TUTORING MODEL 4.0 AND DEVELOPMENT OF RESEARCH PROTOCOL

MODELO DE TUTORÍA 4.0 Y ELABORACIÓN DE PROTOCOLO DE INVESTIGACIÓN

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ABSTRACT
Introduction. 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.

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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.

Discussion. The proposed model yields similar results to the reported literature regarding knowledge management as a determinant of knowledge production and transfer.

Conclusion. Contrast of the model in other samples is recommended.

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

RESUMEN
Introducción - El objetivo de este trabajo fue establecer la incidencia de la tutoría 4.0 en el desarrollo del protocolo de investigación.

Método - Se realizó un estudio exploratorio, transversal y correlacional con una muestra de 100 estudiantes de una universidad pública matriculados en el sistema de práctica profesional y servicio social a través de una tecnología, dispositivo o red electrónica.

Resultados - Demostrar que la elaboración de los antecedentes del problema fue la capa oculta que explica el peso semántico de la tutoría en la elaboración del protocolo, aunque el diseño de investigación limitó los hallazgos a la nuestra de investigación, sugiriendo la extensión del modelo a otras capas ocultas que la literatura identifica como financiamiento de proyectos.

Discusión - El modelo propuesto arroja resultados similares a la literatura reportada sobre la gestión del conocimiento como determinante de la producción y transferencia de conocimiento.

Conclusión - Se recomienda el contraste del modelo en otras muestras.

Palabras Clave:
confiabilidad; protocolo de investigación; redes neuronales; tutoría 4.0; validez

Introduction

In the context of the health and economic crisis caused by the confinement of people 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, according to Bautista, Aldana & García (2018). 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. 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 (Bautista, Aldana & García (2018). 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.

In this section the theoretical and conceptual frameworks that explain the relationship between the formation of intellectual capital with respect to the virtual classroom mediated by technologies and risks inherent to distance communication are exposed (Carreón, Bautista, García, Hernández, Sandoval, Pérez & Valdés, 2016). The classical theories of learning are reviewed cognitive as well as the acceptance and adoption of technologies based on the resources of the parties involved. Despite the differences between the explanatory matrices, they share the unavoidable adjustment of academic resources to the demands of the environment (Carreón, Bustos, Hernández & García, 2016). In other words, the pandemic has forced process innovation rather than resource optimization. This distinction opens a gulf between the traditional classroom and the virtual classroom in tutoring and developing research protocols.

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.

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 (Carreón, Bustos, Hernández, Quintero & García, 2015). 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.

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 (Carreón, Hernández, Bustos & García, 2017a). While the period prior to confinement distinguished the roles of the actors as managers, producers, translators, and learners of knowledge. 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, according Carreón, Hernández, Bustos & García (2017b). 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.

For Fierro, Alvarado & García (2018) 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. 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. 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 (Fierro, López & García, 2018).

According to Fierro, Nava & Garcia (2018), the framing of orthodox tutoring compared to the innovations of tutoring 4.0 shows fewer risks. 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.

The theories of tutoring 4.0, as opposed to traditional theoretical frameworks of learning and adoption of information technologies, devices, and networks, suggest that significant differences prevail between the traditional classroom and the virtual classroom, according García, Carreón, Hernández, Bustos & Quintero (2017). If it is considered that the formation of human capital involves a trilogy of sequences that goes from the management, production, and transfer of knowledge, then the virtual classroom differs from the traditional classroom in terms of data processing and information dissemination (García, Carreón, Hernández & Bustos, 2013). This is so because in the elaboration of the protocol, the interested parties assume that a review of the literature would be conditioned by the keywords rather than by the availability of resources that are handled in a traditional classroom.

This section uses mentoring as a result of the influence of traditional media and electronic networks on the formation of human capital, highlighting inherent risks such as peer violence (García,

Carreón, Hernández & Bustos, 2017). Two models stand out. One related to tutoring as a reflection of academic training and another as a process of determining sequences of learning, performance, satisfaction, competitiveness, and innovation. In the first model, the dimensions of tutoring stand out compared to the variables that cause them to have low or high learning, information processing and knowledge coding.

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, for García, Carreón, Hernández & Bustos (2017).

Specialized work in the Orthodox tutoring argue that this can only be carried r from an agenda of objectives, tasks and goals set previously. In this way, the contents cannot be different from the institutional guidelines because they would imply a mismatch in the teaching and learning process (García, Carreón, Hernández & Rivera, 2015). 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, according García, Carreón, & Hernández (2017). 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.

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. In this sense, risks such as stalking (stalking), trolling (discredit), stashing (neglect) or hiding (concealment) are hallmarks of an agenda 4.0 (García, Carreón, Quintero & Bustos, 2015).

Reviewed the state of the art of tutorials to find that the strategies correspond to institutional interests, from García, Carreón, Sandoval, Bustos & Aguilar (2016). The knowledge management can be institutional in terms of the resources it provides, but production and transfer are inherent to a universal data and processing system that prevails on the Internet according to quality standards such as indexing, or impact factor are refined. In this way, the knowledge network resulting from these structures is a hybrid that would explain and anticipate conflict scenarios between the institution, the parties involved, and technological innovations for data processing and dissemination and content.

Found in the traditional classroom that, except in a first evaluation, the students considered that the tutor was the central actor in the teaching process (García, Carreón & Bustos, 2017). Was rather demonstrated that there is a sequential differentiation inherent to the system rather than the teacher (García, Delgado, Morales, Méndez, García & Vilchis, 2016). This is so because the incidence of the teacher's experience is reduced to a minimum expression in the virtual classroom (García, Juárez, Sandoval & Bustos, 2017). Even autonomy and self-efficacy are more likely in confined students who interact with their tutor at a distance than in students confined in a traditional classroom.

García, Martínez & Sánchez (2018) suggest that tutoring focuses its attention on intellectual capital rather than on the demands of the environment. Mentoring and learning are inherent to the health crisis, but also a formative response where the parties involved built a network of knowledge (Garcia, Martinez & Sanchez, 2018). It is a system for the management, production and transfer of information that allowed not only to observe the impact of the pandemic on learning and knowledge but also its processing in data to build a new proposal crystallized in a protocol.

The dimensions of tutoring are inherent to the asymmetries between the training actors, but the determining relationships are allusive to the demands of the environment and institutional resources, for García, Mejía, Hernández, López & Salinas (2015).

This difference allows the modeling of the reflective variables tutor í to and the determining variables may coexist in a hybrid model. It is a proposal in which data entry forces the parties involved to process more information until they reach a degree of learning and knowledge that involves a quality protocol.

According from García, Sandoval, Rivera & Limón (2017) in this phase the relationships between the variables that make up the hybrid model are discussed. On the one hand, those variables that indicate the management, production, and transfer of data, but also include those variables that promote the transition from data management or coding towards the production or establishment of findings and the transfer or dissemination of results applications.

Challenges of the tutorial the teaching process mediated learning for Information Technology and Communication involve the formation of skills and knowledge from the use of devices and collaborative networks for skills development investigative documentaries and meta – analytic (García, 2017a).

In this scenario, the formation of intellectual capital mediated by technology implies strategic alliances between Higher Education Institutions with organizations that create knowledge (García,2019). 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.

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 (García, 2017b). 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.

From García, E.; García, C.; Rosas, F.; Castillo, B.; Carreón, J.; Hernández, J. & Rivera, L. (2015) effect of mentoring 4.0 on the research seminar on the quality of the drafting of the protocol includes. 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.

The hybrid model suggests that the training of intellectual capital regarding tutoring and the development of research protocols goes beyond the environment of a traditional classroom where the teacher leads the student towards a theoretical, methodological, and technical justification without considering other alternatives such as self-study, according for Garcia, J.; Delgado, M. & Garcia, C., (2018). In this process, innovation emanates from data processing rather than from the teacher's experience or the student's trial of mistakes and successes, for Juárez, García & Quintero (2019). It is a system in which knowledge and learning are compatible with technologies, devices, and networks, but no longer as an imposition in the face of the pandemic but as a pedagogical development of synchronous training.

The objective of this work was to establish the knowledge network around tutoring and the elaboration of research protocols, considering the confinement and social distancing that forced the emergence of the virtual classroom, as well as the risks associated with distance training such as cases of violence between the parties involved. The contrast of a model is proposed to explain the influence of tutoring 4.0 on the elaboration of the research protocol.

From the measurement of information processing indicators such as knowledge management, production and transfer, a common factor is inferred that the literature identifies as knowledge creation. Strategic alliances between universities and organizations are guided by the creation of knowledge. Competitive advantages translate into the creation of knowledge.

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?

For Bautista, Delgado, García, Valdés, Hernández, Castro & Trujillo (2016) 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. 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.

The proposed model will allow progress towards the diagnosis of academic, professional, and labor training from the management, production and transfer of knowledge (Garcia et al., 2015). The conversion of human capital into an intangible asset of knowledge creation can be explained from the model (Garcia et al., 2016). The design of pedagogical sequences guided by the model will allow scientific and technological training. The evaluation of the model will indicate the consequences of strategic alliances between universities and organizations in educational training.

In the case of literacy, understood as the teaching and learning of data and information for its synthesis in theoretical knowledge and practical application, its effects on reading and writing can be explained from the proposed model (Carreon et al., 2018). The model includes three types of knowledge that prevail in

academic, professional, and work training. Data processing skills through tutorial 4.0 facilitate the translation of knowledge.

However, studies on the effect of knowledge management and production have not been approached to explain the performance or use expressed in literacy (Garcia et al., 2018). Therefore, the proposed model will explain the impact of knowledge management on knowledge production. Knowledge management is assumed as the codification of measurable and comparable information (Carreon et al., 2019). This is the case of managing a technology such as tutoring 4.0 that allows access to data sources and their processing into information codes (Carreon et al., 2016). If access to data and codes is possible, then the volume of knowledge production will be predictable, as is the case with publications in books and magazines.

The production of knowledge relative to the number of publications in books and magazines by a community is a reflection of knowledge management, but also of the transfer of knowledge through academic, professional and work training (Garcia et al., 2018). This is the case of universities that establish strategic alliances with organizations to train the human capital that guarantees the continuity of skills and knowledge required in the development of an organization.

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 to explore the incidence of 4.0 tutoring in the learning experience under the confinement of students. The findings are discussed considering the theories and evidence reported in the literature in a recent period before and during the health contingency.

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.

According from Llamas, Lopez & Garcia, C. (2019) instrument *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 "). Each item includes five response options ranging from 0 = "not likely" to 5 = "quite likely."

Procedure; 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 (Llamas, Lopez & Garcia, C., 2019).

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 was used (Martinez, Sánchez & García, 2019).

Where: $X_1 ..., X_n$ 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). $W_1 ..., W_n$ 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) (Martinez, Sánchez & García, 2019).

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 (Morales, Lopez, Delgado, Mendoza, García & Olvera, 2018).

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

Results

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 (see Table 1). The results show that the tutoring and protocol development process is structured around three factors that reflect the virtual classroom and determine its use for academic purposes in a systematic and consistent way. Such findings allow carrying out structural analyzes to investigate the axes and trajectories of relationships between the factors and their indicators.

Table 1. Description of instrument

R	M	SD	A	F1	F2	F3
r1	4.32	1.32	.782	.561		
r2	4.56	1.45	.704	.436		
r3	4.76	1.09	.761	.540		
r4	4.12	1.41	.793	.672		
r5	4.32	1.56	.752	.653		
r6	4.45	1.89	.704	.547		
r7	4.90	1.56	.761	.512		
r8	4.31	1.43	.704	.436		

r9	4.58	1.23	.709		.640	
r10	4.35	1.15	.782		.653	
r11	4.12	1.08	.765		.573	
r12	4.31	1.67	.710		.540	
r13	4.33	1.56	.732		.467	
r14	4.77	1.45	.704		.437	
r15	4.57	1.53	.709		.531	
r16	4.46	1.13	.743		.436	
r17	4.09	1.47	.741			.532
r18	4.89	1.07	.721			.354
r19	4.53	1.56	.734			.412
r20	4.13	1.13	.709			.378
r21	4.37	1.31	.708			.547
r22	4.79	1.12	.731			.346
r23	4.31	1.57	.782			.578
r24	4.32	1.80	.754			.698

Source: Elaborated with data study, R = Reactive, M = Mean, SD = Standard Deviation, A = Alpha excluded value data, Adequacy (KMO = .768), Sphericity ⌈χ2 = 13.24 (23 df) p < .05⌋ Method: Principal ways, Rotation: Promax. F1 = Knowledge Management, F2 = Knowledge Production, F3 = Knowledge Transfer
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 validity of the instrument showed three main axes: management, production, and transfer of knowledge, which explained 42% of the total variance. To observe its structure of relationships between factors, the correlations and covariances were estimated (see Table 2). The results seem to corroborate the theorized structure in which the management, production and transfer of knowledge prevail as a logical sequence that can be observed in a hybrid model of neural networks. This is so because the respondents seem to have adopted the mentoring system as part

of their academic and research training, being able to discern between the three factors and assimilate possible lines of learning and knowledge creation.

Table 2. *Relations between factors*

	M	SD	A	F1	F2	F3	F1	F2	F3
F1	24.31	14.35	.783	1.00			1.78	.546	.437
F2	22.36	16.54	.704	.635***	1.00			1.89	.632
F3	25.46	13.25	.798	.436*	.547**	1.00			1.73

Source: Elaborated with data study, M = Mean, SD = Standard Deviation, F1 = Knowledge Management, F2 = Knowledge Production, F3 = Knowledge Transfer

To be able to observe the effects of tutoring 4.0, 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). There is a series of numerical sequences that demonstrate the differences between the input layer with respect to the hidden and output layer. In other words, knowledge management is distinguished from production and transfer, even though they share similar sequences, it was possible to notice degrees of learning inherent in the training system.

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. This is so because in the virtual classroom and the setting of confinement and social distancing, they can exert some influence on tutoring and developing protocols. Lines of study on the impact of mitigation policies on learning and generation of knowledge will allow us to notice the degree of incidence, controlling and comparing confinement scenarios with high exposure to risks such as hospitals and low exposure scenarios such as the home. To be able to observe the structure of relationships between the factors and indicators, a model of structural equations was estimated (see Figure 1).
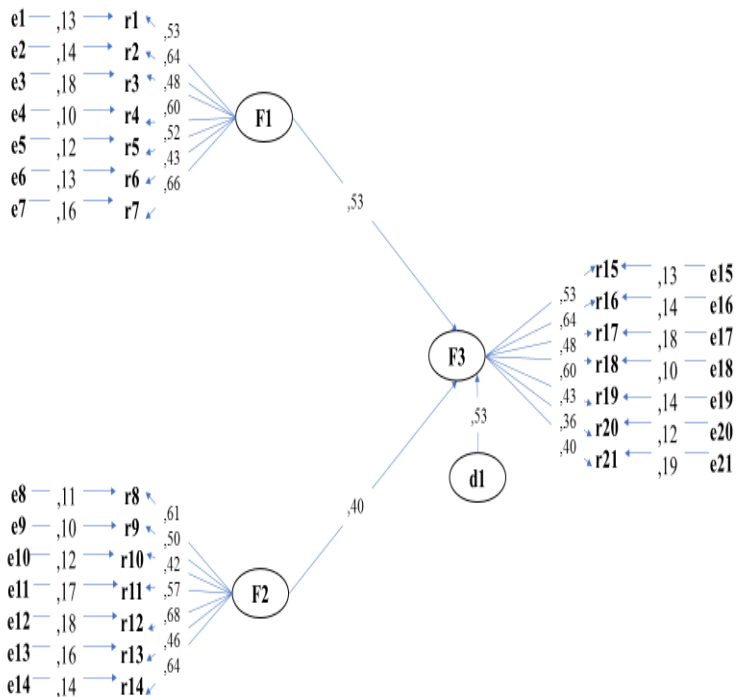
Figure 1. Structural equation modelling
Source: Elaborated with the study data: F1 = Knowledge Management, F2 = Knowledge Production, F3 = Knowledge Transfer; e = Error measurement indicator, d = Disturbance measurement factor

The adjustment and residual parameters $\lceil \chi2 = 14,35$ (23df) $p > ,05$; GFI = ,995; CFI = ,997; RMSEA = ,0007$\rfloor$ 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. In other words, the network learning process seems to be differentiated in management, production, and transfer of knowledge, but the estimation of their

relationships suggests a dual process in which the management and production of knowledge can be simultaneous, affecting the transfer of knowledge. knowledge. This effect distinguishes the virtual classroom from the traditional classroom where the transfer of knowledge influences the management and production of knowledge.

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 (Quintero, Valdés, Delgado & García, 2018). 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 on the elaboration of the background of the problem in the first, tenth and eleventh session (Sandoval, Carreón, García, Quintero & Bustos, 2017). Future lines of research will allow us to observe the importance of the review of the literature in the elaboration of the protocol if it is instructed from a technology, device, or electronic network.

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 (Sandoval,

Carreón, García, Quintero & Bustos, 2017). 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.

Future lines of research concerning systems centered on the institution, the teacher or the knowledge management, production and transfer system will allow us to notice the influence of the environment, as well as the response of the parties involved in the face of crises or risks. In such a scenario, process innovation appears to be an alternative to resource optimization (Valdés, Vilchis, Bautista, García & Castro, 2017). In other words, in the face of a health and economic crisis, rather than austerity, it is necessary to innovate to generate the knowledge that allows to overcome risks and contingencies.

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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