

# Validez de contenido por juicio de expertos: propuesta de una herramienta virtual

## Content validity by experts judgment: Proposal for a virtual tool

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### RESUMEN

#### Palabras clave

Validación de contenido;  
juicio de expertos;  
herramienta virtual;  
metodología de  
investigación

El estudio describe las ventajas de utilizar una herramienta virtual diseñada para validar el contenido de instrumentos de investigación, a través de la técnica del juicio de expertos. Se presentan los resultados de una encuesta aplicada a expertos que participaron como jueces en la validación de contenido, exponiendo su opinión y experiencias en los procesos de validación de instrumentos. El diseño metodológico incluyó tres fases: la primera, relacionada con el diseño de la herramienta virtual; posteriormente, se llevó a cabo la aplicación de esta herramienta a través de un ejercicio real y con el propósito de validar un cuestionario; para la última fase se analizaron los resultados de los siete jueces participantes. Los hallazgos muestran que el uso de la herramienta virtual facilita la organización de la información en ítems por dimensión, así como el registro de la opinión de los jueces por las categorías de claridad, coherencia, relevancia y suficiencia.

### ABSTRACT

#### Keywords

Content validity, experts  
judgement, virtual tool,  
research methodology

*The study describes the advantages of using a virtual tool designed to validate the content of research instruments, through the technique of expert judgment. This study presents the results of a survey applied to experts who participated as judges in the content validation, exposing their opinion and experiences in the validation of instruments. The methodological design included three phases: the first, related to the design of the virtual tool; subsequently, the application of this tool through a real exercise and with the purpose of validating a questionnaire; for the last phase the results of the seven judges participants were analyzed. The findings show that the use of the virtual tool facilitates the organization of the information in items by dimension, and the registration of the opinion of the judges by the categories of clarity, coherence, relevance and sufficiency.*

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## INTRODUCTION

Reliable as well as valid instruments are important to carry out research in education. There are several types of validity and among those of greater use are the validity of construct, criteria and content. This article uses content validity to present the proposal of virtual tool. It is worth mentioning that said tool was used previously to validate a Web survey as part of a doctorate research on Educational Systems and Environments of the Pedagogy Faculty at Universidad Veracruzana. To do so, this procedure was taken as reference to exemplify the real use of the tool.

Part of the interest to present this paper was to show the advantages that the use of a virtual tool designed specifically to validate the content of instruments by an expert committee represents. This assignment has various implications for those acting as judges since it requires specific knowledge and experience, time and organization in their activities in order to develop said assignment in a timely manner.

The analysis carried out of the items that make up an instrument will depend on the researcher's intended objectives, the support requested from the judges, as well as the statistic method to be used. Some recommendations or suggestions might even arise to improve the drafting or content of the items that make up the instrument which must be considered to achieve a better definition of the aspect to be measured.

The methodological reference for the validity process was taken up again mainly from Escobar and Cuervo (2008) proposal. These authors developed a four-category template: clarity, coherence, relevance and sufficiency. Likewise, they defined the content validity by expert opinion as "an informed opinion of people with reported experience on the topic, recognized by other qualified experts on said topic and are capable of giving precise information, evidence, opinions and assessments" (p.29). Hence, the selection of judges is significant since it is important to clarify if said people are knowledgeable of the topic given their academic training or their work experience. In addition, their occupations should be considered as well as the time to carry out the validation assignment.

The opinion of experts is a strategy with extensive benefits. Cabrero and Llorente (2013) summarize them as follows:

the theoretical quality of the response obtained from the person, the level of depth of the assessment offered, its facility to put into action, the absence of many technical and human requirements for its execution, the power of using different strategies to collect information is of great utility to determine the knowledge of the contents and difficult, complex and innovative or not well studied topics, and the possibility to obtain detailed information on the topic argued in the study (p. 14).

Given the benefits this type of procedure represents, its use is largely diffused. A variety of procedures for the analysis of data are clearly

distinguishable in some research articles identified in the literature on the topic. For example, Robles and Rojas (2015) carried out the validation of instruments for the applied linguistics environment with the object of obtaining data on the students' oral expression. To do so, they resorted to the expert opinion procedure to validate items and descriptors, as well as the equivalence of instructions.

Pedrosa, Suárez-Álvarez & García-Cueto (2013) described different methods to assess the content validity. Its characteristics are summarized as follows:

- The method is based on Tucker's factorial analysis that considers the scores given by the judges to the relevance of the items.
- Lawshe's index of content validity identifies if the individual assessment of items is adequate or not through the content validity ratio (CVR).
- Through Rovinelli and Hambleton's index of item-objective congruence, the judge rates items on how well said items tap or not the established objectives using ratings +1 or -1.
- Hambleton's index of congruence is a variant of the foregoing method. The only difference is that Hambleton's index is a congruence index between the item and the construct.
- Akin's V is similar to Hambleton's method and focuses also on the item-construct relevance. However, Akin's method takes into consideration the number of experts participating.
- Sireci and Geisienger's clarification and cluster analysis values the similarity rate of the group of items based on the multidimensional scaling and cluster analysis.
- Levine, Maye, Ulm and Gordon's minimum capacities method focuses on the level of the minimum capacity or ability required to achieve some criteria successfully.
- Interpercentiles range method adjusted to Fitch symmetry, also known as IPRAS, uses a nine-point Likert scale that evaluates adequacy and relevance.
- Hernández-Nieto's content validity coefficient evaluates the degree of agreement per item among judges.
- Rubio's factorial validity index combines three indexes and links construct and content validity.
- Claeys, Neve, Tulkens and Spinewine's average deviation mean index calculates the content validity and the average deviation mean indexes to evaluate the agreements, regardless if the items have been evaluated positively or negatively.

Since some of the methods have been designed only to measure the agreement between two judges, and others require a greater number of participants, it is advisable to estimate the number of judges that will participate according to the test characteristics and the corresponding statistic analysis.

In regard to the participation as expert judge, Robles and Rojas (2015) refer to the relevance of acting as such. They point out that said task is fundamental to “eliminate irrelevant aspects and incorporate those that are essential and/or modify those requiring it” (n.p.). The content validity process implies a series of opinions from the experts and, despite unanimous agreement it is possible to identify the weaknesses and strengths of the instrument. This allows the researcher to carry out an in-depth analysis which will prompt making decisions on what has to be modified, integrated or eliminated.

The procedure may vary according to the objectives of the instrument or the context of application, thus, it is also necessary to inform the judges on the background of the instrument construction, as well as the characteristics of the population and place where the application will be carried out. Many a time, instruments are adaptation of others, translations or modified by adding or eliminating items. All of this must be explained to the judges before evaluating the instrument.

#### OPINION ON THE EXPERIENCE OF PARTICIPATING AS AN EXPERT IN A RESEARCH

In order to obtain elements in regard to the experience of validating the content of instruments, we collected opinions of scholars that have participated in this task. The data were obtained through an online survey applied to different scholars. The participants were eight Ph.D. professors belonging to four higher education institutions: Universidad Veracruzana, Instituto Tecnológico de Sonora, Benemérita Universidad Autónoma de Puebla and Universidad Autónoma de México, whose service seniority ranged from sixteen to thirty-one years. These scholars’ service experience focuses on research and university teaching. Their training focuses on areas such as research in psychology, higher education and public politics, communication and educational technology.

The Ph.D. participants answered a twelve-question online survey focused on exploring how many times they have participated as expert judges; the most usual ways they have received the request to act as such; the criteria for which they believe they were chosen; the satisfaction they feel in carrying out said task, and if they consider said task as being easy, difficult, entertaining or tedious.

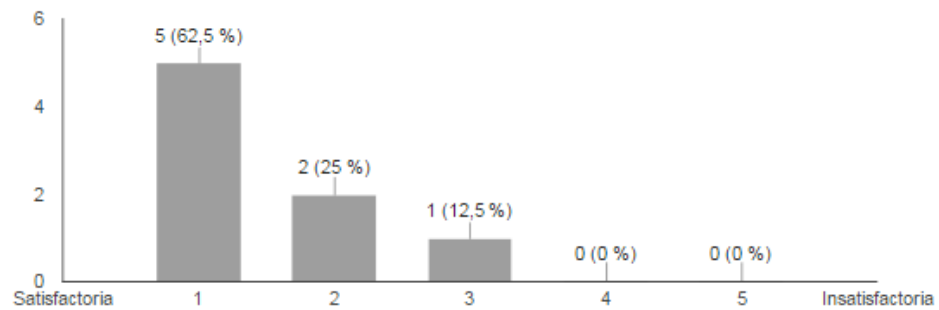
They were also asked if they had to turn down said activity; the time they invested in carrying it out; the communication they have established with the researcher who required their support and opinion in carrying out the validation in person or online. The survey they received can be found at <https://goo.gl/forms/J3z4vhUk6l1pUzL12>, which corresponds to Google Forms.

In regard to the experience of the scholars participating in the validation of instruments, 62.5% indicated having carried out this task more than 16

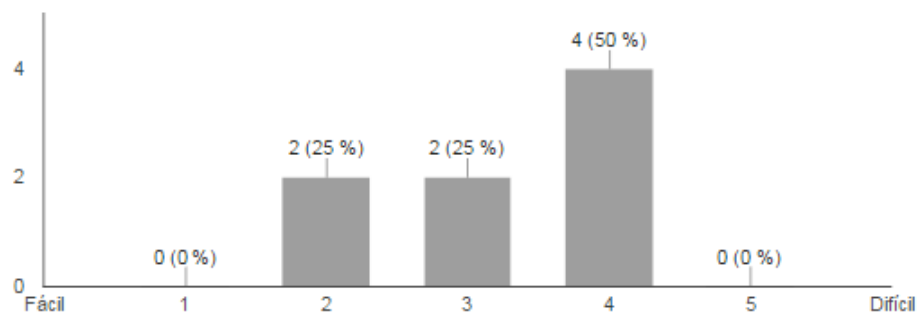
times; 12.5%, between 6 and 15 times; and 25%, had less than five (5) opportunities to do so. The foregoing shows that the participants are people with vast experience and are knowledgeable of the different procedures of this task. In regard to the most recurrent ways of receiving the invitation to participate, they all agree to have been invited through some virtual means, by e-mail mainly.

When asked what they believed was the selection criterion to participate as judges, 87.5% indicated that they were chosen based on their knowledge of research more than their academic level. None of them considered they were chosen based on their work experience.

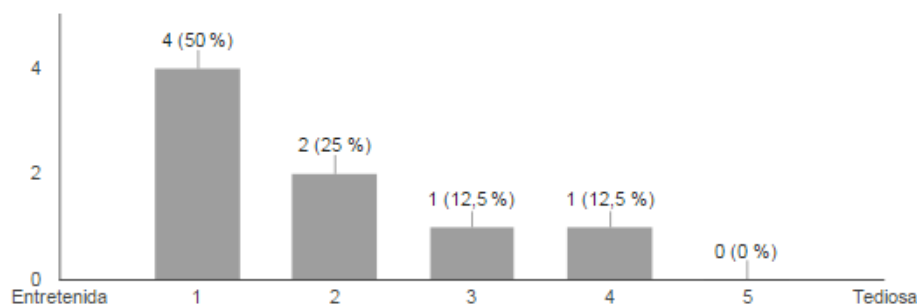
The majority of the academic participants defined the task of expert judge as satisfactory. They also qualified it as difficult and frequently as entertaining (See Graphs 1, 2 and 3).



**Graph 1.** Opinion of the expert judges in regard to the satisfaction produced in validating an instrument



**Graph 2.** Opinion of the expert judges in regard to the difficulty represented in validating an instrument



**Graphic 3.** Opinion of the judges on if the task of validating an instrument is entertaining or tedious

While the activity is not an easy one, the Ph.D. scholars indicated they have never refused participating as judges, unless the topic did not correspond to their field of knowledge. Notwithstanding, they identified a series of problems to carry out the validation process, among which they have highlighted the following:

- The quantity of dimensions or variables intended to be measured. At times, they are very different instruments that include multiple dimensions without clear separation between one and other.
- The lack of clarity of the criteria to carry out the evaluation; the instrument is received without specifying the process expected which leaves the judge the responsibility of interpreting the objective.
- Confusing approach or problems in defining the objective of the instrument: the dimensions that make it up or the categories to evaluate. This could occur because of problems in the drafting but also of confusion in the content.
- The lack of consideration of the researcher in not allocating the expert judge sufficient time to go over the instrument due to the judge's work load. The working conditions of the professors-researchers are such that it is almost impossible for them to review the instrument in a week or less.
- At times, the instruments are quite lengthy and they require to be reviewed thoroughly by parts.

These problems are also reflected in a greater loss of time since dialogue is needed to clarify the situations that arise, redefine times, redraft some items, explain the objectives or categories verbally, among others, that are also time-consuming for the judges.

When the judges were asked about the benefits they encountered in carrying out the review online, they indicated that this option is more comfortable and dynamic. They can distribute their time better. They

consider it quicker since the information is captured easily, it is more concrete and ambiguities are reduced. Furthermore, they do not lose the possibility of contacting the researcher and they can make the most of the technology to express their doubts about the work or get feedback.

Having as reference the positive opinions of the expert judges on the online validation processes, there is a greater certainty that using the proposed virtual tool is possible, since its use aims at resolving some of these difficulties, not only for the role of the judge, but also for the researcher who can fill the template of the tool with the information of his instrument, the instructions considered necessary and retrieve the information on a worksheet. The foregoing saves time and omissions in sending information to the judges are avoided.

#### VIRTUAL TOOL: ITS CATEGORIES AND FORMS OF USE

Research in education poses several challenges. In order to develop it adequately, it is essential to rely on a tool that facilitates some of its processes, above all for aspects as relevant as the validation of the instrument used to collect data on which the stated objectives depend to obtain reliable or coherent results.

The virtual tool designed was based on coherence, relevance, clarity and sufficiency, the four categories established by Escobar and Cuervo (2008) to validate the content of items through a template. In regard to sufficiency, the evaluation cannot be per item but rather per group of items that make up a dimension to be evaluated since what is being evaluated is the sufficiency or insufficiency of the items. There are four numeric indicators per category that represent the opinion of the judge assessing to which extent each item meets the category indicated (See Table 1).

**Table 1.** Categories of the Virtual Tool and Indicators

Categories	Indicators
Sufficiency The items pertaining to a same dimension suffice to obtain their measurement.	<ol style="list-style-type: none"> <li>1. The items do not suffice to measure the dimension.</li> <li>2. The items measure some aspects of the dimension; however, they do not correspond to the total dimension.</li> <li>3. Some items must be increased to be able to evaluate the dimension completely.</li> <li>4. The items do not suffice.</li> </ol>



<p><b>Clarity</b> The item is easily understood, i.e., its syntax and semantics are adequate.</p>	<ol style="list-style-type: none"> <li>1. The item is unclear.</li> <li>2. The item requires considerable modifications or a huge modification in the use of words according to their meaning or their order.</li> <li>3. Some of the terms of the item require a very specific modification.</li> <li>4. The item is clear, its semantics and syntax are adequate.</li> </ol>
<p><b>Coherence</b> The item has a logical relation with the dimension or indicator being measured.</p>	<ol style="list-style-type: none"> <li>1. The item has no logical relation with the dimension.</li> <li>2. The item has a tangential relation with the dimension.</li> <li>3. The item has a moderate relation with the dimension being measured.</li> <li>4. The item is completely related with the dimension being measured.</li> </ol>
<p><b>Relevance</b> The item is essential or important, i.e., it must be included.</p>	<ol style="list-style-type: none"> <li>1. The item can be eliminated without affecting the dimension measurement.</li> <li>2. The item has some relevance; however, another item may include what is being measured.</li> <li>3. The item is relatively important.</li> <li>4. The item is very relevant and must be included.</li> </ol>

Source: Adapted from Escobar & Cuervo (2008, p. 37).

Note: Four categories were considered to develop the virtual tool. Indicator One of the categories is assigned when the item does not comply with the category, and so on until reaching category four which indicates that the item comply totally with the expectations pointed out in the definition of the category. Sufficiency is the only case qualified by dimension and not by item.

The virtual tool is called “Template to evaluate the content validity through expert judges” and it consists of two main templates: a template to register the data from the assessing judge, and the other, to register the qualification and observations for each item and so, participate in the content validation process. The form was set up on the Web PHP programming platform and linked to a MySQL database development. The system is hosted on a free site with a domain that requires the use of subnets. The name of the subnet was validity and the domain was total net, thus the access protocol became: <http://validez.totalh.net>

The proposal for the validation through the virtual tool described can be applied to two or more judges, according to the number determined by the



researcher. In order to achieve the expected data, we recommend following these five steps:

- Send every judge an invitation to participate, highlight the reasons why he/she was chosen and suggest an approximate time to return the results.
- Make sure to attach the electronic file with the instrument to be validated and insert the link of the tool “Template to evaluate the content validity through expert judges”, make sure that the definition of the categories to be evaluated and the dimensions that make up its instrument are clear.
- Review the MySQL database to identify the number of judges that have not responded, and if necessary, send a reminder notice or invite another expert.
- Conduct a data statistical analysis and review the low score items.
- Rework, correct, increase or omit those items that received specific observations from a judge, as the case may be.

The template aforementioned is made up of two screens to ensure that the explanation of the process is clear and comes with an example of the content validation of the web survey in which seven expert judges participated. The first screen shows the name of the instrument to be validated, the reason for which he/she was chosen as expert judge, the objective of the instrument, the filling instructions and a form to collect the expert judge’s data. However, this screen may contain other data such as: the population it addresses, the time for its validation, if the instrument is part of some graduate research, if it is an adaptation of some other instrument, in fact, all the information that the judge may use as background and which clarifies what is expected from him/her or from his/her participation (See Figure 1).

**Figure 1.** First Screen of the Virtual Tool

After filling out the form with his/her personal data, the judge may press the key to continue, and a new screen opens (See Figure 2). The judges will see a table.

Id	Items	Indicadores	Evaluación de la validez de Contenido		
			Coherencia	Relevancia	Claridad
1	¿Tienes una computadora (ordenador) en casa?	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
2	Marca a cuáles de los siguientes dispositivos que pueden realizar conexión a Internet tienes acceso	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
3	¿Puedes conectarte a Internet desde tus dispositivos te resulta:	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			

**Figure 2.** Second Screen of the Virtual Tool, Parts A, B and C

Column A identifies the number of items in ascending and consecutive order, as shown in the instrument. B indicates the items to be valued and C contains a scale from 1 to 4 and the judge clicks on the indicator he/she considers appropriate according to the coherence, relevance and clarity categories.

The indications the judge has to follow unfold on the right of the screen aforementioned, as well as the description of the dimensions to be evaluated. In this case, it is an example which can be substituted according to every instrument. To facilitate the evaluation of every item, swipe the pointer on the list of dimensions and these unfold in a tooltip and appear exactly as those on the real instrument. This is very useful for multiple-choice items.

Id	Items	Indicadores	Evaluación de la validez de Contenido		
			Coherencia	Relevancia	Claridad
1	¿Tienes una computadora (ordenador) en casa?	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
2	Marca a cuáles de los siguientes dispositivos que pueden realizar conexión a Internet tienes acceso	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
3	¿Puedes conectarte a Internet desde tus dispositivos te resulta:	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
4	En qué lugar (hogar, escuela, oficina) puedes acceder a Internet?	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
5	¿Cuándo realizas actividades académicas que requieren hacer uso de una computadora (ordenador) lo haces principalmente en:	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
6	Elige la opción que utilizas con más frecuencia	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
7	En casa con tus propios dispositivos	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
8	En la casa de algún compañero con sus dispositivos	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
9	En la escuela en el centro de cómputo o aula de informática	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
10	En la escuela en el dispositivo del algún compañero	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
11	Vas a un local comercial a rentar una computadora	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
12	Otro: _____	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
13	¿Has tomado algún curso o asignatura que requiera utilizar el Internet?	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			
13	En caso de haber tomado algún curso o asignatura con la que aprendiste a utilizar el Internet, ¿cómo defines esa experiencia?	1. No coincide con el criterio 2. Bajo Nivel 3. Moderado nivel 4. Alto nivel			

**Figure 3.** Second Screen of the Virtual Tool, Parts D and E

Lastly, since the sufficiency category is evaluated by dimension and not by item, this caption has been placed at the end of the second screen (Figure 3), together with an open space for observations (See Figure 4).

Dimensión	Evaluación de Suficiencia				Escriba aquí sus Observaciones
	1. No cumple con el criterio	2. Bajo Nivel	3. Moderado nivel	4. Alto nivel	
1 Acceso a dispositivos y conectividad	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2 Experiencia en Hardware y Software básico	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3 Actitudes hacia el uso de TIC	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	

**Figure 4.** Section of the screen to evaluate the sufficiency of the items per dimension and to include observations

There are three dimensions given as examples which are modifiable according to each instrument. The sufficiency is evaluated by dimension and is carried out to identify if the quantity of items suffices to measure the dimension to which it belongs. The observation section remains open to include the suggestions the judges believe relevant.

After the expert judges have completed the evaluation, the information is saved in a MySQL database from which the information can be exported to a worksheet or any other program to be statistically analyzed. Likewise, it is necessary to read the recommendations made by the judges in the observation section.

The following observations were received from one of the judges who evaluated the instrument through the virtual tool:

- Question 16.5: The expression “in my study” constrains the context of ICT usability. Therefore, it could be expanded to “my educational or work activities”.
- Question 16.7: The term “methodology” has a different use according to the context of usage. However, most of the time, it is used in the field of research. Therefore, I suggest using “participating in educational strategies that...” so the professor or the student may be involved as subjects.
- Question 16.19: Instead of “introduce”, “incorporate” the ICTs in the educational processes or school activities (Judge 01).

The participation of the judges can be directed to the improvement of some items but also to general aspects. For example:

The reagents drafted in negative are not recommendable since they imply a double negative. I suggest translating them into positive. For example, the reagent “it does not seem convenient to introduce the ICT...” can be drafted as “it seems inconvenient...” (Judge 04).

Thus, we have the opinions of the expert judges and the contributions for each dimension, item or category are weighed objectively. The elements are reviewed and are reassessed to validate the content of the instrument and this concludes when the items are coherent, clear, relevant and sufficient.

## CONCLUSION

The proposal of using this virtual tool to facilitate the process for the researcher and the judges focuses on improving aspects such as: respect the timetable of the researcher and the judges; specify the quantity of dimensions or variables to be measured; clarify the criteria for the

validation process; specify the expectations of the process; set the objective of the instrument clearly; explain what each dimension that makes up the instrument refers to; and facilitate the registration information.

The process to make the content validation of the research instruments through expert judges possible is more efficient when the expectations for each instrument are specified and when the time spent by the judges on said validation is taken into consideration given their workload. The use of the virtual tool has the benefit of asynchrony and problems related to distance and time are avoided. This situation includes the researcher, since the information collected is saved in a MySQL database which facilitates the exportation of data to a worksheet or to programs for the statistical analysis, thus saving on the transcription of the information of each participating judge.

According to the method of information analysis, it is convenient to identify the items or dimensions that presented greater discrepancies among judges or those that received a low score, or negative agreements in regard to some of the categories evaluated. This way, it is possible to work on improving the items that require improvement until the instrument content is valid and then move to the next step of the pilot instrument.

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