



EXPLORANDO PATRONES EN CUESTIONARIOS DE SENSACIÓN DE PRESENCIA: UN ESTUDIO COMPARATIVO

EXPLORING PATTERNS IN PRESENCE QUESTIONNAIRES: A COMPARATIVE STUDY

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INTRODUCCIÓN

La sensación de presencia se ha definido como un estado psicológico o una percepción subjetiva en la que la tecnología media la experiencia del individuo, pero el entorno se percibe como si la tecnología no estuviera involucrada [9]. Comprender y cuantificar este fenómeno multidimensional [9] con precisión este fenómeno sigue siendo un desafío ambiguo. La presencia es una sensación subjetiva o manifestación mental que no es fácilmente susceptible de definición y medición [10] Se han desarrollado numerosos cuestionarios para medirla, y algunos son comúnmente utilizados en diversos campos de estudio. Por ejemplo, destacan ITC-Sense of Presence Inventory o ITC-SOPI [1], Mec spatial presence questionnaire o MEC-SPQ [2], I-Group presence questionnaire o IPQ [3], Slater-Usoh-Steed questionnaire o SUS [4], Barfield et al. [5], Biocca et al. [6] y los cuestionarios PQ [7] e ITQ [8] de Witmer-Singer. Sin embargo, la diversidad y falta de cohesión en la estructura de estos instrumentos representa un desafío crítico: preguntas redundantes y constructos con títulos inconsistentes se utilizan para medir conceptos similares, mientras que preguntas idénticas se clasifican bajo constructos diferentes. Estas inconsistencias no solo dificultan la comparación de resultados entre estudios, sino que también comprometen la validez y fiabilidad de las métricas de presencia.

OBJETIVO

Identificar patrones comunes entre los cuestionarios existentes, analizando la relación entre preguntas, constructos y categorías, con el objetivo de contribuir a la creación de métricas estandarizadas para la sensación de presencia.

REFERENCIAS

1. Lessiter J, Freeman J, Keogh E, Davidoff J. A Cross-Media Presence Questionnaire: The ITC-Sense of Presence Inventory. Presence: Teleoperators and Virtual Environments 2001;10:262-97. <https://doi.org/10.1162/105474601300343612>.
2. Vorderer P, Wirth W, Gouveia FR, Biocca F, Saari T, Jäncke F, et al. MEC Spatial Presence Questionnaire (MEC-SPQ): Short Documentation and Instructions for Application. 2004.
3. Berkman MJ, Catak G. I-GROUP PRESENCE QUESTIONNAIRE: PSYCHOMETRICALLY REVISED ENGLISH VERSION. Mugla Journal of Science and Technology 2021;7:1-10. <https://doi.org/10.22531/MUGLAJSCI.882271>.
4. Slater M, Usoh M, Steed A. Depth of Presence in Virtual Environments. Presence: Teleoperators and Virtual Environments 1994;3:30-44. <https://doi.org/10.1162/PRES.1994.3.2.30>.
5. Barfield W, Hendrix C. The effect of update rate on the sense of presence within virtual environments. Virtual Real 1995;1:3-15. <https://doi.org/10.1007/BF02009709>/METRICS.
6. Biocca F, Jin K, Choi Y. Visual Touch in Virtual Environments: An Exploratory Study of Presence, Multimodal Interfaces, and Cross-Modal Sensory Illusions. Presence: Teleoperators and Virtual Environments 2001;10:247-65. <https://doi.org/10.1162/105474601300343595>.
7. PQ: Witmer BG, Singer MJ. Measuring Presence in Virtual Environments: A Presence Questionnaire. Presence: Teleoperators and Virtual Environments 1998;7:225-40. <https://doi.org/10.1162/105474601300343595>.
8. ITQ: Witmer BG, Singer MJ. Measuring Presence in Virtual Environments: A Presence Questionnaire. Presence: Teleoperators and Virtual Environments 1998;7:225-40. <https://doi.org/10.1162/105474601300343595>.
9. International Society for Presence Research n.d. <https://spr.info/> (accessed October 25, 2023).
10. Sheridan TB. Musings on Telepresence and Virtual Presence. Presence: Teleoperators and Virtual Environments 1992;1:102-6. <https://doi.org/10.1162/105474601300343595>.

METODOLOGÍA

Fase 1. Análisis de palabras clave:

Se extrajeron 187 parámetros de 8 cuestionarios o clave, transformando cada pregunta en un parámetro basado en sus palabras clave.

Fase 2. Agrupación de parámetros:

Los parámetros se organizaron en 14 categorías basadas en similitudes de palabras clave.

Fase 3. Comparación con los cuestionarios originales:

Análisis de coincidencias en títulos de constructos y parámetros, e identificación de redundancias y solapamientos entre autores.

El gráfico adjunto ilustra las conexiones y agrupaciones detectadas, destacando los casos de solapamiento y coincidencia.

RESULTADOS Y DISCUSIÓN

Se estudió la relación entre las categorías generadas y los constructos originarios planteados por los autores en cada cuestionario. Las categorías generadas se relacionaron con 70 constructos en total, de los cuales, algunos constructos resultaron con el mismo nombre en distintas de las categorías generadas agrupando un conjunto distinto de preguntas. En concreto, se dieron 10 casos de títulos de constructos repetidos en diferentes categorías, de entre los cuales, 5 casos debidos a constructos del mismo autor distribuidos en categorías distintas, 2 casos donde el mismo constructo apareció en tres categorías, 2 casos con el mismo constructo en cuatro categorías, combinando redundancias intra e inter-autores y 1 caso notable de “spatial presence” repetido seis veces en distintas categorías y por distintos autores.

PROBLEMA DE REDUNDANCIA
Preguntas similares distribuidas entre constructos diferentes.

CONCLUSIÓN

Los posibles problemas de redundancia e inconsistencia destacados en este estudio exploratorio, no solo dificulta la comparación de resultados entre estudios, sino que también compromete la validez general de las métricas de presencia. Para afrontar estas dificultades es crucial generar una taxonomía común para constructos y categorías, crear instrumentos más cohesionados que reduzcan redundancias y faciliten comparaciones, así como ampliar el alcance de este estudio al resto de cuestionarios y validar las agrupaciones y categorías resultantes mediante análisis factorial y pruebas empíricas

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The graph included in this poster visualizes the connections between categories, constructs, and parameters. It highlights the overlaps and the distribution of repeated titles, providing a clear view of the detected issues and patterns.

INTRODUCCION

The sensation of presence has been defined as a psychological state or subjective perception in which technology mediates the individual's experience, but the environment is perceived as if the technology is not involved [9]. Understanding and accurately quantifying this multidimensional phenomenon [9] remains an ambiguous challenge. Presence is a subjective sensation or mental manifestation that is not easily susceptible to definition and measurement [10]. Numerous questionnaires have been developed to measure it, and some are commonly used in various fields of study. For example, notable ones include the ITC-Sense of Presence Inventory or ITC-SOPI [1], MEC Spatial Presence Questionnaire or MEC-SPQ [2], I-Group Presence Questionnaire or IPQ [3], Slater-Usoh-Steed Questionnaire or SUS [4], Barfield et al. [5], Biocca et al. [6], and the PQ [7] and ITQ [8] questionnaires by Witmer-Singer. However, the diversity and lack of cohesion in the structure of these instruments represent a critical challenge: redundant questions and constructs with inconsistent titles are used to measure similar concepts, while identical questions are classified under different constructs. These inconsistencies not only hinder the comparison of results between studies

OBJETIVE

Identify common patterns among existing questionnaires by analyzing the relationship between questions, constructs, and categories, with the aim of contributing to the creation of standardized metrics for the sensation of presence.

REFERENCES

1. Lessiter J, Freeman J, Keogh E, Davidoff J. A Cross-Media Presence Questionnaire: The ITC-Sense of Presence Inventory. Presence: Teleoperators and Virtual Environments 2001;10:262-97. <https://doi.org/10.1162/105474601300343612>.
2. Vorderer P, Wirth W, Gouveia FR, Biocca F, Saari T, Jäncke F, et al. MEC Spatial Presence Questionnaire (MEC-SPQ): Short Documentation and Instructions for Application. 2004.
3. Berkman MJ, Catak G. I-GROUP PRESENCE QUESTIONNAIRE: PSYCHOMETRICALLY REVISED ENGLISH VERSION. Mugla Journal of Science and Technology 2021;7:1-10. <https://doi.org/10.22531/MUGLAJSCI.882271>.
4. Slater M, Usoh M, Steed A. Depth of Presence in Virtual Environments. Presence: Teleoperators and Virtual Environments 1994;3:30-44. <https://doi.org/10.1162/PRES.1994.3.2.30>.
5. Barfield W, Hendrix C. The effect of update rate on the sense of presence within virtual environments. Virtual Real 1995;1:3-15. <https://doi.org/10.1007/BF02009709>/METRICS.
6. Biocca F, Jin K, Choi Y. Visual Touch in Virtual Environments: An Exploratory Study of Presence, Multimodal Interfaces, and Cross-Modal Sensory Illusions. Presence: Teleoperators and Virtual Environments 2001;10:247-65. <https://doi.org/10.1162/105474601300343595>.
7. PQ: Witmer BG, Singer MJ. Measuring Presence in Virtual Environments: A Presence Questionnaire. Presence: Teleoperators and Virtual Environments 1998;7:225-40. <https://doi.org/10.1162/105474601300343595>.
8. ITQ: Witmer BG, Singer MJ. Measuring Presence in Virtual Environments: A Presence Questionnaire. Presence: Teleoperators and Virtual Environments 1998;7:225-40. <https://doi.org/10.1162/105474601300343595>.
9. International Society for Presence Research n.d. <https://spr.info/> (accessed October 25, 2023).
10. Sheridan TB. Musings on Telepresence and Virtual Presence. Presence: Teleoperators and Virtual Environments 1992;1:102-6. <https://doi.org/10.1162/105474601300343595>.

METHODS

Phase 1. Keyword Analysis: 187 parameters were extracted from 8 key questionnaires, transforming each question into a parameter based on its keywords.

Phase 2. Parameter Grouping: The parameters were organized into 14 categories based on keyword similarities.

Phase 3. Comparison with Original Questionnaires: Analysis of matches in construct titles and parameters, and identification of redundancies and overlaps among authors.

The attached graph illustrates the detected connections and groupings, highlighting cases of overlap and coincidence.

RESULTS AND DISCUSSION

The relationship between the generated categories and the original constructs proposed by the authors in each questionnaire was studied. The generated categories were related to a total of 70 constructs, some of which had the same name in different generated categories, grouping a different set of questions. Specifically, there were 10 cases of construct titles repeated in different categories, among which 5 cases were due to constructs from the same author distributed in different categories, 2 cases where the same construct appeared in three categories, 2 cases with the same construct in four categories, combining intra- and inter-author redundancies, and 1 notable case of ‘spatial presence’ repeated six times in different categories and by different authors.

REDUNDANCY ISSUE
Similar questions distributed among different constructs.

INCONSISTENCY ISSUE
Constructs with identical titles used to evaluate different parameters depending on the questionnaire.

CONCLUSION

The potential issues of redundancy and inconsistency highlighted in this exploratory study not only hinder the comparison of results between studies but also compromise the overall validity of presence metrics. To address these challenges, it is crucial to generate a common taxonomy for constructs and categories, create more cohesive instruments that reduce redundancies and facilitate comparisons, as well as expand the scope of this study to other questionnaires and validate the resulting groupings and categories through factor analysis and empirical testing.

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