

## **Medición de la gestión del conocimiento en la Universidad Pública de la Ciudad de México**

*Measurement of knowledge management at the public university at Mexico  
city*

*Mensuração da gestão do conhecimento na Universidade Pública da Cidade  
do México*

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### **Resumen**

Esta investigación se realizó con el objetivo de crear un modelo ecléctico basado en la gestión del conocimiento no solo para identificar las actividades relacionadas con el capital humano, capital intelectual, capital relacional y uso de las TIC, sino también para ayudar a incrementar el rendimiento académico de estudiantes universitarios. La metodología utilizada fue mixta, y se aplicó un cuestionario validado con un total de 997 estudiantes. Los resultados conseguidos con este instrumento fueron capturados y analizados para elaborar un modelo de regresión lineal múltiple con el método de mínimos cuadrados ordinarios. Los resultados indican que las TIC es la variable que tiene mayor impacto positivo en el rendimiento de los estudiantes, mientras que las actividades de congresos, los contenidos multimedia y la participación en clubes de estudio tienen un impacto negativo. Por tanto, se concluye que la integración de las TIC en la

gestión del conocimiento es importante para generar motivación y creatividad en los futuros profesionistas, aunque esto debe ser planeado cautelosamente para evitar un impacto negativo.

**Palabras clave:** capital, conocimiento, gestión, TIC.

### **Abstract**

This research was conducted with the aim of creating an eclectic model based on knowledge management not only to identify activities related to human capital, intellectual capital, relational capital and use of ICT, but also to help increase academic performance of university students. The methodology used was mixed, and a validated questionnaire was applied with a total of 997 students. The results obtained with this instrument were captured and analyzed to elaborate a multiple linear regression model with the ordinary least squares method. The results indicate that ICT is the variable that has the greatest positive impact on student performance, while congress activities, multimedia content and participation in study clubs have a negative impact. Therefore, it is concluded that the integration of ICT in knowledge management is important to generate motivation and creativity in future professionals, although this must be carefully planned to avoid a negative impact.

**Keywords:** capital, knowledge, management, ICT.

### **Resumo**

Esta pesquisa foi conduzida com o objetivo de criar um modelo eclético com base na gestão do conhecimento não só para identificar atividades relacionadas ao capital humano, capital intelectual, capital relacional e utilização das TIC, mas também para ajudar a aumentar o desempenho acadêmico de estudantes universitários. A metodologia utilizada foi mista, e um questionário validado foi aplicado com um total de 997 alunos. Os resultados obtidos com este instrumento foram capturadas e analisadas para criar um modelo de regressão linear múltipla com o método dos mínimos quadrados. Os resultados indicam que as TIC é a variável que tem o maior impacto positivo sobre o desempenho do aluno, enquanto que as actividades de congressos, conteúdo multimídia e participação em clubes de estudo tem um impacto negativo. Portanto, conclui-se que a integração das TIC na gestão do conhecimento é importante para

gerar motivação e criatividade em futuros profissionais, embora esta deve ser planejada com cuidado para evitar um impacto negativo.

**Palavras-chave:** capital, conhecimento, gestão, TIC.

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## Introduction

For a long time, the word knowledge has been used to refer to all processed and analyzed information that individuals have about a particular topic, which can be obtained not only through theoretical or empirical foundations, but also individually and group (Rincon, 2017). Currently, knowledge is considered as the primary source to promote the creation and generation of competitive advantage and wealth in organizations, which is why it is crucial to be able to compete in international markets (Villegas, Hernández and Salazar, 2017). For this reason, its creation is key to generating the wealth of the present and the future both in organizations and in countries, hence there is a growing interest on the part of multiple researchers to try to determine how knowledge could be managed in the individuals

In principle, the subject of knowledge management began in 1995, when Nonaka and Takeuchi developed a theory to explain the success of Japanese companies. In this theory, the aforementioned authors affirmed that the key to these companies was their abilities and abilities to create knowledge (Nonaka and Takeuchi, 1995). In this sense, Nonaka (2008) -precursor in the documentation and understanding of the generation of knowledge- considered that this is created through the conversion of explicit knowledge and tacit knowledge. The first was conceived as one that can be easily expressed in written or oral form in a given context (Nonaka, Toyama and Konno, 2000), while the second is more difficult to express, since it comes from personal experiences, values and ideals. (Bratianu, 2016).

From these theories of knowledge types, Nonaka and his colleagues developed the first knowledge generation model, which has become one of the best known in recent years (Bratianu, 2016). This model is recognized by the acronym SECI, initials of each of the processes of knowledge conversion (socialization, externalization, combination and internalization) (Nonaka et al., 2000). Likewise, in the generation of knowledge and its

conversion there are four elements that contribute significantly to those processes: intellectual, human, structural and relational capital (Díaz and Millán, 2013).

Given the above, the objective of this research is to develop an eclectic model to identify the activities related to the different types of capital (human, intellectual, structural and relational), as well as the use of information and communication technologies (ICT). to help increase the academic performance (average) of the students. This is to identify those activities that can be fostered in the teaching and learning process within the context of knowledge management.

### **Intellectual, structural, human and relational capital**

From a more classical perspective and not so focused on the organizational field, intellectual capital takes a new slope with Edvinsson and Malone, (1997), who describe it as the knowledge acquired and applied that serves not only for technological development, dealing with suppliers and professional skills, but also to generate competitive advantages. In this sense, within organizations it is very important to develop commitment and loyalty on the part of workers to generate intellectual capital in them. This means that an important part for the generation of intellectual capital in workers is training, which offers the possibility of acquiring skills to develop, innovate and create through different technologies or models (Díaz, Ramos and Heredia, 2015) , what can be transferred to the educational field to try better the academic performance of the students.

Now, within the intellectual capital is the structural capital (Archibold and Escobar, 2015, Villegas et al., 2017), which is made up of four subtypes: 1) idiosyncratic structural capital (differentiating part of the organization with respect to others similar), 2) residual structural capital (knowledge produced as a result of the activities carried out), 3) essential structural capital (knowledge generated by the company and transmitted to the entities related to it, such as suppliers, analysts, among others) and 4) generic structural capital (knowledge generated by the company that is disseminated in international markets, such as the Kaizen or Toyota philosophy).

In a general scenario, structural capital refers to that type of knowledge that is created within organizations and remains in them as time passes; that is, it arises from the repetition of actions or routines, and is owned by the company (Pinzón, 2015). In the same way, structural

capital can be seen as knowledge that originates from experience in some process (eg, procedures manuals, strategies, rules and norms of the organization).

Analyzing both structural capital and intellectual capital, we can say that both take into account for their activities human capital, which can be defined as the knowledge derived from the professional skills of a person (their training and academic degrees). This is of vital importance for the economic growth of entities and organizations, which is why it is essential to invest in it (Schultz, 1961). An example of this is Germany, a country where it is considered an infallible ingredient for economic development at a national and individual level (Mahmood, 2016). In fact, one of the causes that has generated the accelerated economic growth of China is in the investment in its human capital (Li, Loyalka, Rozelle y Wu, 2017).

Although human and structural capital is an important part of intellectual capital, it also involves relational capital within its operation and generation, which refers to knowledge produced through relationships. Relational capital, therefore, has to do with all those knowledge, skills, processes, among others, learned by the organization, but whose main source is an external agent (Delgado, Martín de Castro, Navas and Cruz, 2011). This means that innovation capacities and commitment can be improved if the relational capital of organizations is optimized (Sulistyo and Siyamtinah, 2016). For this reason, this capital has captured the attention of researchers in the marketing area, as there is evidence on how it can influence the purchase intentions of customers (Chen, Huang and Davison, 2017).

In conclusion, we could say that intellectual capital and its components are essential for the generation of adequate knowledge and competitive advantages, although it should also be noted that this does not guarantee success within organizations if you do not work in the correct management of knowledge generated in any organization, be it business or educational.

### **ICT as a pillar of knowledge creation**

In the creation or management of knowledge, there are authors who affirm that capital related to ICTs is also fundamental for training human resources. In this regard, the need to include innovative alternatives in the teaching processes that encourage dynamism in the teaching process of current and future professionals is recognized at various levels. In this context, ICTs play a fundamental role, since they provide students with a fun and interactive way of applying and obtaining knowledge (Gaviria, Arango and Valencia, 2015).

Indeed, advances in technology have changed the teaching activities and the ways of carrying out activities in different processes of knowledge generation (Güney, 2014), as has been happening with the massive open online courses, which offer new alternatives to train without the need to attend an educational institution in person (Kwak, 2015).

However, although ICT can be very useful at present, it must be very clear what kind of knowledge is to be generated and which techniques and procedures are the most appropriate and effective to achieve the proposed goals (Gaviria et al., 2015 ), because in this way it is easier to maintain the levels of motivation in the participants. Even so, it is a fact that ICT are particularly useful for the exchange of information (Priyono, 2016), so they offer many possibilities to be included in management processes and even knowledge innovation (Soto y Cegarra, 2016).

ICT, in a few words, are invaluable tools for those who use them correctly, which is why they should be considered in the management of knowledge in institutions that train human resources, the basic objective of this research.

### **The generation of knowledge in universities**

The university is one of the institutions that must dedicate the greatest effort to the subject of knowledge management, since it is the space where professionals are trained to be integrated into the workforce (Petrova, Smokotin, Kornienko, Ershova and Kachalov, 2015). Even so, there are study houses that are not familiar with this concept (Demchig, 2015), although others have applied it to boost the self-criteria, personality and character of the students (Ardashkin and Popova, 2015). In a changing world where the demands are increasingly higher, knowledge management is a key factor in higher education institutions, because through this you can optimize resources, maximize results, make better use of technology, satisfy with greater precision the demands of society and, consequently, generate added value.

However, although the importance of knowledge and its strategic significance in organizations is widely accepted, there is no general application model because knowledge (1) is considered an intangible construction, created in the minds of people, that it is based on human factors such as intuitions, beliefs, culture and experiences, 2) it has a specific meaning only in a specific context and 3) it is an intangible asset that can not be directly managed.

Therefore, it is very important to evaluate the use of activities that affect the exchange of knowledge in the institutional processes in order to improve them, which justifies the model created in this research, which aims to analyze not only the learning capacity of students of higher education through the use of ICT, but also that of higher education institutions to transmit, generate, apply and use knowledge through internal processes.

## Materials and methods

The present investigation had a mixed methodological support and was carried out in Mexico City, specifically in the Interdisciplinary Professional Unit of Engineering and Social and Administrative Sciences of the National Polytechnic Institute. As an assessment instrument, a questionnaire of 31 questions was applied (24 open questions and 7 multiple choice questions, as well as general information). Each of the questions was related to the variables of human capital (CH), structural capital (CE), relational capital (CR) and the use of ICT with academic achievement. The questionnaire was applied randomly to a sample of 997 students, from a population of 11,939 students in the undergraduate programs of the five study programs of that university. Subsequently, with the data that was obtained, a model was made to see the behavior of the data.

## Model

With the data of the questionnaire a model was elaborated through a multiple linear regression, for which the method of ordinary least squares was used. Likewise, the MCO procedure of SAS software (SAS Institute Inc, 2002) version 9.0 was used. Likewise, an analysis based on the p-value statistic was performed, which interprets the probability of rejection of a hypothesis compared to the level of significance  $\alpha$  ( $\alpha = 0.05$  was used). The steps to develop the model are shown below.

- *Choice of variables.* To find the variables that influence the improvement of academic performance in relation to the activities of human capital, structural capital, relational capital and use of ICT, a correlation matrix was used with the purpose of establishing an approximation on the determination of the exogenous variables.

- *Regression analysis.* The value of the estimation parameters ( $R^2$ ) and the adjusted determination coefficient ( $Ra^2$ ) were established, as well as the standard error of the estimation and the contribution of each variable in the model.
- *Assumptions about the error.* The basic assumptions were validated: normality, mean equal to zero and homoscedasticity.

Considering the academic performance function measured as the general average of the student, equation 1 was developed, in which the variables that affect the average are shown (figure 1).

$$Y = F(B, MR, CR, CRS, T, DI, V, A, T, GA, DB, GD, D, VT, E, PP, T, O) \quad (1)$$

Where:

Y: Academic performance measured as the general average of the student.

B: Receipt of some financial support (scholarship).

MR: Failed subjects.

CR: Attendance at courses.

CRS: Attendance at conferences (CH).

T: Thesis consultation (CE).

DI: Informative documents (CE).

V: Videos (CE).

A: Associations (CR).

T: Use of tablets (TIC).

GA: Use of Google Scholar (TIC).

DB: Use of Dropbox (TIC).

GD: Use of Google Drive (TIC).

D: Development of digital audio (TIC).

VT: Use of video tutorials (TIC).

E: Use of real-time surveys (ICT).

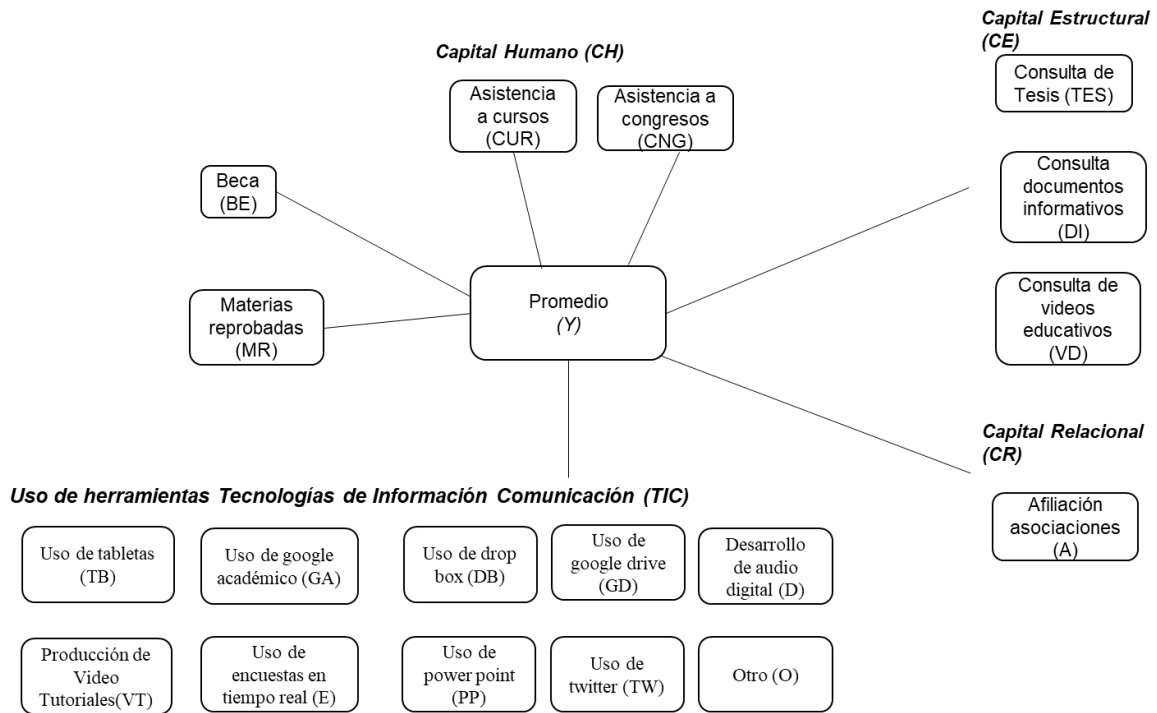
PP: Use of Power Point (TIC).

T: Use of Twitter (TIC).

O: another (TIC).



**Figura 1.** Representación de variables agrupadas por CH, CE, CR y TIC



Fuente: Elaboración propia

On the other hand, Table 1 describes the type of capital to which this variable belongs and its relation to academic performance.

**Tabla 1.** Descripción de variables del modelo

Variable	Descripción	Tipo y relación
<b>Y</b>	Promedio de las materias cursadas.	Endógena: Variable principal que se relaciona con el CH, CE, CR, TIC, así como becas y materias reprobadas.
<b>B</b>	Beca-apoyo económico para manutención.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera elemento de motivación para mejorarlo.
<b>MR</b>	Materias con calificación menor o igual a 5.	Exógena: Se relaciona con la variable <i>promedio</i> por disminuirlo al tener una o más materias reprobadas.
<b>CR</b>	Asistencia a cursos extracurriculares.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que la asistencia a cursos se considera una acción formativa que mejora el conocimiento a través de la capacitación del CH.
<b>CRS</b>	Asistencia a congresos relacionados con las actividades académicas de investigación.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que la asistencia a congresos se considera una acción formativa que mejora el conocimiento a través de la capacitación del CH.
<b>T</b>	Consulta semanal de tesis para elaboración de trabajos académicos.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera un sistema de información que almacena conocimiento para consulta y se considera parte del <i>stock</i> institucional y está dentro del CE.
<b>DI</b>	Consulta semanal de documentos informativos, como boletines, revistas de divulgación, entre otros.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera un elemento base de consulta, que almacena información y forma parte del <i>stock</i> institucional y del CE.
<b>V</b>	Consulta semanal de videos educativos.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera conocimiento codificado y de consulta a través de un sistema de información de gestión, innovación y desarrollo. Se considera como CE.
<b>A</b>	Afiliación en asociaciones de carácter académico para fortalecer actividades educativas.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera un elemento intangible que fortalece las relaciones a partir de las interacciones más allá de los límites de la institución. Se considera como CR.
<b>T</b>	Uso de tabletas electrónicas.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera una herramienta que facilita el uso de la información para fines académicos; asimismo es TIC.
<b>GA</b>	Uso de Google Académico para actividades escolares.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera una herramienta que facilita el acceso a la literatura académica, como artículos, tesis, libros, publicaciones académicas; asimismo es TIC.
<b>DB</b>	Uso de Dropbox como herramienta de almacenamiento.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera una herramienta que sirve para el almacenamiento de información y facilita su organización y consulta; asimismo es TIC.
<b>GD</b>	Uso de Google Drive como herramienta de almacenamiento.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que se considera una herramienta que sirve para el almacenamiento de información y facilita su organización y consulta; asimismo es TIC.

<b>D</b>	Producción de audio digital educativo mediante el uso de herramientas TIC.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que a través de la elaboración de material propio se consolida el conocimiento adquirido previamente; asimismo es TIC.
<b>VT</b>	Producción de videotutoriales educativos mediante el uso de herramientas TIC.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que a través de la elaboración de material propio se consolida y transfiere el conocimiento adquirido previamente; asimismo es TIC.
<b>E</b>	Uso de herramientas TIC para facilitar la obtención y transferencia de conocimiento mediante encuestas en tiempo real.	Exógena: Se relaciona con la variable <i>promedio</i> , para obtener información de fuentes externas y realizar un muestreo con encuestas en tiempo real; asimismo es TIC.
<b>PP</b>	Uso de herramientas TIC para facilitar la obtención y transferencia de conocimiento mediante presentaciones.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que a través de la elaboración de material propio se consolida y transfiere el conocimiento con presentaciones; asimismo es TIC.
<b>T</b>	Twitter es una red social en línea que permite a los usuarios enviar y leer mensajes cortos de 140 caracteres.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que permite la colaboración y comunicación de alumnos y profesores para la elaboración de proyectos que permiten obtener, transferir, producir y aplicar conocimiento adquirido en aula a través del Twitter; asimismo es TIC.
<b>O</b>	Otros espacios de comunicación y colaboración en línea.	Exógena: Se relaciona con la variable <i>promedio</i> , ya que permite la colaboración y comunicación de alumnos y profesores para la elaboración de proyectos que permiten obtener, transferir, producir y aplicar conocimiento adquirido en aula a través del uso de las TIC; asimismo es TIC.
<b>u<sub>1</sub></b>	Error de estimación	

Fuente: Elaboración propia

Also, in equation 2 the proposed model for the analysis is shown.

$$Y = \beta_0 + \beta_1 B + \beta_2 MR + \beta_3 CR + \beta_4 CRS + \beta_5 T + \beta_6 DI + \beta_7 V + \beta_8 A + \beta_9 T + \beta_{10} GA + \beta_{11} DB + \beta_{12} GD + \beta_{13} D + \beta_{14} VT + \beta_{15} E + \beta_{16} PP + \beta_{17} T + \beta_{18} O + u_1 \quad (2)$$

## Results

As a result of this research, a model was developed in which the activities of human capital, structural capital, relational capital and the use of ICTs that should be considered in a higher education institution to improve the internal process of knowledge generation were detected. and have a positive impact on academic achievement (average). Once the variables with the highest incidence in the average were determined, the coefficients of determination and the standard error of the estimate were obtained, as well as the values t and p (table 2).

**Tabla 1.** Estimadores del modelo

Variable dependiente: P (promedio)

<i>Parámetro</i>	<i>Coefficiente de determinación</i>	<i>Error Estándar</i>	<i>T</i>	<i>Valor -p</i>
Const	8.079	0.046	172.939	<0.0001
Beca (B)	0.235	0.042	5.542	<0.0001
Materias reprobadas (MR)	-0.271	0.021	-12.544	<0.0001
Cursos (CR) <i>CH</i>	0.023	0.011	2.110	0.0351
Congresos (CRS) <i>CH</i>	-0.040	0.017	-2.284	0.0225
Tesis (T) <i>CE</i>	0.020	0.008	2.247	0.0248
Documentos informativos (DI) <i>CE</i>	0.008	0.003	2.611	0.0091
Videos educativos (V) <i>CE</i>	-0.008	0.003	-2.917	0.0036
Asociaciones (A) <i>CR</i>	-0.024	0.011	-2.031	0.0425
Tableta (T) <i>TIC</i>	-0.033	0.016	-2.103	0.0357
Google Académico (GA) <i>TIC</i>	0.108	0.040	2.648	0.0082
Dropbox (DB) <i>TIC</i>	-0.090	0.039	-2.301	0.0216
Google Drive (GD) <i>TIC</i>	-0.087	0.040	-2.160	0.0309
Audio digital (D) <i>TIC</i>	-0.102	0.057	-1.795	0.073
Videotutoriales (VT) <i>TIC</i>	0.118	0.062	1.888	0.0592
Encuestas tiempo real (E) <i>TIC</i>	0.156	0.062	2.503	0.0125
Power Point (PP) <i>TIC</i>	0.133	0.044	2.985	0.0029
Twitter (T) <i>TIC</i>	-0.089	0.049	-1.795	0.0729
Otro (O) <i>TIC</i>	0.156	0.066	2.362	0.0184

R<sup>2</sup>: 75.79%    R<sub>a</sub><sup>2</sup>: 74.43%;    Error estándar de la estimación: 0.068;  
F: 274.34 <0.0001

Fuente: Elaboración propia con base en los datos obtenidos del análisis

The model proposed in equation 2, where the general specification is established to estimate the regression parameters to calculate the intercept and the exogenous variables (as shown in the values -p in Table 2), allows to establish the estimation of the model, as defined in equation 3.

$$Y = 8.079 + 0.235B - 0.271MR + 0.023CR - 0.040CRS + 0.020T + 0.008DI - 0.008V - 0.024A - 0.033T + 0.108GA - 0.090DB - 0.087GD - 0.102D + 0.118VT + 0.156E + 0.133PP - 0.089T + 0.156O \quad (3)$$

The model based on various theoretical contributions serves to analyze the impact of the activities of human capital, structural capital, relational capital and use of ICT in the academic performance of students (average). In this sense, it is observed that the courses are the human capital activities that have a positive effect, while the attendance to congresses has a negative effect. The possible cause of the latter may be that the congresses require the student not only willingness and openness to learn, but also a large investment of time, which can cause school activities to be neglected and, therefore, cause a decrease in school attendance. general average.

With regard to structural capital, the activities that have the greatest impact are the consultation of theses and informative documents. The consultation of educational videos has a negative effect, probably due to the fact that students may have difficulty identifying the content and quality of the videos. This could cause that the consultation of the material is not aligned with the current needs of higher education, which is to the detriment of the general average.

Regarding relational capital activities, the participation of students in associations or clubs has a negative impact. Likewise, in current relations, the exchange of communication or information is not being generated to strengthen the creation, transfer and application of knowledge in the school environment.

Finally, it is observed that in this model the use of ICT has the most positive impact, so it is suggested to promote the use of tools such as Google Scholar, videotutorials, real-time surveys, Power Point and other online collaboration spaces . However, as regards the use of tablets, Dropbox, Google Drive and the production of digital audio, a negative impact is evidenced, so it is recommended to develop educational content that can be viewed through these tools. This will avoid confusing the recreational use of these resources with academic use.

## Discussion

As already mentioned, in this study the variables of the SECI model proposed by Nonaka have been combined, since, as Diaz and Millán (2013) emphasize, in all organizations the diverse elements that interact in the conversion of knowledge are of vital importance. In addition, the proposed model includes all the members of the intellectual capital (Archibold and Escobar, 2015).

In this sense, it is of great importance that the activities that make up the intellectual capital and the generation of knowledge be reinforced, since, as Villegas et al. (2017), knowledge is the primary axis to produce creative and innovative ideas that help solve personal and organizational problems. For this reason, and as Nonaka and Takeuchi (1995) state, the success of this process will lie in the competencies that organizations (including universities) can develop to generate knowledge. This implies that efforts must be made to know how this objective can be promoted inside the enclosures. Also, create written and digital materials to facilitate the understanding of this process, so that solutions can be provided for the problems detected.

The results, on the other hand, show that human capital activities have a negative effect on student performance, which is why it is confirmed, in a quantitative manner, that for training and acquiring the skills indicated by Díaz et al. to the. (2015) it is necessary to integrate technologies or models that serve as motivators in the generation of knowledge.

However, addressing the issue of ICT, these have a positive impact on the academic performance of the students surveyed, which is confirmed quantitatively the assertions of Gaviria et al. (2015) about the use of these resources to create striking and effective environments in favor of the generation of knowledge. This means that universities must invest in these types of strategies to exploit the benefits offered by ICTs to the maximum (Güney, 2014). Likewise, it should be noted that while in this model ICTs are useful for sharing knowledge (Priyono, 2016), it must also be foreseen that the materials are appropriate and effective for the required processes (Gaviria et al., 2015).

In summary, it can be highlighted that the importance of this research (unlike others in which only statements based on theoretical discussions are presented) lies in the fact that the

variables have been studied in a quantitative way to try to provide pertinent solutions about some of the most obvious needs of student communities in Mexico City. This, however, also means that one of the limitations of this work is the restrictive scope of the results, so that subsequent studies involving the same variables must be carried out, but in a broader context.

## Conclusions

In conclusion, it can be indicated that the integrating activities of intellectual capital that have the most impact on the academic performance of students are those corresponding to technological capital or the use of ICT. Consequently, proposals should be created that encourage the use of different technological resources in higher education and a wider variety of referential resources (in addition to Google Scholar) such as Emerald, Knowledge Board, RCAAP, Bireme and Scielo.

Regarding structural capital, it is suggested to improve the design of educational videos so that these generate commitment in the student with their learning. Also, it is proposed to specify a new research that focuses on these contents to improve them from the inclusion of the needs of students.

In relation to the negative impact generated by relational capital (affiliation in associations), this can be attended through seminars for the correct transmission of knowledge. In this way, the deficiencies of this variable can be reduced, which is essential to generate tacit knowledge.

Finally, the importance that underlies the management of knowledge within the educational training centers must be stressed, since it is in these spaces that the specialists of all the disciplines are forging. In this sense, universities should usually carry out studies of this nature not only to detect faults, but mainly to try to solve them.

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