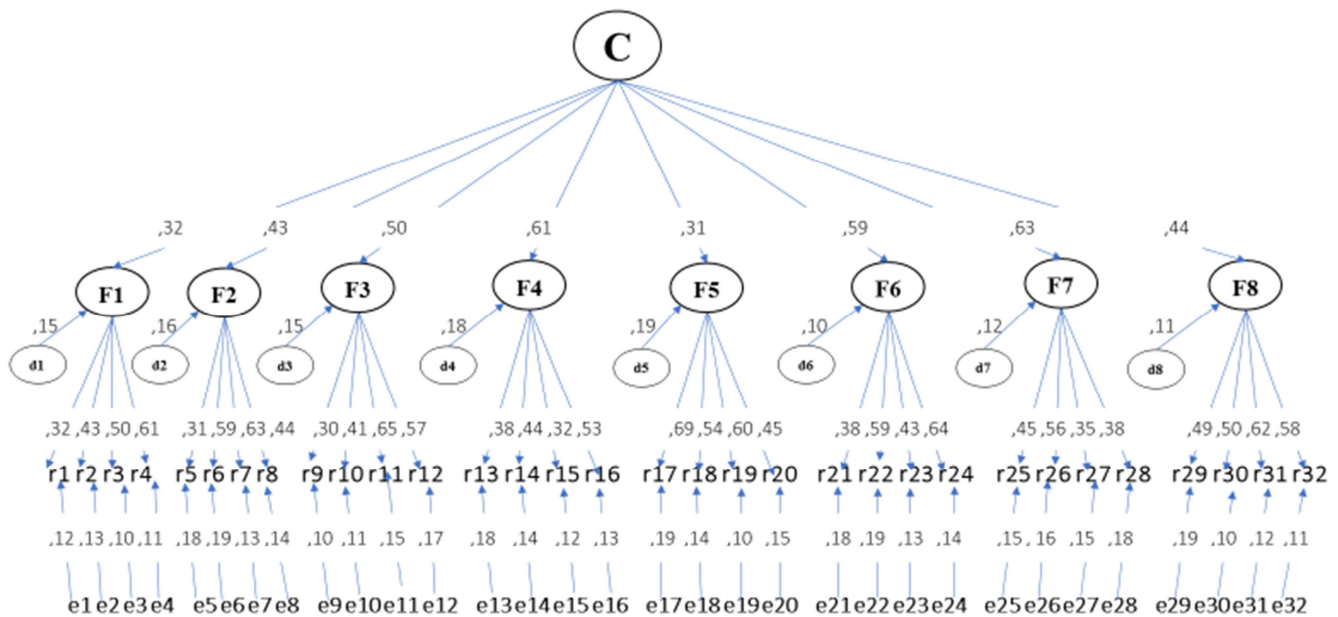


Figure 1. Structural equation modeling.

Source: Elaborated with data study; F1 = Selectivity, F2 = Compatibility, F3 = Computability, F4 = Accessibility, F5 = Extensionality, F6 = Cumulative, F7 = Anxiety, F8 = Addiction; e = Error measurement, d = Disturbance measurement factor, R = Reactive, \leftarrow relations between error and indicator, \rightarrow relation between factor and reactive, \leftrightarrow relation between factors.

The adjustment and residual parameters [$\chi^2 = 13,24$ (23 df) $p > .05$; GFI = .997; CFI = .995; RMSEA = .007] suggest the norm of the hypothesis regarding the significant differences between the theoretical structures with respect to the observed relationship structure,

4. Discussion

The present work has established eight dimensions of the intention of using the Internet in order to process and disseminate information concerning academic interests, but with broad repercussions on the information society, deliberative participation and governance.

The scope and limits of the study are determined by the methodological design insofar as the results cannot be generalized beyond the sample [40]. The study of information networks is recommended based on the dimensions established in the present investigation since, if

each of the factors found explains a significant percentage of variance around the use of the Internet as a mechanism for civil participation with respect to public affairs, management of opportunities and administration of capacities, then it will be possible to anticipate conflict scenarios and resolve them based on criteria and instruments of freedom of expression and information dissemination. The information search approach comparing repositories is recommended. The differences and similarities will allow us to discuss the didactic formation of intellectual capital in the COVID-19 era.

5. Conclusion

The objective of the present work was to establish the validity of an instrument that measures the intention of searching for information on the Internet. The results showed significant differences between the relationship structure

reported in the literature with respect to the observed relationship structure. Research lines related to the relationships between dimensions will allow us to notice axes and trajectories with respect to other constructs, such as the need for information or information anxiety. Consequently, the validity of the instrument will allow the design of educational policies focused on the management of knowledge as a potentiating axis of the production and transfer of knowledge between Higher Education Institutions and organizations dedicated to scientific and technological innovation. In relation to the dimensions found in the search for information on the Internet, it is recommended to extend the study to the systematic and intensive use of repositories in order to anticipate data systematization scenarios.

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