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Review of tutorial networks in the Covid-19 era

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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. 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. The 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.

Keywords: neural networks; reliability; validity; research protocol; tutoring 4.0

Introduction

In the context of the health and economic crisis caused by the confinement of people in order to mitigate the community contagion of the SARS-COV-2 coronavirus and prevent the COVID 19 disease, information and communication technologies have been highlighted as a dissemination tool scientific, labor productivity and academic training (WHO, 2020). In this process of continuous learning of skills, knowledge and experiences, political and social actors, as well as the public and private sectors have established guidelines for the reactivation of confined humanity (PAHO, 2020). In this sense, teleworking and distance education are part of economic reconstruction.

Precisely, academic, professional and work training at a distance or mediated by technologies, devices and networks has emerged as an alternative solution to confinement (García, 2015). Regarding the intensive use of teaching and learning platforms, tutoring 4.0 has had an unusual growth in the management, production and transfer of knowledge (Hernández, 2018).

In the present work, the theoretical, conceptual and empirical frameworks that demonstrate the effects of tutoring 4.0 on academic performance, educational performance and the quality of processes and products are exposed, evaluated, accredited and certified. Next, the method of a study is presented in order to explore the incidence of 4.0 tutoring in the learning experience under student confinement. The findings are discussed considering the theories and evidence reported in the literature in a recent period before and during the health contingency.

Mentoring theory 4.0

The strategic alliances between Higher Education Institutions (IES) and knowledge-creating organizations in the face of the pandemic and the protection of people highlighted the 4.0 mentoring whose practice had been carried out as a complement to other experiential strategies of academic, professional and labor training with the purpose of incorporating graduates of bachelor's degrees with high theoretical and practical content into the local labor market (Aguilar, 2019).

In this process, tutoring was an accessory to the management or codification of experiences, knowledge and knowledge of professionals and teachers with students and future employees (Bouls, 2020). In the case of knowledge production, it located mentoring as part of documentary research, as well as the transfer of knowledge, it used mentoring as a complement to academic, professional or work practice (García, 2019).

The confinement of the interested parties in the management, production and transfer of knowledge forced the use of technological and computer systems to substitute this learning mediated by devices to the traditional training and training guidelines (Carreon, 2019). While the period prior to confinement distinguished the roles of the actors as managers, producers, translators and learners of knowledge (García, 2014). In the new context, these roles are now diversified and even interspersed between teachers and students.

This is the case of tutoring 4.0, which focuses on a flexible system of self- teaching and self-learning in which the interested parties process information not only for its implementation but also for its systematic accumulation (Quiroz, 2020). This is so because before the pandemic, managers translated knowledge, producers designed it, and translators provided it, but in the new context the parties involved only process the information without contrasting it with practice.

This distinction is essential when differentiating Orthodox tutoring from 4.0 tutoring. The degree of uncertainty defines the type of tutoring that is built in the educational system and the workplace, considering the trilogy of management, production and transfer of knowledge (Martínez, 2019). In a scenario of evaluation, accreditation and certification, orthodox tutoring supposes an interrelation between the parties without necessary mediation, but in an uncertain context, technologies, devices and networks propose

alternatives for the management, production and transfer of knowledge, although limited by contrast of initiatives and proposals in traditional interaction scenarios.

In this way, the virtue of orthodox tutoring consisted in the not always documented discussion of axes and topics in a previously established agenda without the interference of the parties involved, very defined as teacher and apprentice (Carreon, 2017). In the new confinement scenario, tutoring 4.0 makes its way into the diversification of proposals and the construction of a multiple agenda in terms of topics.

The frame representing the Orthodox tutoring compared with 4.0 innovations mentoring evidence less risk out from you. In technology-mediated learning, risks are amplified as a function of self- learning and self- teaching proposals. In a confinement such as the one that occurs, the parties involved do not agree on ways, spaces, times or means for learning and only converge in terms of their willingness to adopt the new reality imposed on them by the pandemic.

Tutoring Studies 4.0

The studies related to tutoring 4.0, as well as those alluding to orthodox tutoring, suggest the exploration, description, explanation and understanding of the risks that inhibit the management, production and transfer of knowledge (García, 2018).

Specialized work in the Orthodox tutoring argue that this can only be carried r from an agenda of objectives, tasks and goals set previously (Villegas, 2018). In this way, the contents cannot be different from the institutional guidelines because they would imply a mismatch in the teaching and learning process. This is so because the tutor is defined as the central actor and the student is an accessory component of the reproduction of knowledge, experiences or content.

In the new scenario of tutoring 4.0 the contents are diversified and even not necessarily linked. It is a scenario for discussing results rather than procedures (Clark, 2020). While orthodox mentoring imposes unilateral starting and ending points among the actors, mentoring 4.0 identifies these foundations and results as provisional, while new proposals, methods and findings build a flexible agenda for knowledge transfer and production management (Carreon, 2016).

While the risks in orthodox tutoring were attributed to the teacher and their capacities or resources, now tutoring 4.0 refers to risks in the intensive use of technologies, devices and networks (García, 2013). In this sense, risks such as stalking (stalking), trolling (discredit), stashing (neglect) or hiding (concealment) are hallmarks of an agenda 4.0

Modelling of tutoring 4.0

Identify the challenges of the tutor in the teaching - learning process mediated by Information Technology and Communication as well as oriented training skills and knowledge from the use of devices and networks collaborative, for development of documentary and meta-analytic investigative competences (García, 2017).

In this scenario, the formation of intellectual capital mediated by technology implies strategic alliances between Higher Education Institutions with organizations that create knowledge (Carreon, 2015). The formation of human capital in its intellectual aspect is brewing from tutoring 4.0 (auto orientation of the mentee from the experience of their tutors and peers through information technology and communication) facilitates skills to the tutored search, select, process and systematize the information that allows them to make a professional decision or carry out an internship in a knowledge-creating organization (García, 2020).

The use of technologies is always the way to have an approach with the student and allow the student to become self-taught and an organizer of their own learning, without feeling alone at any point in the teaching-learning process. Publons, Mendeley, Clarivate, and Frontiers allow mentees to collaborate with their peers and experts in their fields on research projects and technological innovation. The student registers in the systems and begins to interact with peers or experts, answers questions regarding their competencies, knowledge and abilities, as well as access to projects and experiences.The null hypothesis that explains the effect of the 4.0 tutoring related to the research seminar on the quality of the protocol development includes:

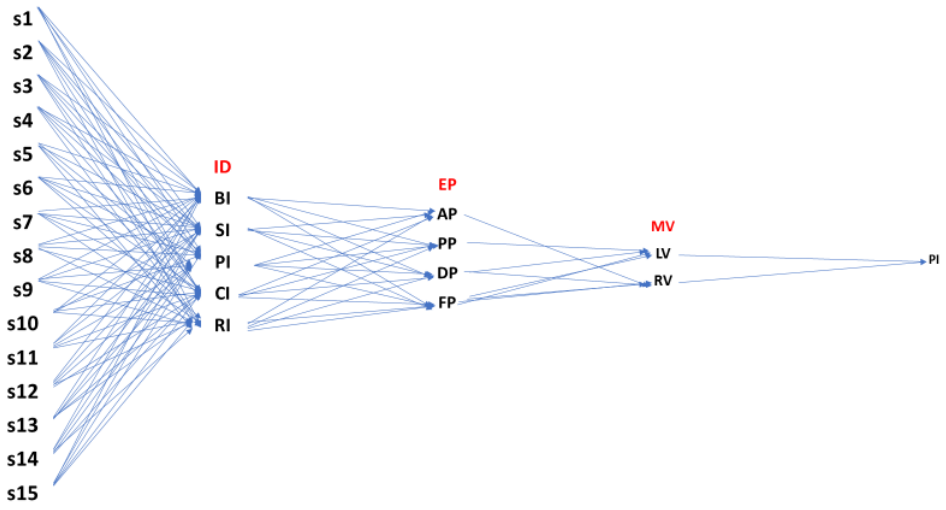


Figure 1. Measurement model

Note: Own elaboration ; S = Session, ID = Documentary Research, BD = Information Search , S I = Information Selection , P I = Information Processing ,C I = Information Comparison , R I = Information Summary , EP = Protocol Elaboration, A P = Background of the Problem, PP = Statement of the Problem, DP = Delimitation of the Problem, FP = Formulation of the Problem, MV = Modeling of Variables ; LV = Limits of Variables, RV = Relationships between Variables, PI = Research Protocol

Figure 1 shows the process of neuronal learning in which 15 tutoring sessions 4.0 determine the development of the research protocol through three m or modules relating to document retrieval, processing and protocol modeling variables. It is a systematic, continuous and permanent process if it is considered that every project is susceptible to adjustments and therefore is provisional.

In this way, the elaboration of the protocol would be a learning in networks of sessions, modules, data and variables from which an academic,

professional and labor research agenda is built for the management, production and transfer of knowledge.

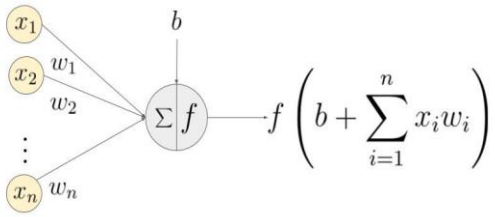
Method

Design. 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.

Instrument. The Carreon Intellectual Capital Training Scale (2020) 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 "). Each item includes five response options ranging from 0 = "not likely" to 5 = "quite likely."

Procedure ; In each of the fifteen sessions tutoria 4.0 1) to plication of pretest; 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

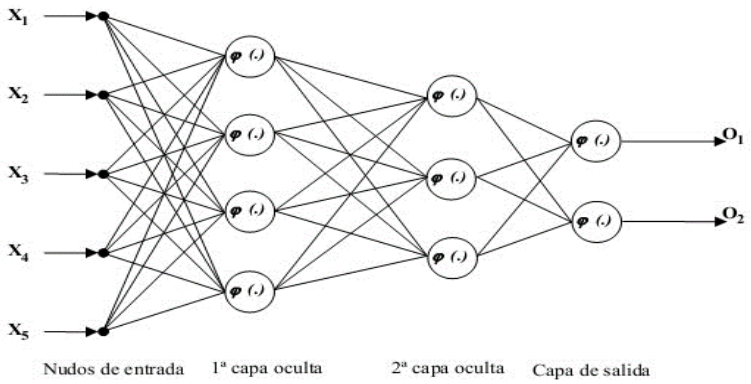
Analysis. The data were processed in the statistical analysis package for social sciences version 24.0 considering the estimation of parameters of normality, reliability, adequacy, sphericity, validity, neural networks in which equation (1) was used



(1)

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)

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 (2)



$$f(x) = \sum_{j=1}^{m} w_j h_j(x)$$

$$h(x) = \exp\left(-\frac{(x-c)^2}{r^2}\right)$$

(2)

This is the same estimation process, although three intermediate or hidden layers are considered in addition to the input and output layer (see Table 1).

Input layer	Tutoring Factors 4.0		Session
		1	Management
		2	Management
		3	Management
		4	Management
		5	Management
		6	Production
		7	Production
		8	Production
		9	Production

		10	Production
		11	Transfer
		12	Transfer
		13	Transfer
		14	Transfer
		15	Transfer
	Number of units		4
Hidden layers	Number of hidden layers		3
	Number of units in hidden layer 1 to		9
	Trigger function		Hyperbolic tangent
Output layer	Dependent variables	1	Preparation of protocol
	Number of units		1
	Scale change method for scale dependents		Standardized
	Trigger function		Identity
	Error function		Sum of squares

Table 1. Neural networks

Note: Prepared with the study data

Results

Table 2 shows the descriptive values of the instrument; normal distribution, reliability or internal consistency of the scale, sphericity, adequacy and validity as requirements prior to the analysis of the neuronal structure.

R	M	S	A	F1	F2	F3
r1	4,05	1.32	, 780	, 567		
r2	4,00	1.45	, 784	, 408		
r3	4.65	1.01	, 775	, 612		
r4	4,01	, 105	, 772	, 508		
r5	4,03	1.08	.709	, 486		
r6	4,02	1.13	, 783	, 532		
r7	4.01	1.45	, 780	, 678		
r8	3.02	1.38	, 784		, 670	
r9	3.01	1.02	, 773		, 652	
r10	4.35	1.26	, 771		, 543	
r11	3.72	1.18	, 770		, 651	
r12	3.18	1.04	, 731		, 457	
r13	4.0	1.17	, 780		, 476	
r14	3.89	1.18	, 743		, 498	
r15	3.15	1.04	, 705			, 543
r16	4.06	1.09	, 737			, 523
r17	4.08	1.34	, 790			, 513
r18	3.79	1.23	, 746			, 490
r19	3.83	1.15	, 745			, 478
r20	3.05	1.18	, 740			, 436
r21	4.12	1.90	, 778			, 532

Table 2. Instrument descriptions

Note: Prepared with the results of the study; M = Mean, S = Standard Deviation, A = Cronbach's Alpha, Extraction method: Main axes, Rotation Promax. Adequacy (KMO =. 768) and Sphericity $\lceil \chi 2 = 14.23 / 23$ gl) $p < .05 \rfloor$. 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). All items include five response options: 0 = "not likely" to 5 = "quite likely".

The validity of the instrument showed three main axes: management, production and transfer of knowledge, which explained 42% of the total variance. In order to observe its structure of relationships between factors, the correlations and covariances were estimated **(see Table 3).**

	M	S	F1	F2	F3	F1	F2	F3
F1	24.35	12.34	1,000			1,763	, 467	, 534
F2	25.47	15.46	, 654 *	1,000			1,698	, 610
F3	20.12	10.23	, 456 **	, 597 ***	1,000			1.90

Table 3. Structure of correlations and covariances

Note: Prepared with the study data: M = Mean, S = Standard Deviation, F1 = Knowledge Management, F2 = Knowledge Production, F3 = Knowledge Transfer; * p <.01; ** p <.001; *** p <a, 0001

In order to be able to observe the effects of tutoring 4.0 (see Table 4), the structure of neural networks was estimated to detect learning, considering management (documentary research), production (elaboration of the protocol) and knowledge transfer (modeling of variables).

EC						CO							CS
		BI (1: 1)	YES (1: 2)	PI (1: 3)	CI (1: 4)	RI (1: 5)	AP (1: 6)	PP (1: 7)	DP (1: 8)	FP (1: 9)	LV (1:10)	RV (1:11	
	(Bias)	, 247	, 229	, 127	, 309	-, 124	, 471	, 157	-, 271	-, 242	, 295	, 152	
	[GC = 1.00]	-. 290	, 492	-, 221	, 390	-, 414	, 401	, 361	-, 212	- .279	-, 335	, 211	
	[GC = 2.00]	, 097	, 456	.070	-, 431	.024	- .064	- .378	, 168	-, 236	-. 118	, 398	
	[GC = 3.00]	, 119	, 103	, 395	, 334	- .078	-, 126	-, 109	.021	- .019	-, 438	, 208	
	[GC = 4 , 00]	- .487	- .028	-, 124	, 339	, 291	- .467	-, 335	-, 294	-. 106	- .379	, 291	
	[GC = 5 , 00]	- .046	- .278	, 280	, 425	.045	-, 211	, 428	, 131	- .282	- .329	, 561	
	[PC = 6 , 00]	.037	-, 232	-, 162	- .090	, 109	-, 149	-. 106	- .461	, 243	-, 233	, 320	
CO	[PC = 7 , 00]	-. 176	, 340	-, 224	- .080	-, 433	- .471	- .305	-, 239	.040	- .277	, 297	
	[PC = 8 , 00]	- .020	, 091	, 310	- .099	-. 192	, 223	-, 193	-. 280	-, 163	, 087	, 167	
	[PC = 9 , 00]	-, 271	-, 267	, 319	- .082	, 207	, 288	, 314	, 451	, 412	.028	, 307	
	[PC = 1 0 , 00]	- .036	-, 363	, 473	, 394	- .284	, 491	, 217	.015	-, 350	-. 164	, 387	
	[TC = 11 , 00]	- .054	- .443	-, 249	- .020	, 131	, 409	-, 465	- .367	-, 190	, 286	, 290	
	[TC = 12 , 00]	, 161	-, 297	, 107	-, 103	- .288	-, 336	, 263	-, 422	- .018	- .471	, 307	
	[TC = 13 , 00]	, 491	- .284	, 328	- .080	-, 261	, 231	-, 321	.050	, 338	-, 210	, 189	
	[TC = 14 , 00]	, 349	-, 152	-. 597	-, 169	, 163	-. 570	-, 255	- .004	-, 190	-, 229	, 306	
	[TC = 15 , 00]	, 106	, 123	, 421	-. 167	, 197	, 076	, 326	, 505	- .011	- .093	, 721	
	(Bias)												-173
CS	H (1: 1)												- .474

Table 4. Neural Networks from Mentoring 4.0

CE = Input Layer, CO = Hidden Layer, CS = Output Layer, GC = Knowledge Management, PC = Knowledge Production, TC = Knowledge Transfer; ID = Documentary Research, BD = Information Search, SI = Information Selection, PI = Information Processing, CI = Information Comparison, RI = Information Summary, EP = Protocol Elaboration, A P = Background of the Problem, PP = Statement of the Problem, DP = Delimitation of the Problem, FP = Formulation of the Problem, MV = Modeling of Variables; LV = Limits of Variables, RV = Relationships between Variables, PI = Research Protocol

The results show a learning neural structure from tutoring, although the relationships between the components have semantic weights close to zero, indicating the influence of other variables in the teaching and learning process.

Discussion

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. The reliability and validity of an instrument that measures before and after the effect of tutoring was established, which was established in fifteen sessions divided into five for the management, production and transfer of knowledge. The neural network structure notices the influence of each node in the hidden and output layers, but being very close to zero, the incidence of other variables that the literature identifies as utility and ease of use of the technology is noted.

In relation to the theory of tutoring 4.0 which highlights a learning focused on problems and alternative, multiple and differential solutions, the present work warns that the surveyed sample focuses its interest in the elaboration of the background of the problem in the first, tenth and eleventh session. Future lines of research will allow us to observe the importance of the review of the literature in the elaboration of the protocol as long as it is instructed from a technology, device or electronic network (García, 2016).

Regarding the 4.0 tutoring studies, which highlight learning from risks such as stalking , stashing , trolling or hiding , the present work has shown that the sample The respondent focuses her attention on reviewing the literature and preparing the background of the problem, suggesting that risks can inhibit learning. Research lines related to risks in documentary research will allow us to notice biases in the elaboration of protocols, as well as the background of the research problem.

Regarding the specification of the model that suggests greater learning based on an increase in autonomy; self-control and self-efficacy, the present work has revealed the importance of the review of the literature and the elaboration of antecedents since they complement a self-learning of the relationships between variables reported in the literature, developing an experience and wisdom that will position the student as an expert on the theme or problem.

Conclusion

If we have the technologies, devices and networks for the development of projects, then we must take into account 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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