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Reliability and Validity of Scale of Studies of the Perception of Internet Use*

Fiabilidad y validez de la escala de estudios de la percepción del uso de Internet

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ABSTRACT

The objective of this work was to establish the reliability and validity of an instrument that measured the perception of Internet use. A non-experimental work was carried out with a non-probabilistic selection of 340 students from a public university in central Mexico. The results show a total percentage of variance explained by two perceptual dimensions that allude to the search and selection of information, although the type of design limited the results to the research scenario, suggesting the inclusion of factors related to the beliefs of use of Internet and the provisions as determinants of intentions and the use of digital networks.

Keywords: Governance, Internet, networks, technologies, devices, selectivity.

RESUMEN

El objetivo de este trabajo fue establecer la confiabilidad y validez de un instrumento que midiera la percepción del uso de Internet. Se realizó un trabajo no experimental con una selección no probabilística de 340 estudiantes de una universidad pública en el centro de México. Los resultados muestran un porcentaje total de varianza explicado por dos dimensiones perceptivas que aluden a la búsqueda y selección de información, aunque el tipo de diseño limitó los resultados al escenario de investigación, lo que sugiere la inclusión de factores relacionados con las creencias de uso de Internet y las disposiciones como determinantes de intenciones y el uso de redes digitales.

Palabras clave: gobierno, Internet, redes, tecnologías, dispositivos, selectividad.

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Since its inception, the Internet has been an hegemonic factor in academic and professional training, although its use as a tool for information processing has not even been explored. The objective of this paper is to establish the reliability and validity of an instrument that measures the perception of internet use, considering a review of the literature that goes from 1996 to 2019, using the keywords of "technology", "management" and Internet in repositories of Latin America; Dialnet, Latindex, Redalyc and Scielo (see Table 1).

Table 1. Studies of the perception of Internet use

Year	Author	Results
1977: 1982; 1993; 1994; 1995; 2001	Bandura	Developed the model of self - efficacy (MAE) to refer to *the self - assessment of operational capabilities that function as a determinant of the behavior of people, their thought patterns and emotional reactions which imposed situations experienced before. Self-efficacy is an antecedent variable of knowledge and computational skills but has not been related to Internet use protocols as in the case of the intensive use of digital social networks.*
1989; 1993; 2006	Davis	Redesigned a model based on the budgets of the MRA and the MPB. The Acceptance Model Technology (TAM for short English) with dispositional variables MPB and RRM to incorporate exogenous and variables explaining the acceptance or rejection of an ICT more promptly. Integrated in the Model Technology Acceptance, the perception of control and perception of self-efficacy in its proposal for perceptual variables of usefulness and usability of technology defined as *the degree to which individuals perceive that using a technology imply less physical and mental effort* to *improve their job performance* (1989: 320 p.).
1991; 2001; 2002	Ajzen	Developed two models to explain the rational processes and systematic predicting beliefs delimited from behavior, not r more, perceptions, attitudes and intentions.
1996	Davis & Venkatesh	Consider hardware and software ICT as an exogenous acceptance of technology. The relationship between technology and acceptance imply technical, rational, deliberate, planned and systematic processes in which socioecological variables such as training and development from a technological or interact with human cognition; perceptions, attitudes and intentions.
2000	Awargal	Suggests that socioeconomic, sociodemographic and or educational variables are considered exogenous to human cognition that indirectly or BRE s use of Information and Communication Technologies (ICT).

Year	Author	Results
2002	Carmel & Awargal	Reported four levels of interaction in which the motive to tools, skills and knowledge related to information technologies. In the level, the interaction sticked to household.
2003	Venkatesh, Morris, Davis & Davis	Warn the exponential increase of ICT studies indicated by an increase up to 50 percent in the to lie organizational research and consequent explanation 40 percent of the total variance around the acceptance and use of ICT.
2007	García	Conducted an exploratory research with students of a public institution to establish causal relationships among the factors that determine e - commerce. Using variables from the MRA, MPB, TAM and the Human Development Ecology Model (EHDM for its acronym in English), developed a model to explain the causal relationships between the determinants of the consumption of products and services in digital transfer protocols. Information.
2008	García	Suggests that users of social networking build around what he defined as *a network of opportunities that encourage the sale of products and services benefiting traders, consumers, investment or and especially potential customers financially ,who interact with others to increase their skill and profit expectations, regulations, decisions and procurement of goods and services with digital information transfer protocols.*
2010	Borjas	Entrepreneurship is a subject of public opinion given the degree of social representation. In this sense, its innovative dimension would be linked to the issues established in the knowledge production agenda.
2010	Chiang, Mendez & Sánchez	Entrepreneurship is determined by opportunities to interrelate with seniority, but its conformist and innovative dimensions seem to be structured around capabilities.
2010	Fuentes & Sánchez	The creativity that entrepreneurship entails is related to female identity. In this sense, innovative entrepreneurship acquires a feminine nuance and conformist entrepreneurship, a masculine sieve.
2010	López, Vazquez & Montes	The satisfaction of innovative entrepreneurship is negatively related to Mobbing, that is, conformist entrepreneurship would be determined by organizational violence.
2010	Molero, Recio & Cuadrado	The avoidant leadership would be linked to the conformist entrepreneurship while the transformational, developer and corrective styles would be linked to the innovative dimension of entrepreneurship.

Continue...

Year	Author	Results
2010	Moreno, Ríos, Canto, García & Perles	Negative emotions would be determinants of conformist entrepreneurship, while positive emotions would influence the innovative dimension of entrepreneurship.
2010	Omar	Leadership, confidence and satisfaction would be determinants of entrepreneurship both in its conformist and innovative dimensions.
2010	Yáñez, Arenas & Ripoll	The climate of relationships would be related both negatively and positively to both the conformist and innovative dimensions of entrepreneurship.
2011	Adenike	Organizational satisfaction would be determined by entrepreneurship in its innovative dimension, while dissatisfaction would be influenced by conformist entrepreneurship.
2011	Celik, Turunc & Begenirbas	Confidence would determine innovation and Burnout would affect conformism.
2011	Galindo & Echavarría	The production of knowledge is related to the creativity and innovation that entrepreneurial projects suppose.
2011	Jyoti & Jyoti	The psychological differences would anticipate entrepreneurial asymmetries in both conformity and innovation dimensions.
2011	Rodríguez, Retamal, Lizana & Cortejo	Productivity and performance would affect entrepreneurship, but satisfaction would anticipate its innovative dimension.
2011	Rojas, García & García	Vocational training would influence entrepreneurship, formative violence would determine conformity, flexibility would correlate with innovation and technological competences would be linked to both dimensions of entrepreneurship.
2011	Yuangion	Identity determines entrepreneurship and covariates with perceptions of self-efficacy predicts the innovative dimension
2012	Anwar & Norulkamar	Leadership affects satisfaction through entrepreneurship in its innovative dimension.
2012	Díaz, Hernández & Roldán	Entrepreneurial training is subject to management, curriculum, production and knowledge transfer.
2012	Hallak, Brown & Lindsay	Identity influenced entrepreneurship as rootedness intensified, compliance would be exacerbated.
2012	Hazlina, Mohd & Rohaida	Management influences performance through entrepreneurship in both dimensions.

Continue...

Year	Author	Results
2012	Game, Race & Villareal	Motivation determines the entrepreneurship, the extrinsic dimension would influence the conformist dimension and the intrinsic dimension on the innovative dimension.
2012	Tayo & Adeyemi	The commitment as a determinant of performance affects the innovative or conformist entrepreneurship according to the degree of productivity.
2012	Vargas & Arenas	The educational quality when influencing professional training would determine entrepreneurship
2013	Cardon, Gregoire, Stevens & Patel	Entrepreneurship is multidimensional because it is made up of perceptual and intentional factors
2013	Danes & Joyoung	The commitment would be linked to responsibility through entrepreneurship
2013	Escamilla & Caldera	Social capital, indicated by identity, would determine the perception of opportunity, the main indicator of entrepreneurship
2013	Rante & Warokka	Labor culture by influencing management through entrepreneurship involves roles and management styles that increase innovation or exacerbate compliance
2013	Zampetakis & Mostakis	The strategic vision would be an indicator of entrepreneurship.
2014		
2015	García	Established a relation between identity and technologies, devices and information networks considerin users' profiles..
2016	García, C., Carreón, J., Mendoza, D. y Aguilar	Established the relationship between education and development through the intensive use of technologies, devices and information networks regarding the optimization of resources rather than process innovation.
2017	García, Carreón y Hernández	Established the unifactorial dimension of the intention of use from high probabilities of intensive use of technologies, devices and knowledge networks, considering a rational, deliberate, planned and systematic process of resource optimization and process innovation.
2018	García	Demonstrated the one-dimensional prevalence of knowledge management related to the codification of knowledge, experiences and capabilities. The factor explained 45% of the total variance explained, suggesting the extension of the model in order to incorporate knowledge recoding.
2019	García	Demonstrated the emergence of a factorial structure focused on academic, professional and occupational training regarding knowledge management.

Source: Self-made.

It is possible to appreciate that: 1) the studies focus on predicting the use of the Internet; 2) cognitive factors are determinants of the fusion between technology and capabilities; 3) the perception of Internet use is essential for knowledge management; 4) the production and transference of knowledge is carried out in organizations that adopted information technologies, devices and networks (García, 2007; 2008).

In the case of the perception of Internet use, it has focused on the capacity, usefulnes and ease of use as the determinants of the dispositions and intentions of Internet use, although the perceptions of risk are the determinants of decision making in transactions and purchase of products or the request for digital services (Garcia, 2011a; 2011b; 2011c; 2011d; 2011e).

Precisely, in the case of the perception of usefulness and the perception of risks, these have demonstrated their predictive power with respect to the intentions of use and consumption of digital services, but in the case of the perceptual dimensions they have not diversified in accordance to technological advances (García, 2012; 2013; 2018).

The perceptual dimensions in relation to capabilities and technological advances would explain the relationship between risks and utility with respect to the efficient use of the Internet (Garcia, Carreon, Hernandez, Montero & Bustos, 2013).

The perception of risks has been a determinant of favorable attitudes towards the use of the Internet, as would be the case of identity theft and pathologies such as harassment (Garcia, Carreon, Hernandez, Montero & Bustos, 2012).

In the case of perceived usefulness, expectations have been addressed from instruments that explore individual features such as the use of digital technologies and networks that explain information processing (Garcia, Carreon, Hernandez, Bustos, Morales & Lemon, 2013).

Regarding the perceived capacity in the use of Internet has been a preponderant variable in the study of academic and professional training, as well as transfer and training programs (Garcia, Carreon, Hernandez, Bustos, Bautista, Mendez & Morales, 2013).

Well, the three perceptual variables such as risk and usefulness have been diversified in their dimensions, but only in terms of digital economic protocols such as electronic banking, bypassing aspects of educational and academic order aimed at job placement (Villegas, García & Hernández, 2018).

In summary, studies of the perception of Internet use have focused on the risks and usefulness of the use of technologies, devices and information networks, circumventing the powers for research such as the search and choice of Information for processing.

Likewise, knowledge management and production are related to the search and information selection skills, since both involve the codification of knowledge, experiences and capacities aimed at optimizing resources and innovating processes.

Based on the impact factors of journals and author indexes, the search and selection of information suggests the optimization of common resources would be the case of the research experiences that are transferred between the interested parties.

However, in the case of process innovation, the search and selection of information by reducing the risks of creating and implementing a proposal, increase new forms of management.

Method

Are there significant differences between the theoretical dimensions of the perception of Internet use with respect to the relationships between factors and indicators to be observed?

Null hypothesis: There will be differences between the theoretical dimensions of the perception of Internet use reviewed in the literature with respect to the relationships between factors and indicators to be observed.

Alternate hypothesis: There will be significant differences between the theoretical factors and the empirical relationships between their observed indicators.

Participants

A non-experimental study was carried out with a non-probabilistic selection of 340 students from a public university in central Mexico (see Table 2).

Table 2. Sample data

Sex	%	Age	%	Entry	%	Civil	%	Cyberuse	%
M	56,4	<18	67,2	<350 USD	52,2	Singleness	71,2	<3hrs	34,5
W	44,6	>18	33,8	>350 USD	48,8	Other	29,8	>3hrs	66,5

Source: Elaborated with the study data.

Instrument

The Internet Use Perception Scale was used, which has its predecessor in the Ease of Use Scale proposed by Davis (1987) and the Bandura Self-Efficiency Scale (2001). Both scales suggest that the intensive use of technologies, devices and information networks is due to the continuous, gradual and staggered learning of these resources in terms of optimization and innovative transformation.

In other words, the optimization of information technology resources, as well as the innovation of teaching-learning processes suggests a continuous processing of information, indicated by the search for this technology and its selection based on universally built criteria on the internet.

Despite the restrictions on access to specialized and updated information, resource optimization and process innovation is possible based on the information available for evaluation. This is because the information flows regularly, considering open access policies, the dissemination of institutional or private collections, as well as technologies, repositories or applications dedicated to the dissemination of science and technology.

This is how the Internet Use Perception Scale covers both dimensions when trying to weigh management learning and knowledge production in its information processing phase, mainly focused on the search and selection of findings or data.

The Internet Perception and Use Scale (IPU-14) was built, which included dimensions related to information processing such as search and data selection. All the items are answered with one of five options: 0 = “not likely” until 5 = “quite probable” (see Table 3).

Table 3. Construction of the IPU-14

Factor	Concept	Indicator	Measurement	Interpretation
Search perception	refers to the criteria for using repositories from keywords (Garcia, Carreón y Hernández, 2017)	Redalyc will help me find local data	0 = "not likely" to 5 = "quite likely"	High scores suggest a structured, delimited and effective perception
Perceived selection	Refers to the criteria of data selection based on its usefulness and ease of processing (García, Espinoza y Carreón, 2017).	Scielo will help me to delimit my research object	0 = "not likely" to 5 = "quite likely"	High scores denote a convenient utility and use

Source: Elaborated with the study data.

Process

The surveys were carried out in the public university facilities, provided with a written guarantee of confidentiality, anonymity and non-impact of the results on the academic status. The information was processed in IBM-SPSS-AMOS version 25.0 considering the normality, reliability and validity from exploratory factor analysis of principal axes with promax rotation.

The criteria for observing the normal distribution were a threshold between 0 and -1 in the case of kurtosis; but in the case of multivariable kurtosis, a value greater than 25 units of the Mardia parameter is the indispensable minimum. In the case of the most optimal internal consistency, the alpha coefficient had to reach a value greater than 0.60 and less than 0.90; but in terms of validity this threshold was from 0.30; being in the case of correlations and beta weights greater than 0.60

Results

Table 4 shows the statistical properties of the instrument in which it is possible to appreciate that they comply with the requirement of consistency, as well as the convergence of factors in two constructs.

Table 4. Descriptive of the IPU-14

R	M	S	W	K	A	F1	F2
R1	1,03	0,49	1,30	2,03	0,781	0.381	
R2	1,06	0,39	1,35	2,06	0,793	0.382	
R3	1,07	0,29	1,38	2.15	0,765	0.392	
R4	1,19	0,31	1,23	2,16	0,732	0.391	
R5	3.10	0,52	1,35	2,46	0,704	0,390	
R6	3,04	0,39	1,33	2.37	0,761	0.491	
R7	3,17	0,69	1,30	2,33	0,772	0,330	
R8	3.47	0.25	1.65	2,01	0,783		0.410
R9	1,06	0,51	1.30	2.83	0,792		0,482
R10	1.01	0,83	1,35	2.04	0,705		0,532
R11	1,83	0,93	1,36	2,81	0,707		0,492
R12	1.27	0,62	1,34	2.93	0,793		0,415
R13	1.20	.63	1,31	2,32	0,765		0,592
R14	1,17	0,84	1,39	2.04	0,784		0,351

R = Reactive, M = Median, S = Standar Desviation, W = Swednes, K = Kurtosis, A = Alpha. Adecuacy (KMO = ,752), Sphericity (X2 = 124,23 (34gl) p = ,000). Extraction: Main axes, Rotation: Promax. F1 = Search perception (18% total variance explained and alpha of ,780), F2 = Perceived Selection (11% total varianza explained and alpha of ,775). All the items are answered with one of five options: 0 = "not likely" until 5 = "quite probable".

Source: Elaborated with the study data.

However, both factors only explain 29% of the total variance, suggesting the inclusion of other factors that the literature identifies as computational self-efficacy and compatibility. The adjustment and residual parameters $\left[X^2 = 456,34\ (34gl)\ p = ,008;\ GFI = ,990;\ CFI = ,995;\ RMSEA = ,009\right]$ suggest the null hypothesis of the null hypothesis relative to the adjustment of the theoretical dimensions of the perception of Internet use with respect to its observed factors and inducers.

Discussion

The contribution of the present work consists in establishing the reliability and validity of an instrument that measures the perception of Internet use, but the type of non-experimental study, the type of non-probabilistic sample selection and the type of exploratory analysis limited the results to the research scenario, suggesting the inclusion of compatibility and self-efficacy.

The percentage of variance explained suggests the inclusion of both factors, although the internal consistency seems to indicate the exclusion of items that will reduce both factors.

García (2018) warns that the processing of information to be determined by the management of knowledge enhances the factor of the search for information that in the present work has been linked to the selection of the same and both explain the perceived use of technology in what to repositories refers.

García, Rivera & Aguilar (2018) demonstrated the influence of digital networks in the rescue of those trapped by the earthquake in Mexico City, evidencing the importance of electronic networks that this study has highlighted as a search and selection tool associated with the knowledge of a subject.

García, Martínez & Rivera (2018) demonstrated the link between digitalized knowledge networks and labor flexibility in terms of location, scope and usefulness, but as far as this research is concerned, knowledge networks would be explained by the search and selectivity of information.

However, the IPU-14 should be contrasted in other scenarios and samples in order to give it validity and be able to associate it with other scales that the literature refers as adoption models of technology, electronic commerce and risk in transactions.

In relation to the instruments used in the literature consulted and with respect to the reported reliability and validity where one-dimensional variables focused on the use of the Internet and stand out as an instrument for learning skills and control over resource optimization and innovation of processes, in the present work it has been shown that two indicators prevail that explained 29% of the total variance explained, suggesting the extension of the work towards other indicators such as the compatibility between the meanings of technology, devices and information networks regarding their Intensive use for processing, management and production of knowledge.

Conclusion

The objective of this paper has been to establish the reliability and validity of an instrument that measures the perception of Internet use, but the IPU-14 shows a consistency that is insufficient, as well as a validity that would include a third factor related to the use of the Internet efficacy, although the type of study, sampling and analysis limit the results to the context of the investigation, the contrast of the instrument in other samples will be relevant.

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