



ORIGINAL

Cognitive accessibility in health care institutions. Pilot study and instrument proposal

Accesibilidad cognitiva en instituciones de salud. Estudio piloto y propuesta de instrumento

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ABSTRACT

Introduction: cognitive accessibility is part of the overall accessibility framework. Cognitive accessibility means that services are simple, coherent, clear, multimodal, error tolerant and focused, taking into account all users.

Aims: to validate a questionnaire on cognitive accessibility to be applied to health professionals.

Methods: the study has a quantitative approach, with a non-experimental and cross-sectional design, developed in the period between March and June 2022. The sample consisted of 130 health professionals in Argentina, selected by means of purposive sampling.

Results: the validation process was carried out in three stages. The analysis of internal consistency (reliability) was performed through Cronbach's Alpha. The descriptive results with the 17 items showed a variance of each item of 4,445, a total variance of 13,049, with a total Cronbach's Alpha of 0,701, showing that the instrument presents internal consistency.

Conclusions: it was possible to verify that the scores of both Cronbach's Alpha and the factorial analysis, allow affirming that the instrument has the necessary metric aspects to be used in future research, taking into account that the instrument had a previous evaluation by expert criteria. It can be considered that this article becomes the starting point for future studies, in which it is intended to continue the line of research, which allows the analysis of cognitive accessibility in the context of health professionals.

Keywords: Cognitive Accessibility; Pictograms; Health Personnel; Validation Study; Instrument Validation.

RESUMEN

Introducción: la accesibilidad cognitiva forma parte del marco general de accesibilidad. La accesibilidad cognitiva significa que los servicios sean sencillos, coherentes, claros, multimodales, tolerantes a los errores y centran la atención, teniendo en cuenta a todos los usuarios.

Objetivos: validar un cuestionario sobre accesibilidad cognitiva para aplicar en profesionales de la salud

Métodos: el estudio es de enfoque cuantitativo, con diseño no experimental y transversal, desarrollado en el período comprendido entre marzo y junio de 2022. La muestra estuvo constituida por 130 profesionales de la salud de Argentina, seleccionados mediante un muestreo intencional.

Resultados: el proceso de validación se realizó en tres etapas. El análisis de consistencia interna (fiabilidad) se realizó a través del Alpha de Cronbach. Los resultados descriptivos con los 17 ítems mostraron una varianza de cada ítem de 4,445, una varianza total de 13,049, con un Alpha de Cronbach total de 0,701, mostrando que el instrumento presenta consistencia interna.

Conclusiones: se pudo comprobar que las puntuaciones tanto del Alpha de Cronbach y el análisis factorial, permiten afirmar que el instrumento cuenta con los aspectos métricos necesarios para utilizar en futuras

investigaciones, teniendo en cuenta que el instrumento contó con una valoración previa por criterios de expertos. Se puede considerar que se convierte este artículo en el punto de partida para próximos estudios, en las que se pretenden continuar la línea de investigación, que permita analizar la accesibilidad cognitiva en el contexto de los profesionales de la salud.

Palabras clave: Accesibilidad Cognitiva; Pictogramas; Personal de Salud; Estudio de Validación; Validación de Instrumento.

INTRODUCTION

Cognitive accessibility is part of the general accessibility framework. Cognitive accessibility means that services are simple, consistent, clear, multimodal, error tolerant, and focused, with all users in mind.⁽¹⁾

Studies anticipate that user communication methods are an excellent strategy for improving cognitive accessibility by introducing individualized and adaptive interfaces.^(2,3)

Guillomía et al.⁽⁴⁾ state that the key concepts for cognitive accessibility are information processing, comprehension, easy reading, and signaling, which are studied in two support applications: indoor communication and orientation. In addition, it is highlighted that cognitive accessibility benefits all populations, not just people with special needs.

Cognitive accessibility is a burden that must be overcome to achieve social participation. The interface design must contemplate its appearance, usability, and content from this point of view.

In the Argentine context, there are cognitive accessibility programs in the municipalities of San Fernando del Valle de Catamarca (Catamarca),⁽⁵⁾ Esquel (Chubut),⁽⁶⁾ Rosario (Rosario),⁽⁷⁾ and only one investigation on the implementation of a "Signage Program with cognitive accessibility" in the city of Olavarría (Buenos Aires).⁽⁸⁾

It is considered essential to study cognitive accessibility in health institutions, and there are no questionnaires that allow, in principle, to carry out a situational diagnosis in the Argentine and Latin American contexts. This study was carried out to validate a questionnaire on cognitive accessibility to apply to health professionals.

METHODS

The study is of a quantitative approach, with a non-experimental and cross-sectional design, developed between March and June 2022.

The sample consisted of 130 health professionals from Argentina, selected by purposive sampling.

The inclusion criteria were: health professionals working in Argentina's public or private institutions.

An instrument was designed for the Argentine context, based on the authors' expertise and taking previous research on cognitive accessibility as a reference.

For the development of this research, the ethical aspects of research in human beings contained in the Declaration of Helsinki⁽⁹⁾ were considered. In addition, the informed consent of the participants was required at the time of entry into the research.

RESULTS AND DISCUSSION

Description of the validation process

First, a bibliographical review was carried out to have a theoretical basis and make operational and conceptual definitions of cognitive accessibility.

Based on the previous theoretical activities, an initial version of the instrument was designed, consisting of three dimensions: sociodemographic, conceptual, and perceptions of cognitive accessibility.

The instrument questions were written in affirmative or interrogative sentences, depending on the type. The initial version consisted of 17 questions.

The final version before the pilot study was approved by expert judgment made up of 3 professionals who gave their opinion on the wording's relevance, sufficiency, and clarity.

The definitive version after the adjustments derived from the observations of the experts can be accessed in Supplementary Material 1.

The construct validation and reliability calculation were carried out in the second stage in a pilot test.

To confirm the proportion of the variability of the results, Cronbach's Alpha 10 was used, and when confirming a highly reliable value, a factorial analysis was performed.

Validation results

The results of the distribution of the variance of the items by factor are shown in table 1.

Table 1. Analysis of variance by item

Item	Variance
Item 1	0,477
Item 2	0,477
Item 3	0,477
Item 4	0,151
Item 5	0,249
Item 6	0,489
Item 7	0,064
Item 8	0,250
Item 9	0,477
Item 10	0,155
Item 11	0,151
Item 12	0,248
Item 13	0,477
Item 14	0,008
Item 15	0,051
Item 16	0,058
Item 17	0,186

Internal consistency analysis (reliability) was performed using Cronbach's Alpha. The descriptive results with the 17 items showed a variance of 4,445 for each item, a total variance of 13,049, with a total Cronbach's Alpha of 0,701, indicating that the instrument presents internal consistency.

According to López et al.⁽¹¹⁾, the validation of instruments is considered a type of study within the intervention studies, that is, at the same level as the experimental, quasi-experimental, among others.

The proposed instrument showed an acceptable internal consistency so that other researchers could use it; Cronbach's Alpha and factorial analysis allows us to determine the internal consistency of the items and how they behave among themselves. It is exploratory and aims to discover the underlying structure in the data, that is, the internal structure of a large number of variables.

The effectiveness of health education materials and signage in health institutions depends to a large extent on their legibility and cognitive accessibility.⁽¹²⁾

For this reason, the World Health Organization recommends several principles about universal and cognitive accessibility.⁽¹³⁾

However, studies indicate that many health education materials and signage in health institutions are more complicated than expected, so lay readers find it difficult to understand them, which will inevitably compromise the effectiveness of the intervention and increase the health risks.^(14,15)

In this sense, implementing this instrument as a survey of the status of cognitive accessibility will serve to take concrete strategies to sensitize and train health professionals regarding cognitive accessibility.

Study limitations

On the other hand, the lack of return of contact by email and WhatsApp about the sample selection process is necessary to develop subsequent studies and correlate with qualitative research.

CONCLUSIONS

Bearing that the validation of instruments is a fairly common practice for researchers in health sciences, it is necessary to ensure that the measurement instrument presents the same metric properties.

It was possible to verify that the scores of both Cronbach's Alpha and the factorial analysis allow us to affirm that the instrument has the necessary metric aspects to be used in future research, considering that it had a prior assessment by expert criteria.

It can be considered that this article becomes the starting point for future studies, in which it is intended to continue the line of research, which allows the analysis of cognitive accessibility in the context of health professionals.

REFERENCES

1. Kärpänen T. A Literature Review on Cognitive Accessibility. *Stud Health Technol Inform* 2021;282:259-

70. <https://doi.org/10.3233/SHTI210402>.

2. Gullà F, Cavalieri L, Ceccacci S, Germani M, Bevilacqua R. Method to design adaptable and adaptive user interfaces. *Communications in Computer and Information Science*, Los Angeles: Springer Verlag; 2015, p. 19-24. https://doi.org/10.1007/978-3-319-21380-4_4.

3. Smirek L, Zimmermann G, Beigl M. Just a Smart Home or Your Smart Home - A Framework for Personalized User Interfaces Based on Eclipse Smart Home and Universal Remote Console. *Procedia Computer Science* 2016;98:107-16. <https://doi.org/10.1016/j.procs.2016.09.018>.

4. Guillomía MA, Artigas JI, Falcó JL. Cognitive Accessibility and Support in Special Education. *Sensors (Basel)* 2021;21:4871. <https://doi.org/10.3390/s21144871>.

5. Concejo Deliberante de la Ciudad de San Fernando del Valle de Catamarca. Ordenanza No 7892/21 2021. <https://www.catamarcaciudad.gob.ar/transparencia/archivos/Boletines/2021/BM-142-2021.pdf>

6. Municipalidad de Esquel. Ordenanza N° 182/22 2022. https://www.esquel.gov.ar/sites/default/files/boletin_municipal_21_2022.pdf

7. Consejo Municipal de Rosario. Ordenanza No 10171/2020 2022. <https://www.rosario.gob.ar/normativa/verArchivo?tipo=pdf&id=168990>

8. Rohvein CA, Spina E, Colo IP. Planificación, diseño y ejecución de un Programa de señalética con accesibilidad cognitiva. *Masquedós - Revista de Extensión Universitaria* 2021;6:9-9.

9. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. *JAMA* 2013;310:2191-4. <https://doi.org/10.1001/jama.2013.281053>.

10. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951;16:297-334. <https://doi.org/10.1007/BF02310555>.

11. López Fernández R, Avello Martínez R, Palmero Urquiza DE, Sánchez Gálvez S, Quintana Álvarez M, López Fernández R, et al. Validación de instrumentos como garantía de la credibilidad en las investigaciones científicas. *Revista Cubana de Medicina Militar* 2019;48.

12. Gal I, Prigat A. Why organizations continue to create patient information leaflets with readability and usability problems: an exploratory study. *Health Educ Res* 2005;20:485-93. <https://doi.org/10.1093/her/cyh009>.

13. Ji M, Liu Y, Hao T. Predicting Health Material Accessibility: Development of Machine Learning Algorithms. *JMIR Med Inform* 2021;9:e29175. <https://doi.org/10.2196/29175>.

14. Smale M, Renfrew MJ, Marshall JL, Spiby H. Turning policy into practice: more difficult than it seems. The case of breastfeeding education. *Matern Child Nutr* 2006;2:103-13. <https://doi.org/10.1111/j.1740-8709.2006.00045.x>.

15. Williams AM, Muir KW, Rosdahl JA. Readability of patient education materials in ophthalmology: a single-institution study and systematic review. *BMC Ophthalmol* 2016;16:133. <https://doi.org/10.1186/s12886-016-0315-0>.

SUPPLEMENTARY MATERIAL 1

The objective of this work is to gather information on the use of cognitive accessibility tools in hospitals and health centers to improve the care and quality of life of patients with comprehension challenges.

Its purpose is to know the use of cognitive accessibility tools in the context of the health system in Argentina and it is oriented to physicians, technicians, nurses, administrative staff and other health professionals.

The instrument is anonymous and its results will only be used for research purposes.

We invite you to participate so that we can make progress in improving cognitive accessibility.

Thank you in advance.

Training or field:

Medicine.

Kinesiology and Physiatry.

Nutrition.

Nursing.

Bachelor's Degree in Nursing.

Surgical Instrumentation.

Music Therapy.

Health Services Administration.

Pharmacy.

Biochemistry.

Other: _____

Place of Work

Buenos Aires

Ciudad Autónoma de Buenos Aires

Catamarca

Chaco

Chubut

Córdoba

Corrientes

Entre Ríos

Formosa

Jujuy

La Pampa

La Rioja

Mendoza

Misiones

Neuquén

Río Negro

Salta

San Juan

San Luis

Santa Cruz

Santa Fe

Santiago del Estero

Tierra del Fuego, Antártida e Islas del Atlántico Sur

Tucumán

Field

Public

Private

Both

Do you know what accessibility is?

Yes

No

Do you know what cognitive accessibility is?

Yes

No

To the best of your knowledge, which of these three concepts do you consider to be cognitive accessibility?

1. Cognitive accessibility is the characteristic of environments, processes, activities, services, objects, and devices that enable easy understanding and communication.

2. Cognitive accessibility is the condition that environments, processes, goods, products and services, as well as objects or instruments, tools and devices, must meet in order to be understandable, usable and practicable by all people in conditions of safety and comfort and in the most autonomous and natural way possible. It presupposes the strategy of "universal design or design for all people", and is understood without prejudice to the reasonable adjustments to be adopted.

3. Cognitive accessibility is the necessary and appropriate modifications and adaptations that do not impose a disproportionate or undue burden, when required in a particular case, to ensure to persons with disabilities the enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms.

Have you ever been offered or had any accessibility training?

Yes

No

Do you know who the cognitive accessibility tools are intended for?

Yes

No

Check according to your considerations, to whom of these people are the cognitive accessibility tools addressed to:

People with intellectual disabilities

All persons

People with intellectual disabilities

Children

Elderly

People with acute illnesses

People with chronic diseases

Do you know what a pictogram is?

Yes

No

Is your workplace (hospital, sanatorium, doctor's office, clinic, etc.) marked with signs, arrows, numbers, pictures, etc.?

Yes

No

In your workplace, do you use images as an anticipatory resource such as photos and pictograms for the practices or interventions you perform?

Yes

No

What type of cognitive accessibility tool you use (you can choose more than one)

Pictograms

Technological devices Which one

Social Stories

SAAC (Augmentative and Alternative Communication Systems)

Anticipatory badges

None

Other:

Do you believe that visuals can enhance the understanding of certain types of people elderly, people with intellectual disabilities, people with autism, etc.

Yes

No

Would you be interested in learning more about cognitive accessibility?

Yes

No

Do you know what autism is or do you know people with autism?

Yes

No

Do you know what sensory hypersensitivity is or do you know people with sensory hypersensitivity (tactile, auditory)?

Yes

No