Development and Psychometric Validation of an Information Competency Assessment: The Information Management Brief Scale

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Abstract: Today's college students relate directly to the information through which they learn. They are the ones who detect the information they need, search and evaluate it, and also use it to develop academic projects. Information literacy programs have increased in universities to support the development of these skills to students. The aim of this study was to provide an instrument that allows the measurement of information competency in higher level students and generate evidence of its validity and reliability. The Information Management Brief Inventory (IMBS) was developed, which consisted of 16 Likert type items. IMBS was applied to a sample of 1,937 students from a public university in northern Mexico. For the evaluation of the construct validity and identification of the factor grouping of the items, an exploratory factor analysis (EFA) was carried out. Confirmatory factor analysis (CFA) was carried out to explore the goodness of fit of the model. It was found that the 16 items were grouped into three factors: information management, access to information and information ethics. The psychometric properties of IMBS were adequate.

Introduction

As the world and society change and evolve, it is natural that professions and their practice do as well. From some time to the present, the use of information and communication technologies (ICTs) has been massively adopted. Consequently, it is important that students acquire and develop skills that allow them to successfully relate to information (Humanante-Ramos et al., 2019).

Although in the past, professionals were requested to develop highly specialized skills, the emphasis started to be placed on demanding flexibility and dynamism from them is why the competency-based academic approach has been more popular in recent years. Within this model, learning is achieved through the personal experiences of each student. Their purpose is that the obtained learning is deep and permanent and be of great help in the development of skills, attitudes, and critical thinking, for this, it is necessary that the entire process is focused on the student's activity (Rojo Venegas & Navarro Hernández, 2016).

Thanks to all the changes that society has undergone and the ways of communicating and interacting with others, the teaching-learning process has also been transformed and updated. It is found that students are increasingly immersed in learning environments and technology-driven learning (Komar et al., 2022). ICTs are those tools that allow knowledge to be distributed and can be used, for example, in research (Escorcia-Guzman et al., 2022).

ICTs refer to a variety of communication technologies such as: mobile applications, computers and other applications and tools that can provide information to users digitally (Komar et al., 2022). These technologies are increasingly becoming an indispensable part of the education system that helps the development of student-centered environments. Therefore, one of the objectives of ICT in education is the increase of knowledge and skills necessary for a better life and sustainable development (Das, 2019).

Currently, it has been possible to observe the importance of making use of ICTs, for example, due to the COVID-19 pandemic, these have been of great help, not only for medical personnel and health services, as they are tools that proofed

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very useful for the detection, diagnosis, and treatment of diseases and hospitalizations. They have also been useful for people to maintain contact with others during social distancing, perform home office, and keep in touch with the outside world. Although they have also generated difficulties, for example, as they are means by which false information is shared (Sood et al., 2022), here is the importance of learning to use ICTs and the information they provide.

As information becomes easier and more available thanks to ICTs, it is important that those who are interested in obtaining it, acquire the knowledge and skills to find access and use it effectively (Anunobi & Udem, 2015). This need demands to be able to identify the level of domain of people over the skills that make up the competence. Since information competency can be perceived in different ways according to the context (Song & Kwon, 2012), it is important that the instruments that evaluate it are valid and reliable with respect to the characteristics of the target population.

The Association of College and Research Libraries (ACRL, 2000) facilitated, through the definition of skills that integrate information literacy, the development of inventories that evaluate it. However, the instruments that other authors have developed have disadvantages and do not comply with a formative character in education, and also, along with the development of new technologies, these skills may vary (Sommer et al., 2021). According to the above, to evaluate the information competency, the instrument would have to consider the characteristics of the population and be updated.

Within this article, the objective is to provide an instrument that allows the measurement of information competency in higher level students and generate evidence of its validity and reliability. This instrument is a self-perceived Likert-type scale, which is a quantitative and summative. The items were created in the form of statements, where each one contains an indicator of information competency, with simple, clear and direct language, ad hoc to the students who answered it (university students). The level of competence will result from the sum of the scores obtained on the items. The results are not only of information competency in general, but of its dimensions.

Literature Review

Information Literacy

With the rapid development of information technologies, information literacy has become a fundamental skill that people in modern societies must develop (Guo et al., 2022). Information literacy refers to the knowledge, skills and attitude to recognize when and why information is needed, where to find and access it, how to evaluate it, synthesize it, use it and communicate it ethically and legally (Anunobi & Udem, 2015). Wu et al. (2022) define information literacy as the ability of individuals to search, find, understand, and evaluate information from online resources and benefit from them.

In 1999 The Society of College, National and University Libraries (SCONUL) published a model called Seven Pillars of Information Literacy that was expanded in 2011. In this model, basic competencies are defined including knowledge and skills that are the objectives of information literacy development in higher education (Anunobi & Udem, 2015). The seven pillars are:

- Identify: able to identify an information need
- Scope: current knowledge can be assessed, and gaps are identified.
- Plan: strategies can be built to locate information and data.
- Collect: They can locate and access the information and data you need
- Evaluate: able to review the research process, compare and evaluate information.
- Manage: Information can be organized in a professional and ethical manner.
- Present: whoever is researching can apply the knowledge they have acquired by presenting the results of their research, creating new knowledge with old and newly acquired data, etc.

On the other hand, the ACRL (2000) shared the information literacy competency standards for higher education. This model operationally defines five components of information literacy that are:

1) Determine the nature and scope of the information needed.
2) Search and access necessary information effectively and efficiently
3) Critically evaluate information and its sources
4) Use the information effectively to achieve a specific purpose.
5) Understand the economic, legal and social issues surrounding the use of information and access.

Information Competency

As mentioned, information literacy has gained relevance. It has been defined by several authors. Borges and García-Quismondo (2017) as "the convergence of knowledge (know), skills (know-how) and attitudes (know how to be) that are desired develop during an information literacy process".

Within these competencies, various processes are related to each other. Among these processes, we can find search, location, selection, retrieval, organization, evaluation, production, and dissemination of information. In this way, by acquiring these competencies is intended to facilitate the learning and development of information skills, information literacy, or informational literacy (Castillo Pérez et al., 2016).

There is a difference between information literacy and information competency, this does not properly reside in the processes involved in each of them. Rather, this differentiation arises because literacy implies something that is known or has been learned and competence refers to something demonstrable through behaviors. For example, if analyzed analogously to reading and writing literacy, an individual may have become literate (knows how to read and write), however these processes can be seen evidenced in a wide range of behaviors that would come to be represented by reading-writing skills (Castillo de León, 2023).

The relationship between being information competent and learning has been identified in scientific literature. Gargallo López et al. (2020) approach *Learning to Learn* as a key skill. As part of the definition of this construct, they integrate the effective management of information, which is: (a) the ability to search for and use information; (b) effectively manage the information of the specialty and (c) ability to acquire, analyze, interpret and manage information.

Since ICTs have become more important in the educational field it has been considered that both students and teachers use it with information to achieve educational activities. Teachers serve as mediators between students and knowledge, so they will also be mediators between students and technology. In this way it is necessary for the teachers can improve their classes with the advantages that new technologies provide, and develop the information competency, it is important that the teacher of the 21st century develop these skills (A. Y. Wong & Daud, 2018).

Information Competency Assessment

As S. C. Wong (2020) describes, measuring competency should focus on behaviors and attitudes. In the literature search, it was possible to identify some instruments for assessing information competency that meet this criterion. The globally accepted model for the construction of information competency assessment instruments is that of the ACRL (2000). Once the information literacy standards were published, various instruments were proposed for their evaluation, one of them being the Information Competence Assessment Instrument (Marshall, 2006) which has a 10-dimensional structure, Valenzuela Urra et al. (2021) translated and adapted it by proposing a version of 27 items.

On the other hand, universities began to develop their own instruments to assess information-related skills. The United States International University- Africa designed an instrument based on the five ACRL standards with 30 questions designed to assess knowledge (Nyarigoti, 2020). The design of its own assessment instruments has also been carried out in basic education. In China, to assess the information competency of first- and second-grade teachers, the China E-Learning Technology Standardization Committee designed and validated the Information Literacy Assessment Tool for Primary and Secondary School Teachers which has knowledge-based multiple-choice questions (Chen et al., 2023).

In Spanish language, the IL-HUMASS scale (Pinto & Sales, 2010) was identified to assess information competency in translation students at three Spanish universities. It categorizes information competency into four standards: search, evaluation, processing and dissemination. This self-perceived Likert-type instrument has been adapted to different populations by other authors, among these adaptations can be found that of García Llorente et al. (2019) who adapted it to be applied in high school students.

In summary, information-related skills are now considered important for effective performance in learning environments. As can be seen, the benefits of being proficient in information can impact even other areas of people's lives. The evaluation of these skills allows professionals to identify the level of competence and, in turn, establish strategies for its improvement.

Methodology

Research Design

This is as an instrumental study (Montero & Leon, 2005). It was used a quantitative, non-experimental design. The aim of the study was to develop the IMBS and generate evidence of its validity and reliability.

Participants

The sample consisted of 1,937 students from a public university in northern Mexico, enrolled in various majors and semesters. The mean age was 20.08, with a *SD* of 2.982. For the selection of the participants, the data such as sex, age,

and semester were indistinct; the only inclusion criterion that was established was that they were regular students. The sampling was not proportional by major; their selection was incidental, and the decision to participate was voluntary.

Instrument

The Information Management Brief Scale (IMBS) was designed based on the information competency standards established by the ACRL (2000) and the five information competencies defined by Castillo de León and Méndez Hinojosa (2016). The instrument was made up of 16 items related to each of the information competencies: need for information, access to information, evaluation of information, use of information, and ethics of information.

The scale is Likert type, the items were written in first person and with a clear and uncomplicated language for the target population. The response options are *always*, *often*, *sometimes*, *rarely*, and *never*, with a score of 5 to 1, all of which are positive items. The 16 items of the scale on the original language can be seen in *Appendix 1*.

Procedure

The procedure used by the authors in this study is the one described by Carretero-Dios and Pérez (2005) for the design of IMBS and for the evaluation of its psychometric properties.

The instrument was designed based on information competency. The five information competencies were taken as dimensions, which had already been defined (Castillo de León & Méndez Hinojosa, 2016). Each of the five competencies was defined both conceptually and operationally, establishing the pointers that would indicate their presence. Subsequently, items were developed for each of the dimensions in accordance with their corresponding pointers following the criteria of Edwards (1983) for the design of these.

The resulting version of the scale made up of 16 items was submitted to the judgment of two experts to assess the content validity of the items. In this exercise, the experts were asked to answer whether each item measured what it had to measure. As a result, modifications were made to some items, but none were removed.

Prior to beginning the application of the instruments, the corresponding permits were requested, and the participants signed the informed consent. No financial, material or academic reward was granted for participation. The authors made sure to comply with the confidentiality principles of the Declaration of Helsinki.

It was decided by the authors that the form of filling out the instrument by the participants would be digital and self-administered. After the IMBS was applied, values were assigned to each of the responses to be coded and evaluate their psychometric properties. The final database was divided in such a way that the participants were random and proportionally distributed in two samples.

Analysis of Psychometric Properties

For the evaluation of the construct validity and identification of the factor grouping of the items of this instrument, an exploratory factor analysis (EFA) was carried out using sample one. The feasibility of factor analysis was analyzed using the Kaiser-Meyer-Olkin (KMO) index analysis and the Bartlett's test of sphericity. The generalized squares method was applied as the extraction method and the Varimax rotation was applied as rotation. The EFA analyses were carried out with the SPSS v24 statistical software.

The KMO index is taken as acceptable when its score is greater than .50; and Bartlett's test of sphericity must be statistically significant ($p < .05$). When selecting the number of factors (figure 1) in the EFA, the K1 Rule (eigenvalues > 1) was used as a basis. To make the decision to include the items in the factor, the factor loadings must be considered, which must be greater than or equal to .40 (Hair et al., 1999).

Confirmatory factor analysis (CFA) was carried out on the second sample, using the AMOS v24 statistical software, to explore the goodness of fit of the five-dimensional model. The 16 items of the scale were loaded, and the CFA was performed based on the Pearson *r* correlation matrix and the estimation by unweighted least squares (Hair et al., 2014). The goodness-of-fit values were determined by chi-square ($\chi 2$), however, considering that $\chi 2$ is sensitive to sample size (Fujikoshi, 2000), the relative chi-square ($\chi 2/df$) (Bollen, 1989) was reported, which expresses an adequate model fit when presenting values between two and three, or more flexibly, with values ≤ 5 (McIver & Carmines, 1981). Goodness-of-fit index (GFI), comparative fit index (CFI), normative fit index (NFI), and root mean square error of approximation (RMSEA) were calculated. The following were used as indicative values of a good fit: in the case of the GFI, AGFI and NFI > .90 and for RMSEA < .08 (Hu & Bentler, 1999). For factor loadings ($\lambda´s$) values ≥ .40 were considered adequate (MacCallum et al., 1999).

Once the factorial structure of the IMBS was determined, reliability indices were obtained through an inter-item reliability analysis with Cronbach's alpha test (Cronbach, 1951) for each factor found in both samples. Garcia-Cadena (2009) suggests that a score below 0.60 indicates that reliability is unacceptable, from 0.60 to 0.65 is undesirable, between 0.65 and 0.70 minimally acceptable, from 0.70 to 0.80 respectable and from 0.80 to 0.90 very good, so values closer to 1 indicate greater reliability. In addition, composite reliability analyses (CR) and the mean variance extracted

(AVE) were performed to measure the internal consistency of indicator variables. If the CR is greater than 0.70 then the indicator variables have shared variance among them. Finally, descriptors per item and per dimension were obtained to detect the dimension that best explained the meanings regarding information management that both samples possess.

Findings/Results

The referential theoretical framework led to the design of 16 Likert-type items that were subjected to content validity. The results indicated that they all represented the construct, so none was eliminated.

Regarding the analysis of construct validity, in the evaluation of the feasibility of the EFA a Kaiser-Meyer-Olkin (KMO) sample adequacy measure of .936 was obtained. The results of the Barlett sphericity test are reported below (Table 1).

Table 1. Bartlett's Test

Test	Value
Approx. Chi-Square	6382.755
df	120
Sig.	.000

Both the KMO value and Barlett's sphericity test justify the application of exploratory factor analysis. The generalized squares method with Varimax rotation yielded the factors. The sedimentation graph (Figure 1), as well as the K1 rule (eigenvalues>1) suggested the extraction of three factors.
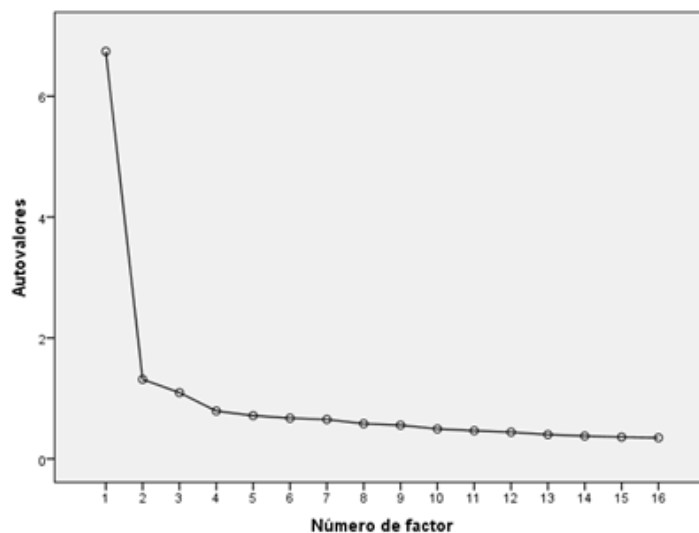

Figure 1. Sedimentation Graph

The eigenvalues for each one of the factors, as well as the percentage of explained variance are shown in Table 2. The sum of the percentage of the explained variance by the three factors is 57.19.

Table 2. Eigenvalues and Percentage of the Explained Variance

Factor	Eigenvalues	Percentage of the explained variance by the factor
1	6.741	42.130
2	1.314	8.215
3	1.095	6.842

Since the analysis offers a solution composed of three factors, these have been called by the authors (a) Information Management, (b) Access to Information and (c) Ethical Aspects of Information. The factor loads of each item for its corresponding factor are shown in Table 3. The 16 items factor loads meet the criteria proposed by Hair et al. (1999) (greater than or equal to .40).

Table 3. Rotated Factor Matrix

	Factor		
	1	**2**	**3**
1) I recognize when the information I have to make my assignments is not enough and I need to look for in other sources.	.595		
2) I have strategies to determine the keywords that are related to the topic of which I require information.	.537		
3) When I have a question about a topic, I know what information sources to turn to.		.587	
4) I recognize a wide variety of formats in which information can be found.		.717	
5) I use specialized databases to access information.		.600	
6) I know how to locate information in a library.		.485	
7) I evaluate the information I get according to certain criteria.	.468		
8) I easily recognize when a scientific article may have information relevant to my academic assignments.	.645		
9) I set categories to organize the information I am going to use.	.510		
10) I use the information I obtain following rules established by some authority in my discipline (example APA).			.546
11) I can synthesize the information before using it according to the objective of my academic assignment.	.635		
12) I integrate information from different sources into the same academic activity.	.604		
13) I know how long the new information lasts.			.428
14) I take into consideration ethical aspects related to the use of information when including it in my academic activities.			.627
15) I prevent the illegal reproduction of copyrighted information (e.g., photocopies of books).			.563
16) I properly cite the authors of articles when I use their information.			.571

Regarding the CFA, each of the 16 items of the scale was loaded into three latent variables that represent the three previously extracted and identified factors (see Figure 2). Goodness-of-fit indices revealed that the three-factor correlated model fitted well with the data ($\chi2$ = 621.244. *df* = 115. *p* = .000; $\chi2/df$ = 5.40; GFI = .862; AGFI = .958; NFI = .901 and RMSEA = .067). The standardized factor loads (λ's) for the three-factor model were: Information Management (GI) factor (item GI.1 = .67; item GI.2 = .67; item GI.7 = .69; item GI.8 = .70, item GI.9 = .65, item GI.11 = .71, item GI.12 = .70); Access to Information (AI) factor (item GI.3 = .74; item GI.14 = .74; item GI.5 = .64; item GI.6 = .59); Ethical Aspects of Information (ETI) factor (item GI.10 = .65: item GI.13 = .59: item GI.14 = .72: item GI.15 = .57; item GI.16 = .66) with an average λ of .668.
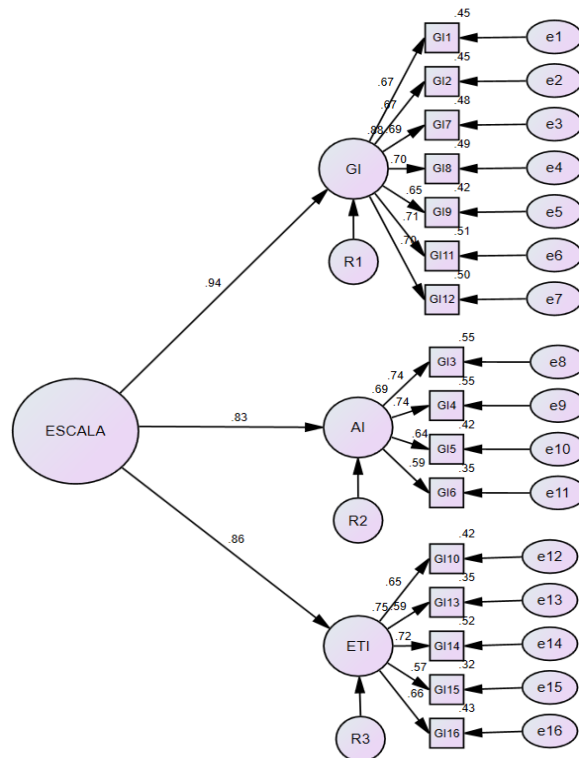

Figure 2. Three-Factor Model of the Information Management Brief Scale (IMBS)

Once the factorial structure was obtained, the reliability analyzes were performed by factor (see Table 4). Likewise, a Cronbach's Alpha coefficient of .902 was obtained for the full scale.

Table 4. Internal Consistency of the Brief Information Management Scale

Factor	Number of items	Cronbach's Alpha	Composite reliability	AVE
Factor 1: Information management	7	.860	.863	.475
Factor 2: Access to information	4	.747	.759	.449
Factor 3: Ethical aspects of information	5	.771	.783	.424

Discussion

Information competency is considered a fundamental skill in modern life (Guo et al., 2022). The objective of this study was to provide a valid and reliable instrument to measure information competency in higher education students. According to the results, the IMBS proved to be a valid and reliable instrument.

Despite the instrument having been designed under a model of five information competencies (Castillo de León & Méndez Hinojosa, 2016), the analyses confirmed the existence of three factors in which the 16 items were grouped. The three-factor model shows that items related to the need, use and evaluation of information were grouped into a single factor which was called Information Management. On the other hand, the items related to Information Access and those related to Information Ethics remain grouped in their corresponding factor. Commonly, defining information access as a competency, aspects related to the perception of need, organizing, obtaining, locating, and knowing the sources are integrated *(*Jorge Winston et al., 2010), nevertheless, in this study the perception of the need for information is outside this competency.

As can be seen in the model that this study proposes, three information competencies are identified:

- Information Management: skills related to identifying a lack of information, the analysis and evaluation of information, as well as the correct use of it to meet an information need.

- Information Access: skills related to exploring information sources, familiarity with search terms and recognizing resources to reach information.

- Information Ethics: includes the skills of use and reproduction of information which are appropriate for higher education.

Ottonicar et al. (2018) indicate that because information literacy skills can vary according to context, it is possible to create different models for each area in which these skills are assessed. It is highlighted in the literature that it is necessary for individuals to possess the skills to search, evaluate and select the various sources of information provided by the informational universe (Alonso-Varela & Saraiva-Cruz, 2020). Likewise, all human behavior is immersed in guidelines and norms, these are necessary to achieve stability and harmony. These three competencies are relevant in the line of study of information literacy and information skills.

Having an instrument to evaluate information competency and a factorial model that supports it allows the future development of information literacy programs, as well as studying the participation of these skills in the learning process of university students.

Conclusion

This conclusion will begin with a quote from Pozo Municio and Monereo (2009), who state that "in recent years the university has not been agitated but swept by the intense winds of change". This situation has led it to transform its structures from within, focusing the teaching process on learning. Giving a large part of the responsibility of learning to the students, with teachers only being designers and facilitators of this process.

Changing the role of the student from passive to active does not only require motivation on the part of teachers and students. Among other competencies, it is required that the student be competent in information since the responsibility for obtaining the information to be learned falls on him. If it is identified that this student is close to graduation, the situation becomes more complicated because the information he or she has received at the university is about to expire. When this same student does not continue to enroll in a master's program, his or her knowledge will be obsolete in less than five years.

Previously, Monereo and Pozo Municio (2001) have already addressed the expiration of information, they mentioned that the knowledge of the world is constantly renewed, because it has historicity, when a new knowledge is produced, it surpasses another that was new before and aged and disposes to be surpassed tomorrow by another (Freire, 2004). Whether they like it or not, people are becoming permanent learners, condemned to constantly update themselves. Although, as stated by the authors, not all knowledge, strategies and attitudes are as perishable as others.

That is why the main way to be a lifelong learner is information literacy, because it is not enough to know how to access information; cognitive work is required to transform it into authentic knowledge and to develop powerful cognitive resources that, in turn, allow reflection, critical assimilation, and the creation of new knowledge. So, by evaluating the information competency, it will be possible to develop it, transform it, and make it a competence of most university graduates, who will have a lifelong learning.

Recommendations

The first recommendation regarding the use of the IMBS is the same as that would be given for the use of any measuring instrument: analyze its psychometric properties in the population that is being applied. And whether it is to be applied in a different language or is necessary to make a cultural adaptation, use at least one specific technique for it, such as the Backtranslation method. However, in relation to research that could derive from this study, the following can be found:

1. Psychometric properties analysis of IMBS in different contexts.

2. Measure the information competency in the type case. To do this, it is necessary to carry out an ex-post-facto study where it is necessary to select high school students as a sample, as well as first-semester university students. The reason is explained by Monereo (2009), who states that faced with the need to search for information on the Internet, most students do so from a generic search engine (such as Google) and take what is shown on the first page of results as pertinent information, without considering the real objectives of the search for information. They aren't interested in the validity and credibility of what is collected, nor in the prestige of the authors, whether it is current or relevant. Thus, by selecting populations categorized as type cases, i.e., populations where the variable is expected to occur or not, a lot of data can be obtained on the need to measure information competency and justify future interventions.

3. To examine the effect of an intervention designed to train students with information competency. From the above study, an experimental investigation is suggested, directed at the previously selected educational levels. With before and after measurements and with a control group. As mentioned by Monereo (2009), the objective is to train *gatekeepers*, that is, "effective enchanters of valid and relevant information (p.90)", especially at the university level.

4. To analyze the relationship between information competency and the variable academic plagiarism. Considering the dimensions of the IMBS, specifically the information ethics, it can be appreciated that there are rules that regulate the use and reproduction of information. It is very likely that if they do not know how to access the correct information, the student ignores the proper way to use it in some task or research, and this situation leads to academic plagiarism. Hence, there is a need to relate both variables.

5. Use different instruments and techniques to measure information competency. It is likely that, in research conducted in school contexts, students respond in terms of social desirability and may indicate in self-report instruments be proficient in information competency without having this competence has been further developed. Therefore, the use of qualitative methods to triangulate the information collected is suggested. One method of assessing information competency could be problem-solving, where with a checklist, the researcher evaluates the indicators of this competence at the same time as the student does the search.

6. Compare educational levels. There are multiple studies that could be carried out by those interested in the construct information competency. It can compare educational levels, types of educational institutions (private or public), and gender. It is possible to correlate the results with age or semester.

It is for this reason that researchers are urged to carry out more studies in this regard, which allow us to understand the construct: information competency. And not only researchers because research must be at the service of science but also of society. In this case, it is recommended that teachers interested in assessing and developing their students' information competency apply the instrument as part of a diagnostic evaluation at the beginning of the school year, and that, based on the results found, decisions can be made about the need or not to train students in this competence or in specific skills of the same given by the subscales.

It should be noted that Likert scales are easy to measure and interpret. The interested teacher would only have to add up the scores in each dimension and observe how close the student is to the maximum score to be obtained. Finally, it is emphasized what was said at the beginning: it is always desirable to evaluate the psychometric properties in the different contexts, to be able to affirm that the measurement was valid and reliable.

Limitations

As part of the limitations of this study, it can first be identified that the validation of the IMBS is of its Spanish version. In addition, their items describe behaviors related to the information competencies of university students since they were designed for this population.

Ethics Statements

Prior to the application of the IMBS, the written informed consent of the participants was provided. They were told that freedom of coercion would be present, and they could decide not to answer the instrument at any time if they wanted without any consequences. They were assured that the data would be treated under the principles of privacy and confidentiality.

Authorship Contribution Statement

Castillo de León: Conceptualization, data analysis/ interpretation, drafting manuscript, statistical analysis, admin. Mendez Hinojosa: Data acquisition, critical revision of manuscript, final approval. Cárdenas Rodríguez: Securing funding, technical or material support, supervision.

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Appendix

Table A1. Rotated Factor Matrix in the Original Language

	Factor		
	1	**2**	**3**
1)Reconozco cuando la información que tengo para realizar mis tareas no es suficiente y necesito recurrir a otras fuentes.	.595		
2)Cuento con estrategias para determinar las palabras claves que están relacionadas con el tema del cual requiero información.	.537		
3)Cuando tengo una duda sobre un tema sé a qué fuentes de información recurrir.		.587	
4)Conozco una amplia variedad de formatos en los que se puede encontrar la información.		.717	
5)Utilizo bases de datos especializadas para acceder a la información.		.600	
6)Sé cómo ubicar información en una biblioteca.		.485	
7)Evalúo la información que tengo de acuerdo a determinados criterios.	.468		
8)Reconozco con facilidad cuando un artículo puede poseer información relevante para mi tarea académica.	.645		
9)Establezco categorías para organizar la información que voy a usar.	.510		
10)Uso la información que obtengo siguiendo normas establecidas por alguna autoridad en mi disciplina (ejemplo APA).			.546
11)Logro sintetizar la información antes de usarla de acuerdo al objetivo de mi tarea académica.	.635		
12)Integro información de diferentes fuentes en una misma actividad académica.	.604		
13)Conozco la vigencia temporal que tiene la información.			.428
14)Tengo en cuenta aspectos éticos relacionados con el uso de la información al incluirla en mis actividades académicas.			.627
15)Evito la reproducción ilícita de información con derechos de autor (ejemplo fotocopias de libros).			.563
16)Cito adecuadamente a los autores de los artículos cuando utilizo su información.			.571