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STRUCTURAL EQUATION MODELLING OF TUTORING 4.0 IN THE PANDEMIC PERIOD

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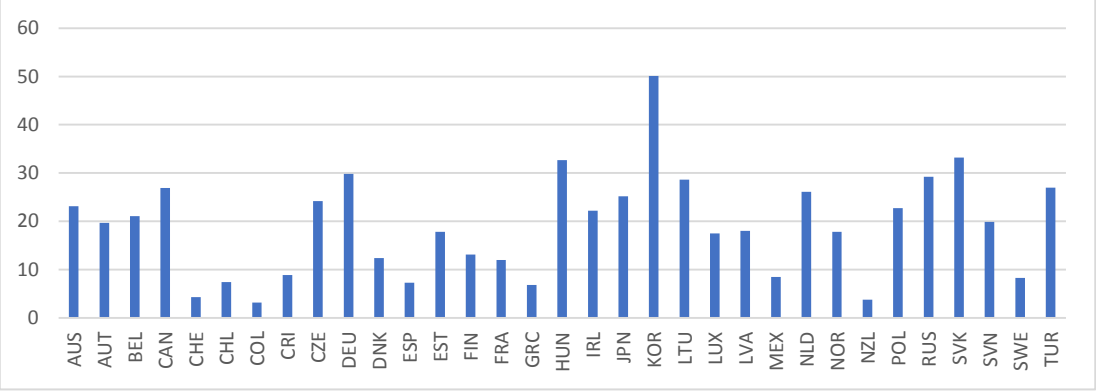
ABSTRACT

The objective of this work was to establish the incidence of tutoring 4.0 on the development of the research protocol. Method. An exploratory, cross-sectional and correlational study was carried out with a sample of 100 students from a public university enrolled in the professional practice and social service system through a technology, device or electronic network. Results. Show that the elaboration of the antecedents of the problem was the hidden layer that explains the semantic weight of the tutoring on the elaboration of the protocol, although the research design limited the findings to the research sample, suggesting the extension of the model to others. hidden layers that the literature identifies as project financing. The proposed model yields similar results to the reported literature regarding knowledge management as a determinant of knowledge production and transfer. Contrast of the model in other samples is recommended

1. INTRODUCTION

During the period from the pandemic from December 2019 to June 2021, the medical consultation in the countries that make up the Organization for Economic Cooperation and Development, Korea, Hungary and Slovakia lead the consultations of a generalist or specialist nature, as well such as types of consultation, outpatient in hospitals or homes (see Figure 1). It is possible to observe that a lower number of consultations suggests an immeasurable per capita diagnosis of infections, diseases and deaths related to Covid-19 in the case of Mexico, although in the case of Chile, the control of community transmission would be associated with per capita inquiries (1, 2, 3).

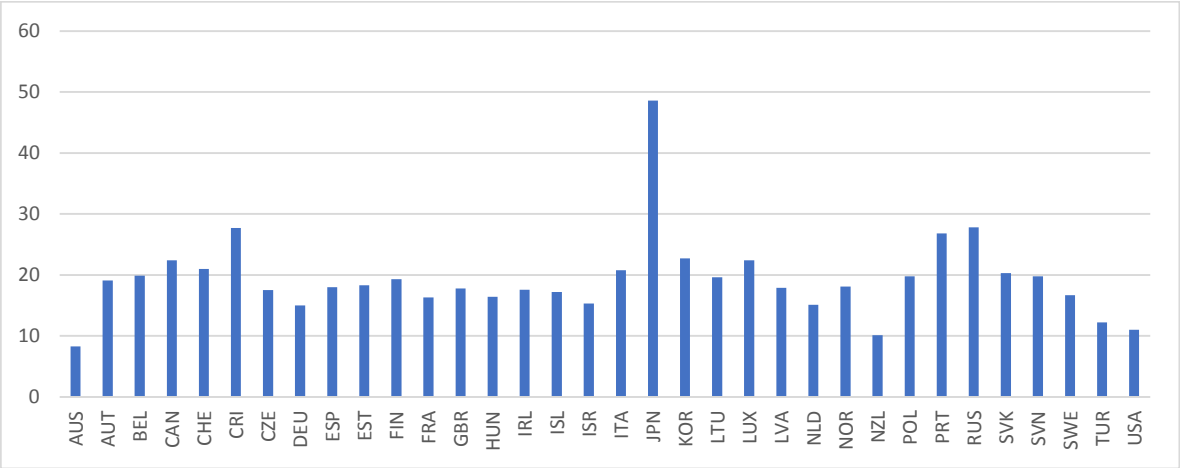
Figure 1. Doctor's Consultations



Note: Elaborated with data OECD (2021)

The Average Length of Stay in Hospitals, estimated by the number of days of hospitalization in a year by the number of admissions and discharges, suggests that Japan, Russia and Portugal lead this indicator, although the three countries have a variable number of infections, sick and dead (see Figure 2).

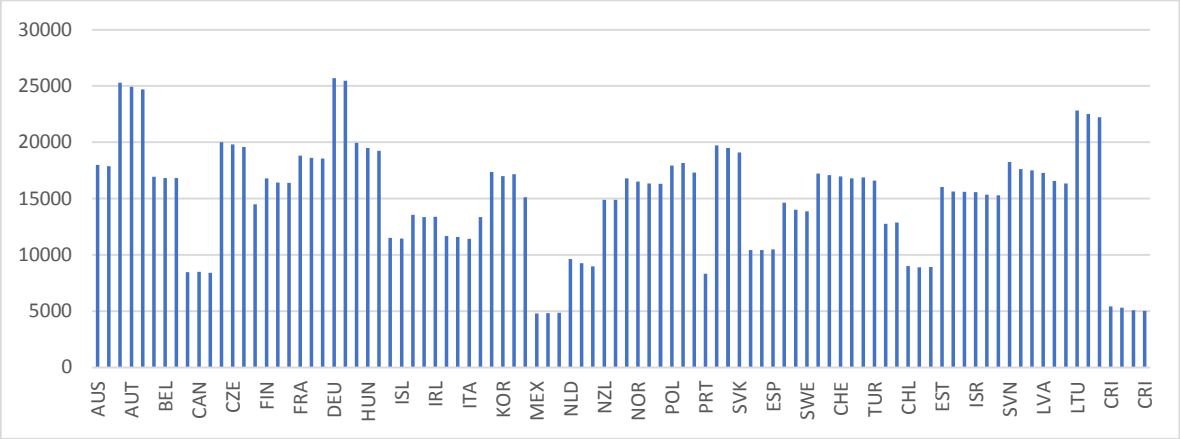
Figure 2. Length of hospital stay



Note: Elaborated with data OECD (2021)

Germany, Lithuania and Austria appear as the countries with hospital discharges, considering a day of hospitalization with recovery or death (See Figure 3). This indicator suggests that the management of the pandemic would be related to the number of cases of infected, sick and deaths at least for the leading countries of the indicator (4, 5, 6).

Figure 3. Hospital discharge rates



Note: Elaborated with data study

From the three indicators; medical consultations, length of hospital stay and hospital discharge rates it is possible to note that among the countries that make up the OECD, the formation of human capital can be carried out in those countries that have carried out more medical consultations, the length of stay in hospitals is less prolonged and discharge is favorable to the treatment of Covid-19 (7, 8, 9). In this way, strategic alliances between health institutions and universities for professional practices and social service are essential in the training of talents to combat the pandemic (10, 11, 12). Therefore, the study of platforms such as Tutorial 4.0 will allow anticipating scenarios for the management, production and translation of knowledge in the face of the confinement and social distancing caused by the health crisis (13, 14, 15).

Tutoring 4.0 technology is a virtual platform and an advisory and monitoring tool (16, 17, 18). Tutors and tutors register in the system and access content to develop collaborative work. Unlike other platforms and tools, tutoring 4.0 has a comparative system: generalized couching versus personalized advice (19, 20, 21). This difference is significant because it predicts the demand for general requirements, adjusting them towards specific needs (22, 23 24).

Are there significant differences between information input, data processing and learning as knowledge production around academic training focused on tutoring and the development of research protocols?

The premise that guides this work warns that the academic formation of a knowledge network between the parties involved involves three phases of reception, processing and dissemination of information concerning conflicts, agreements and co-responsibilities synchronized in sequential phases of data input and output (25, 26, 27). Consequently, knowledge management as an advisory in the development of protocols would be linked to the production of knowledge indicated by the association of data, as well as the transfer of findings whenever nodes of discussion and reorganization of optimization and innovation of resources emerge (28, 29, 30).

The objective of this work was to establish the effects of tutoring mediated by technologies, devices and networks on the development of the research protocol in a sample of students in the process of graduation and job placement.

2. METHOD

An exploratory, cross-sectional and correlational study was carried out with a sample of 100 students (M = 21.3 years SD = 1.23 years; M = 7'890.23 monthly income SD = 243.56), considering their training in science behavior, as well as their social service and professional practice in knowledge-creating organizations in strategic alliance with the public university.

The selection of the sample included those who carry out professional practices and social service in organizations linked to the university by strategic agreements, applying formula to estimate the sample size (31, 32, 33).

$$\text{Sample size} = \frac{\frac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

N = population size • e = Margin of error (percentage in decimal form) • z = z-score. The z-score is the number of standard deviations a given proportion is away from the mean. To find the right z-score to use (90% = 1,96).

Intellectual Capital Training Scale was used, which includes dimensions related to knowledge management (“I will learn the use of technologies to search for professional opportunities”), knowledge production (“I will learn to process data in statistical software ") and knowledge transfer (" I will learn to model relationships between variables ") (43). Each item includes five response options ranging from 0 = "not likely" to 5 = "quite likely".

In each of the fifteen sessions of the 4.0 tutorial 1) a pre-test application; 2) Group formation and collaborative leadership dynamics; 3) High `in Publons, Clarivate, Mendeley and Frontiers, interaction with peers and experts through the question and answer system, as well as consultation of research projects and technological innovation; 4) Discussion of the challenges and challenges, as well as the alternative solutions proposed by peers and experts; 5) posttest application.

The data were processed in the statistical analysis package for social sciences version 24.0 considering the estimation of parameters of normality, reliability, adequacy, sphericity, validity, neural networks in which equation was used (34, 35, 36).

Where: $X_1 \ldots, X_n$ are the values of the input layer or the responses to the pre and posttest during the 15 sessions of the 4.0 tutorial referring to management (documentary research), production (elaboration of the protocol) and knowledge transfer (modeling of variables). $W_1 \ldots, W_n$ are the synaptic weights of the relationships between the sum of the responses of the pre and posttests of each of the fifteen 4.0 tutoring sessions on management and of this on production successively until transfer and up to the research protocol; where b is the activation of the function applied to the summation of the p of the results (output layer) (37, 38, 39).

Because the measurement model includes an input layer (4.0 tutorial sessions), three intermediate layers (document management or research, production or elaboration of the protocol, and transfer or modeling of variables), as well as a layer of output (research protocol) a radial equation was used (40, 41, 42). This is the same estimation process, although three intermediate or hidden layers are considered in addition to the input and output layer.

3. RESULTS

In order to be able to model the relationship between tutors and tutors, preliminary analyzes were carried out, the results of which allow the establishment of axes and trajectories to be carried out. This means that the instrument can be applied in other shows, making it advisable to analyze the management, production and transfer of knowledge factors (see Table 1).

Table 1. Description of instrument

R	M	SD	A	F1	F2	F3
r1	4.35	1.43	.765	.546		
r2	4.36	1.09	.781	.650		
r3	4.32	1.56	.732	.653		
r4	4.65	1.41	.705	.436		
r5	4.32	1.12	.783	.541		
r6	4.12	1.54	.761	.432		
r7	4.30	1.65	.773	.345		
r8	4.65	1.09	.795		.436	
r9	4.32	1.65	.762		.432	
r10	4.41	1.43	.773		.324	
r11	4.31	1.12	.794		.536	
r12	4.39	1.41	.761		.540	
r13	4.05	1.65	.705		.653	
r14	4.56	1.21	.794		.549	
r15	4.76	1.32	.763			.432
r16	4.23	1.45	.763			.546
r17	4.14	1.19	.751			.532
r18	4.39	1.01	.783			.436
r19	4.67	1.07	.794			.412
r20	4.56	1.56	.762			.436
r21	4.31	1.45	.762			.429

Source: Elaborated with data study, R = reactive, M = Mean, SD = Standard Deviation, A = Crombach's Alpha excluded value item, Suitability (KMO = .768) and Sphericity ⌈χ2 = 14.23 / 23 df) p <.05⌋. F1 = Knowledge Management (18% of the total variance explained and alpha of .786), F2 = Knowledge Production (14% of the total variance explained and alpha of .765), F3 = Knowledge Transfer (10% of the total variance explained and alpha of .760).

The results show the prevalence of three factors among which, knowledge management is the one that explains the highest percentage of variance. That is, the effects of tutoring 4.0 can be explained from knowledge management. This is so because technology is more oriented to the codification of knowledge and the monitoring of projects rather than to specialization and the dissemination of findings (see Table 2).

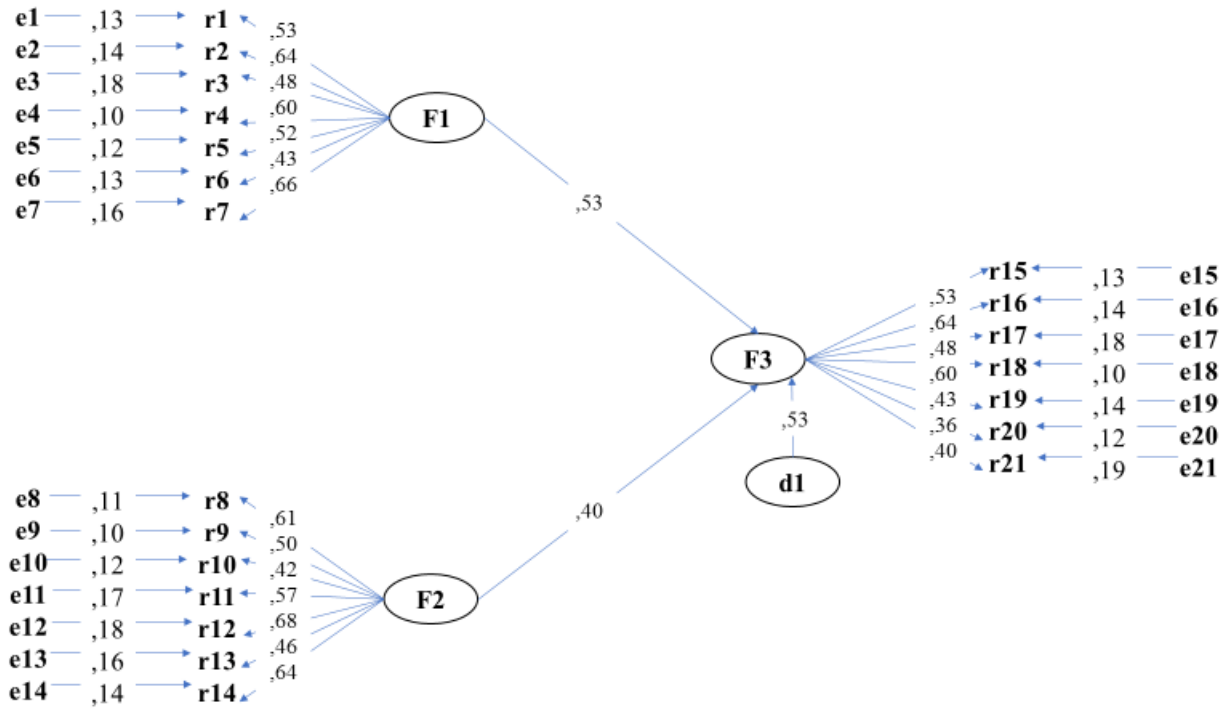
Table 2. Relations between variables

	M	SD	A	F1	F2	F3	F1	F2	F3
F1	24.31	13.24	,784	1.000	.546	.643	1.879	.543	.436
F2	22.35	15.43	,794		1.000	.435		1.854	.357
F3	26.54	16.54	,776			1.000			1.945

Source: Elaborated with data study

In other words, the findings suggest that the surveyed sample relates management to the production and transfer of knowledge, although technology is perceived and represented more as a tool for the codification of knowledge than as a device for the production of knowledge (see Figure 1).

Figure 1. Structural equation modelling



Note: Prepared with the study data: F1 = Knowledge Management, F2 = Knowledge Production, F3 = Knowledge Transfer; e = Error measurement indicator, d = Disturbance measurement factor
The adjustment and residual parameters ⌈χ2 = 14,35 (23df) p > ,05; GFI = ,995; CFI = ,997; RMSEA = ,0007⌋ suggest the non-rejection of the null hypothesis, which alludes to the fact that there are significant differences between the structure of theoretical relationships with respect to the observed model.

4. DISCUSSION

The contribution of this work to the state of the question lies in the establishment of the effects of the Tutoring 4.0 platform on the collaborative elaboration of a protocol, focusing on the management of knowledge such as the codification of knowledge and the monitoring of the findings, suggesting the contrast of the model in other samples of professional practitioners and social servants (43, 44, 45). Such contribution will allow the anticipation of knowledge coding scenarios around the formation of human capital in a health crisis.

In relation to the indicators of medical consultations, hospital stay and medical discharge, the present work suggests that the implementation of the technology can be carried out in this context of pandemic, since the coding of these indicators for the formation of human capital will allow to anticipate a health crisis scenario that can be remedied with the use of the training platform (46, 47, 48).

Regarding distance learning teaching technology, the present work suggests that its central structure lies in knowledge management (49, 50, 51). In other words, the codification of wisdoms will make it possible to predict in the virtual classroom a significant learning focused on the relationship established by tutors and tutored during confinement and social distancing.

Research lines concerning the implementation of technology during the pandemic and in confinement and social distancing scenarios will anticipate pedagogical sequences oriented towards meaningful learning of protocol management in real time (52, 53, 54). This interaction between tutors and totorados will allow us to develop the advantage of the Tutoring 4.0 platform, which consists of comparing the monitoring of progress of the protocol with the self-learning essential for the training of human capital at a distance.

5. CONCLUSION

The objective of this work was to establish a knowledge network related to mentoring and training of human capital for the elaboration of protocols. A structure of three factors or layers was found that explain the search, processing and dissemination of data, although the values of the relationships between the factors and their indicators suggest investigating the influence of confinement and social distancing, comparing high-risk scenarios with scenarios of low risk.

The development of a training strategy, considering the differences between the traditional and virtual classroom, as well as the systems focused on the institution, the teachers and the students compared to the proposed model, will make it possible to detect knowledge networks based on the demands of the environment and the availability of resources, but no longer as an optimization strategy in the face of crises but as an innovation strategy to overcome the crisis.

In this way, the implications that this work has for educational policies would be oriented towards the development of training protocols that encourage autonomy and collaboration between the parties involved.

If we have the technologies, devices and networks for the development of projects, then we must consider that the tutor must have more knowledge in the use of these platforms. I n use of technologies, devices and networks is necessary for academic and professional training, since students now find it easier to carry out their activities through their smartphones. On the other hand, universities are forced to offer non-face-to-face careers, to bring the university closer to a larger population.

Teachers are faced with the rejection of technology, the challenge to change since we are used to the fact that classes must be face-to-face or not knowing how to use technological devices and consequently the different platforms. Their training should be around the use of technologies, the use of English, knowledge about the different platforms, creative ways of working with students, knowing how to identify how to work with the different cultural, social and economic aspects of the students. students. Collaborative work, organized work, these aspects are not always dominated by teachers, therefore we do not know how to instill it in students. Teachers require the use of technologies, devices (mobile, storage), networks and specific software that are used when giving a class or tutoring, use of email, collaborative work.

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