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Estudio evaluativo de las competencias genéricas en las licenciaturas de comercio y administración de modalidad virtual del IPN

Assessment Study of Generic Competences in the Virtual Modality Degrees of Commerce and Administration of the IPN

Estudo avaliativo das competências genéricas nos graus de comércio e administração da modalidade virtual do IPN

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Resumen

El objetivo de esta investigación fue evaluar las competencias genéricas del alumnado de la modalidad en línea del Instituto Politécnico Nacional, particularmente del área de comercio y administración. La metodología que se utilizó fue una de tipo cuantitativa con un alcance descriptivo. Y el instrumento al que se recurrió para obtener la información fue un cuestionario basado en una escala Likert. La muestra estuvo constituida por estudiantes inscritos en las licenciaturas en Administración y Desarrollo Empresarial, Contador Público, Negocios Internacionales, Relaciones Comerciales y Comercio Internacional; todas ellas ofrecidas por la Escuela Superior de Comercio y Administración, Unidad Santo Tomás, de las institución ya mencionada. La distribución muestral con respecto al género fue de 82 % de mujeres y el porcentaje

restante de hombres (18 %). Para organizar y analizar la información se utilizó la estadística descriptiva e inferencial.

Los principales resultados fueron que el estudiantado presenta un nivel de dominio de insuficiente a moderado para las competencias genéricas de tipo instrumental, interpersonal y sistémico. También se hallaron diferencias estadísticas significativas por género, edad, experiencia laboral y nivel académico.

Palabras clave: competencias genéricas, estudiantado, evaluación, nivel de dominio.

Abstract

The objective of the research was to assess the generic competences of students in higher education in the online modality of the National Polytechnic Institute in the area of commerce and administration. The type of study that was used was a quantitative methodology with a descriptive scope. The instrument that was used to obtain the information was a questionnaire based on a Likert scale. The sample of the study was constituted by the student enrolled in the bachelor's degrees in Business Administration and Development, Public Accountant, International Business, Commercial Relations, International Trade offered by the Higher School of Commerce and Administration, Santo Tomas Unit. The sample distribution with respect to gender was 82% of women and the remaining 18% of men. To organize and analyze the information, descriptive and inferential statistics were used.

The main results were that the student has a level of proficiency from insufficient to moderate for the generic competences of instrumental, interpersonal and systemic type. Also, significant statistical differences were found by gender, age, work experience and academic level.

Keywords: generic competences, student, evaluation, level of mastery.

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Resumo

O objetivo desta investigação foi avaliar as competências genéricas dos alunos da modalidade on-line do Instituto Politécnico Nacional, particularmente na área de comércio e administração. A metodologia utilizada foi quantitativa, com escopo descritivo. E o instrumento utilizado para obter as informações foi um questionário baseado em uma escala Likert. A amostra foi composta por alunos matriculados nos cursos de Bacharel em Administração e Desenvolvimento, Contador Público, Negócios Internacionais, Relações Comerciais e Comércio Exterior; tudo oferecido pela Escola Superior de Comércio e Administração, Unidade Santo Tomás, da referida instituição. A distribuição da amostra em relação ao gênero foi de 82% das mulheres e a porcentagem restante de homens (18%). Para organizar e analisar as informações, foram utilizadas estatísticas descritivas e inferenciais.

Os principais resultados foram que o aluno possui um nível de proficiência de insuficiente a moderado para as habilidades genéricas do tipo instrumental, interpessoal e sistêmico. Diferenças estatisticamente significativas também foram encontradas por gênero, idade, experiência de trabalho e nível acadêmico.

Palavras-chave: competências genéricas, corpo discente, avaliação, nível de proficiência.

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Introduction

The United Nations Educational, Scientific and Cultural Organization [Unesco] (2009), the International Labor Organization [ILO] (2008) and the Organization for Economic Cooperation and Development [OECD] (2000), among other international organizations, they have postulated education as a strategic development factor. Consequently, countries around the world have implemented a series of policies aimed at consolidating it through a competency-based approach. As confirmed by Ehrlich, Li and Liu (2017), investment in human capital boosts endogenous growth by generating constant increases in production, greater efficiency in productive chains, a maximization in the value chain and higher achievements in the organizations

Taking into account the above, higher education institutions from various latitudes undertook a curricular revision process to contribute to the training of autonomous professionals with a critical, reflective and analytical capacity that allows them to take advantage of, discriminate and process the available information (Coronado and Estévez, 2016, Akareem and Hossain, 2012, Vázquez, 2009, León, 2004). Thus, the competency-based approach aims to tune the higher education programs with the needs of the environment, the national productive sector and international insertion from a holistic and integral view of the educational process, which, it should be noted , implies a change in the traditional roles of teachers and students, as well as the need to promote social relevance in the training of professionals (Camperos, 2007). According to the OECD (2012):

> Competencies transform lives and boost economies. Without the right skills, people remain on the margins of society, technological progress does not translate into economic growth and countries can not compete in the economies or increase their participation in the generation of knowledge in society (p. 10).

In this way, being competent includes knowing, knowing how to do, knowing how to be and knowing how to be, all variables involved in professional practice (Le Boterf, 2010, Grossmana, Hammerness and McDonald, 2009). Likewise, this concept, that of competence, refers to a "set of knowledge, procedures and attitudes combined, coordinated and integrated in the professional practice, definable in action, where experience is shown as unavoidable and context is key" (Tejada and Ruiz, 2016, p.3).

And to achieve its application, it is necessary that the development of the higher education system, both in face-to-face and online, encourage the generation of human capital based on the design of learning environments oriented towards the following: a) an authentic situation as a source of specification of the competences; b) the student as protagonist and agent of the action; c) the promotion of competition for action and resources; d) the community that fosters collaboration with other students and members of the same, and e) the authentic evaluation to feedback in training and to have an assessment of their performance (Littlewood, 2011, McGaghie, Issenberg, Ros and Conesa, 2013).

In addition, the World Bank (2003) established the relevance of having information and communication technologies (ICT) that are adequate, up-to-date and functioning correctly, since they have the potential to streamline and reduce the activities of institutions; expand access and improve educational quality and significantly increase access to information and databases not only nationally but globally. Similarly, Echeverría (2002) mentioned that ICT generate a new social space and, therefore, a new educational space - known as virtual education -; a type of modality that represents an alternative for an important group of students, since it allows them to combine their work and family activity with their training.

It should be noted that among the main causes that originated this educational modality are the distance from the higher education centers and the limited availability of time of the students, as well as the attention to those who have some type of disability that prevents them from accessing the option face-to-face (Silvio, 2006; Bourne and Moore, 2003).

In this sense, the World Conference on Higher Education of Unesco (2009) established that "the growing demand for higher education can not be satisfied only with the traditional activities of classroom teaching. It will be necessary to use other strategies, such as open and distance learning "(p.7). Therefore, from the perspective of the offer of higher education, the incorporation of ICT has generated competitive advantages in the provision of online educational services at the undergraduate and graduate levels. Based on Simmonson, Smaldino, Albright y Zvacek (2006):

> Virtual education is one that is based on formal education institutions, where the learning group is separated and has interactive telecommunications systems that are used to create the connection between students, resources and the teaching staff. (p. 32).

Also, the characteristics of this educational context, add the conditions of the student population, which requires individualized attention, interesting, timely and flexible (Nieves, Otero and Molerio, 2007). Said population, by its experience in a globalized world and mediated by technologies, has ways of being and learning that go beyond the transmission of knowledge through a master class or another traditional educational strategy mediated by a digital tool (Rubio , 2003; Correa, 2004; Campos, 2009). Thus, the virtual modality promotes cooperation between people and the creation of online communities (Kollányi, Molnár and Székely, 2007).

Regarding its classification, the Tuning-Latin America project 2004-2006 (2007) divided the generic and specific competences. The first are defined as shared attributes by a set of

professions in common and that are developed by various disciplines: they are related to the behaviors and attitudes at work in various areas of working life and its relevance is because they are transferable and necessary for the employment and life as a responsible citizen, regardless of the discipline of training. Consequently, they comprise a wide range of combinations of knowledge and doing, knowledge, skills and attitudes, which allow an effective and efficient exercise in any profession (Baños and Pérez, 2005).

While the second, the specific competences, are linked to the series of knowledge and attitudes of each profession in particular. In this regard, the Tuning-Latin America project (2007) classifies them as instrumental, interpersonal and systemic. The first focus on the development of basic techniques and procedures for the performance of work activity. The second ones focus on favoring the processes of social interaction and cooperation, so they are linked to the willingness to work, organization, coordination, adaptation and intervention. The third ones are related to the skills and abilities that, together, allow the application of knowledge in working life. These are the main competencies that any professional requires to develop in higher education because they constitute the set of skills, skills and attitudes that will allow you to interact in the workplace.

It should be noted that there are several previous studies conducted on this subject. Among them is the one carried out by Brenzini and Martínez (2012), who determined the low presence of generic competences in the profile of civil engineers in terms of the ability to analyze and organize, as well as in terms of skills for the management of ICT, problem solving and decision making, as well as knowledge of a second language. In as much, Farías and Firinguetti (2012) found that, of the systemic competitions, the management of project is most valued; in the interpersonal, the treatment of conflicts and negotiation; in terms of instruments, analysis and synthesis capacity. On the contrary, the least valued were the ability to communicate in a second language, the ability to work in international contexts and the commitment to the preservation of the environment.

Durán y Estay (2012), For their part, they found that the most developed generic competences in a scale of assessment from zero to five were the following: the ability to apply knowledge in practice, the skills in the use of ICT, the research capacity, the ability to to pose and solve problems, the ability to work autonomously and the capacity for criticism and self-criticism (all with a rating of five). While the capacity for abstraction, analysis and synthesis and the skills to search, process and analyze information from different sources, as well as the ability to motivate

and lead towards common goals, had a level of four in the student of the virtual modality. The least valued were the ability to work as a team with an achievement level of three.

In addition, in the research of Cabero, Llorente and Puentes (2010) it was identified that 84% of the students showed a high level of satisfaction for taking the degree in the online modality. This is because the findings on the characteristics of the subject had, on a rating scale ranging from one (totally disagree) to four (totally agree), an average of 3.15; the role of the online tutor reached, on the other hand, an average of 3.25; the development of contents, 3.04; online communication, 2.95, and platform management, 3.16.

On the other hand, Medina, Amado and Brito (2010) determined that the most important generic competences were knowledge about the area of studies and the profession, skills in the use of ICT, the ability to make decisions, interpersonal skills, the ability to motivate and lead towards common goals, the ability to formulate and manage projects, the commitment to quality and initiative and the entrepreneurial spirit; all of them distributed evenly among the three types of generic competences. Thus, worldwide, there is interest in the study of the levels of development of generic skills as a component of educational quality, so it is necessary to assess their development in the online mode to obtain relevant information for the purpose to design intervention strategies that consolidate the processes of selection, performance evaluation, professional development, equipment and management both academic and administrative in the institution that provides this type of educational offer (Denis, Watland, Pirotte and Verday, 2004).

Finally, Lindblom, Ylanne, Pihlajamäki and Kotkas (2006) and Kearney (2013) pointed out that the implementation of both competences in higher education is a still incipient reality, and that the participation of the students is an indispensable condition to encourage reflection on the learning processes and results that allow to identify the level of achievement of the acquired competences.

Taking into account everything mentioned so far, for this research it was considered to take the National Polytechnic Institute (IPN) as an object of study because it is an organization that offers the following academic programs in the virtual modality: Administration and Business Development, Accountant Public, International Business, Commercial Relations and International Trade.

The purpose of the study

Evaluate, from the students' perception, the levels of development of generic competences in higher education in the online modality of the IPN in the area of commerce and administration.

Method

Type of study

The type of methodology used was one of a quantitative approach and with a descriptive scope. This is because, as already established, the goal was to evaluate the development of the generic competences acquired in the training process at the virtual degree level (Hernández, Fernández and Baptista, 2010).

Participants

The study population was integrated by the students of the five virtual modality degree programs taught by the IPN. To find the optimal size of the sample, the procedure recommended by Martínez (2012), as well as by Münch and Ángeles (2007) was used, based on the following conditions: a population of 3184 people, a probability of success of 0.5 (p.) and a confidence level of 95%. Therefore, a representative sample of 343 students was obtained. Subsequently, a stratified sampling was carried out to determine the number of participants in each degree program (see table 1).

Tabla 1. Muestra del estudio

Licenciatura	Estudiantes	Muestra estratificada	Porcentaje
Administración y Desarrollo Empresarial (ADE)	124	13	4 %
Contador Público (CP)	594	64	19 %
Negocios Internacionales (NI)	951	103	30 %
Relaciones Comerciales (RC)	661	71	20 %
Comercio Internacional (CI)	854	92	27 %
Total	3184	343	100 %

Fuente: Elaboración propia

Instrument

To collect the study data on generic competences developed, a questionnaire based on the Likert scale was used. And for its design the contributions of Medina et al. (2010), Farías and Firinguetti (2012), Durán and Estay (2012), as well as the Tuning-Latin America project itself (2007). The reagents of this questionnaire were organized according to the following sections: 1) Contextual data: General characteristics related to the profile of the students and 2) Levels of evaluation of the generic competences: Set of competences classified in instrumental, interpersonal and systemic developed in the bachelor's degree. Once the instrument was constructed in its initial version, the expert judgment technique was used to verify the content validity: six researchers with a high degree of knowledge about this topic were selected, who analyzed the items in terms of clarity, congruence and bias in order to "study the accuracy with which significant and appropriate measures can be made with an instrument, and in the sense that the trait to be measured is actually measured" (Ruíz, 1998, p.73).

Based on this information, the necessary modifications were made and the final version of the questionnaire was prepared. Subsequently, the Cronbach's alpha coefficient was calculated to measure the reliability of the scale for each dimension; in this regard, it was found that for instrumental type was 0.824, interpersonal was 0.843 and systemic was 0.872, with a total value of 0.846, values that are interpreted as a suitable internal consistency for the instrument (Cea, 1999).

Likewise, the Kaiser-Meyer-Olkin index (KMO) and the Bartlett sphericity test were calculated. For the first, a value of 0.923 was obtained, which indicates an excellent sample adequacy; while for the second, a value of $p < 0.05$ was obtained, which means that it is sufficiently adequate to develop a factorial analysis. Finally, the eigenvalues were determined, which explained 76.45% of the total variance, so it is true that the instrument in the study has a one-dimensionality (Burga, 2006).

Analysis of data

According to Stevens (2001), an evaluation scale was used to measure the characteristics of generic competences, through the assignment of numbers or values: each of the items had five response options that went from zero (no developed) to four (very developed).

Once the field work was carried out, the information collected through the SPSS program was organized in order to carry out both the descriptive and inferential analysis and, thus, determine the influence of the variables of gender, age and program, applying evidence of comparison of means based on the t-Student test and the analysis of variance (Anova), respectively.

Subsequently, the interpretation of the results obtained was carried out through the following evaluation scale: From 0.00 to 1.00 a level of undeveloped competence was considered; from 1.10 to 2.00 as an insufficient level of development; from 2.10 to 3.00 as a level of regular or moderate development, and from 3.10 to 4.00 as a consolidated level of development.

Results

Contextual results of the sample

The gender of the sample was distributed in 82% women and 18% men, that is, a higher participation of the female sex in the research. With regard to age, it was identified that 25% of the respondents are between 25 and 29 years old; 46% is in the range of 30 to 34 years; 26% from 35 to 39 years, and the remaining percentage (3%) is in the highest age range, namely, from 40 to 44 years.

Regarding the work experience of the participants, it was found that 14% have from 0 to 4 years; 34% from 5 to 9 years old; 35% from 10 to 14 years old; 8% from 15 to 19 years old, and 9% from 20 to 24 years old. Regarding the academic level in which the students are, it was

determined that 28% are in the first year of studies; 36%, the second; 25%, the third and 11% are in the fourth year of studies.

In addition, it was identified that the main reason that motivated the respondents to complete their undergraduate studies was to strengthen their job performance (72%); and to a lesser extent to obtain a job promotion in the organization (23%) and to have better job opportunities (5%). It was also found that 70% of the participants decided to pursue the degree in virtual mode for the workload they have; 20% for the distance to attend the school and 10% to attend personal matters.

With regard to satisfaction with the educational service they have received in their professional training at a higher level, it was found that 49% of the students consider that they have been given an adequate preparation for their work development; 34% that has enabled them to expand their employment opportunities and 17% that has allowed them to achieve a personal goal when they complete their undergraduate studies.

Results on generic competences

The results on the evaluation of generic instrumental competences are concentrated in table 2.

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Tabla 2. Competencias instrumentales del estudiantado

Competencia genérica	Dimensiones	Media					
		General	ADE	CP	NI	RC	CI
Instrumentales	Capacidad de abstracción, análisis y síntesis	3.29	3.87	3.48	3.11	3.05	2.94
	Capacidad para organizar y planificar el tiempo	3.41	3.81	3.72	3.26	2.75	3.51
	Conocimiento sobre el área de estudio y la profesión	3.55	3.46	3.64	3.51	3.52	3.64
	Capacidad de comunicación oral y escrita	3.14	3.02	3.14	3.34	3.26	2.94
	Capacidad de comunicación en un segundo idioma	1.21	1.08	1.08	1.42	1.11	1.36
	Habilidades en el uso de las tecnologías de la información y de la comunicación (TIC)	3.49	3.62	3.59	3.57	3.43	3.24
	Capacidad para identificar, plantear y resolver problemas	3.11	3.55	3.36	3.28	2.31	3.06
	Capacidad para tomar decisiones	3.24	3.85	3.62	2.72	2.97	3.04
	Capacidad crítica y autocrítica	3.33	3.37	3.54	3.09	3.16	3.49
	Capacidad de trabajo en equipo	2.42	2.29	2.16	2.40	2.54	2.71
	Habilidades interpersonales	2.12	2.26	1.73	2.48	2.08	2.05
	Habilidad para trabajar en contextos internacionales	1.87	1.06	1.15	2.06	1.98	3.10
	Compromiso ético	2.32	2.31	2.47	2.18	2.29	2.35
	Capacidad de aplicar los conocimientos en la práctica	3.42	3.86	3.40	3.15	3.07	3.62
	Media global	2.85	2.96	2.86	2.83	2.68	2.93

Fuente: Elaboración propia

For the first group of generic competences, the results allow establishing that the level of development is from insufficient to consolidated. The least developed competences at the undergraduate level in the online modality are the ability to communicate in a second language and the ability to work in an international context. While the most developed are knowledge about the area of study and profession, as well as the skills in the use of ICT. In global terms, a level of regular development was obtained based on the evaluation scale, where the Bachelor in ADE obtained the highest score, while the Degree in RC was the one with the lowest score. For the second type of generic competences, the findings are concentrated in table 3.

Tabla 3. Competencias interpersonales del estudiantado

Competencia genérica	**Dimensiones**	**Media**					
		General	ADE	CP	NI	RC	CI
Interpersonales	Responsabilidad social y compromiso ciudadano	3.08	3.36	3.04	2.95	3.31	2.74
	Capacidad de investigación	3.12	3.19	3.08	2.94	3.01	3.38
	Capacidad de aprender y actualizarse permanentemente	2.62	2.85	2.75	2.36	2.24	2.90
	Habilidades para buscar, procesar y analizar información procedente de fuentes diversas	3.57	3.64	3.59	3.49	3.36	3.77
	Capacidad para actuar en nuevas situaciones	2.31	2.26	2.25	2.37	2.22	2.45
	Capacidad creativa	2.43	2.39	2.32	2.45	2.49	2.50
	Capacidad de motivar y conducir hacia metas comunes	1.59	1.64	1.60	1.57	1.53	1.61
	Media global	2.67	2.76	2.66	2.59	2.59	2.76

Fuente: Elaboración propia

For the second group of generic competences, it was found that their level of training is considered between insufficient and consolidated. The least developed is the ability to motivate and lead towards common goals, while the most developed are the skills to seek, process and analyze information, research capacity and social responsibility and citizen commitment. In global terms, an average of 2.67 was determined, which means a moderate level of development based on the evaluation scale. And the degrees in ADE and CI were the highest scoring; while the bachelor degrees in NI and RC were the lowest scoring. Regarding the third group of generic competences, the results are displayed in table 4.

Tabla 4. Competencias sistémicas del estudiantado

Competencia genérica	**Dimensiones**	**Media**					
		General	ADE	CP	NI	RC	CI
Sistémicas	Compromiso con la preservación del medio ambiente	3.22	3.41	3.17	3.14	3.09	3.29
	Compromiso con su medio sociocultural	3.06	3.21	3.14	3.05	2.98	2.92
	Valoración y respeto por la diversidad y multiculturalidad	1.88	1.79	1.73	2.09	1.82	1.97
	Habilidad para trabajar en forma autónoma	3.79	3.83	3.77	3.68	3.81	3.86
	Capacidad para formular y gestionar proyectos	3.42	3.51	3.39	3.41	3.32	3.47
	Compromiso con la calidad	3.35	3.42	3.28	3.32	3.36	3.37
	Conocimiento de culturas y costumbres de otros países	1.83	1.56	1.32	2.21	1.64	2.42
	Iniciativa y espíritu emprendedor	3.50	3.68	3.24	3.42	3.57	3.59
	Motivación de logro	3.33	3.38	3.28	3.29	3.34	3.36
	Media global	3.04	3.09	2.92	3.06	2.99	3.14

Fuente: Elaboración propia

From the perception of the students, for this third group of competences it was identified that the least valued generic competences, with an insufficient level, were the knowledge of cultures and customs of other countries, as well as the appreciation and respect for diversity and multiculturalism ; while the most valued were the ability to work autonomously, initiative and entrepreneurial spirit, as well as the ability to formulate and manage projects with a consolidated level. Based on the evaluation scale, an average of 3.04 was found, which corresponds to a consolidated level for this third group of generic competences; the degree in ADE was the one that obtained the highest score and the degree in CP which obtained the lowest score.

Likewise, the research focused on evaluating if there are differences between the variables of gender, age, work experience and academic level, and the results were the following. Differences were found between men and women with respect to their generic competences ($t = 4.325$, $p = 0.00$), so this finding allows to determine that the male gender self-evaluated better than the female gender.

For age, the sample was organized into four groups with a range of five years in order to use the ANOVA means test ($F = 8.234$; $p < 0.05$), meaning that significant differences were found, which implies that the youngest students self-evaluated with a lower score than the older ones.

With respect to work experience, five groups were also organized at five-year intervals to use the Anova test ($F = 6.195$; $p < 0.05$), where there are also significant differences: the most experienced group self-evaluated with the highest score with respect to others. While, for the academic level, the presence of significant differences was determined from this same test ($F = 5.725$, $p < 0.05$), where the first-year student self-evaluated with the lowest score in relation to those of fourth year.

Discussion

For this investigation a similar result was found with the study of Durán and Estay (2012), as well as that of Medina et al. (2010), in terms of the most developed generic competences, namely the ability to apply knowledge in practice, as well as the use of ICT. It was also identified that in both studies the competence on the ability to work was the one that obtained the lowest evaluation by the respondents. Likewise, this study coincides with the finding of Farías and Firinguetti (2012)

regarding generic competences with a lower level of development: the ability to communicate in a second language and the ability to work in international contexts.

In addition to the above, a similar result was obtained with the same work by Farías and Firinguetti (2012) in terms of the greater developed systemic competence, namely the ability to formulate and manage projects. In the same way, another similar result was identified with regard to the satisfaction of studying the studies in virtual modality with that of Cabero et al. (2010): the possibility of alternating their work and personal activities with their formative degree course.

On the other hand, this research differs from the work carried out by Brenzini and Martínez (2012) in terms of ICT management, which was one of the competences with the highest level of development that was determined for the present study. Instead, it coincides with the competence about the knowledge of a second language with an insufficient level of development.

Therefore, this research confirms what was found by Vila, Dávila and Ginés (2010), who determined the strategic role of higher education by evaluating generic competences, as they are considered as fundamental elements for the success of people in their performance professional.

In turn, the relevance of the study was based on the assessment of student achievement levels in the instrumental, interpersonal and systemic components, based on self-assessment as a strategy to develop the capacity for self-criticism, so that virtual education in the IPN has to be strengthened as a learning space to achieve a consolidated development of generic competences by using the various tools based on ICT (Internet, Web 2.0 and social networks). Undoubtedly, the results obtained provide a particular view of the generic competences in this modality of business degrees in the IPN, and allow to identify their levels of achievement. Consequently, it is suggested that other investigations be carried out to corroborate, expand or refute the findings obtained for other virtual higher education programs offered in Mexico.

Conclusions

The main objective of the study was to evaluate the levels of development of the generic competences from the perception of the student of the degrees in commerce and administration of the IPN. As a result of this, valuable information was obtained about the state of the instrumental, interpersonal and systemic types during their training, which allowed us to diagnose, by extension, those that need to be strengthened as areas of opportunity.

The results obtained are far-reaching for the virtual higher education imparted by the IPN, based on the perception of the students, in order to be able to implement and implement training actions aimed at the consolidation of generic competences. Likewise, the data collected is useful because it provides valuable information on the generation of good practices in online mode, since, as mentioned by Cabero and Romero (2010), these practices significantly enhance the social relevance of the institution of higher education and promote an active role in the construction of a sustainable society politically, culturally, environmentally and economically from the achievement of competencies in the student body.

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Rol de Contribución	Autor (es)
Conceptualización	Edgar Oliver (igual) y María Trinidad (igual)
Metodología	Edgar Oliver (igual) y María Trinidad (igual)
Software	Edgar Oliver
Validación	María Trinidad
Análisis Formal	Edgar Oliver (igual) y María Trinidad (igual)
Investigación	Edgar Oliver (igual) y María Trinidad (igual)
Recursos	Edgar Oliver (igual) y María Trinidad (igual)
Curación de datos	Edgar Oliver
Escritura - Preparación del borrador original	Edgar Oliver (igual) y María Trinidad (igual)
Escritura - Revisión y edición	Edgar Oliver (igual) y María Trinidad (igual)
Visualización	Edgar Oliver
Supervisión	María Trinidad
Administración de Proyectos	Edgar Oliver (igual) y María Trinidad (igual)
Adquisición de fondos	Edgar Oliver (igual) y María Trinidad (igual)