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Higher education and metaverse, a systematic review in progress

Camilo Jose Peña Lapeira[1] *[0000-0003-3082-9461]*
Andrea del Pilar García Donato[1] *[0000-0003-4576-5085]*
[1] *Corporación Universitaria Minuto de Dios*
cjpena@uniminuto.edu, angarcia@uniminuto.edu

Abstract

Considering that the metaverse, more than a trend, has become a social experience, that also offers the opportunity to adapt to educational contexts, its development is a challenge for higher education, where universities must prepare the academic community for its implementation. We intend to take as a starting point for this process a systematic review, which allows us to obtain a broad overview of the existing scientific literature about the keywords, by establishing a search formula and criteria for the inclusion and exclusion of sources, based on their relevance to address the problem question. Following the PICOC method, a preliminary analysis of the data collected is carried out to identify the conceptual field associated with the research topic, without reaching the indepth analysis of the studies collected, which constitutes a stage to be developed later in the determination of the characteristic and technical elements to be considered for the incorporation of the metaverse in the academic processes.

Keywords: Tecnologí Metaverse, Immersive technology, Research, Higher education.

Introduction

Currently, the incorporation of the metaverse is being explored in higher education and research, where complex situations and experiments can be recreated in an easier and more accessible way, allowing greater flexibility and ability to perform tests and experiments in a controlled environment [1], where through the use of these spaces can change the way we interact with technology and with other users in the virtual world [2].

The aim is to investigate research on implementing the metaverse model in academic processes in higher education, with a view to channeling learning from these investigations that contribute to this process. Consequently, it was planned to develop a systematic review, based on the guidelines of the PRISMA Statement (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020, which presents a methodology that guides how to conduct systematic reviews in a clear, rigorous, and accurate way to identify, select and evaluate relevant studies and answer a research question [3].

Theoretical framework

The metaverse can be defined as "a virtual world that is populated by avatars controlled by users, as well as programmed by systems", which in the case of education represent challenges and opportunities that allow processes to be carried out more efficiently and closer to reality.[4] It is also pointed out that the metaverse should be used consciously and responsibly, to avoid negative effects on health and socialization of users [5].

On the other hand, it is also pointed out that the metaverse should be used consciously and responsibly, to avoid negative effects on the health and socialization of users [5]. Therefore, the metaverse must be re-conducted ethically and with a focus on the well-being of the users. [6,7]

A systematic review provides a synthesis of the state of knowledge in a given area, from which future research priorities can be identified, questions that could not otherwise be answered by individual studies can be addressed, issues in primary research that should be identified be corrected in future studies and generate or evaluate theories about how or why phenomena of interest occur. [8]

Methodology

The starting point was the formulation of a question structured according to the PICO (Participants Intervention Comparison Output) method. For the social sciences, an adaptation is made to remain PICOC, the C at the end representing the context or the circumstances in which the research takes place.[9] For the present case, it is: What are the characteristic and technical elements (Compartition) to be compared?

For the present case: What are the characteristic and technical elements (Compreparation) to consider in the implementation of a metaverse model (Intervention) for the management of research processes (Participants) in the university (Context)?

The search was performed using the relevant Boolean operators. With the sensitive search formula "metaverse AND research", in Scopus, yielding a total of 581 results, the criterion: University OR Higher education was added to the search, obtaining 25 results, with the alternative formula ((metaverse AND research) AND (University OR Higher education). The advanced search formula was: (TITLE-ABS-KEY ((metaverse AND research)) AND TITLE-ABS-KEY ((university OR higher AND education))) AND (LIMIT-TO (DOCTYPE," ar") OR LIMIT-TO (DOCTYPE," cp")).

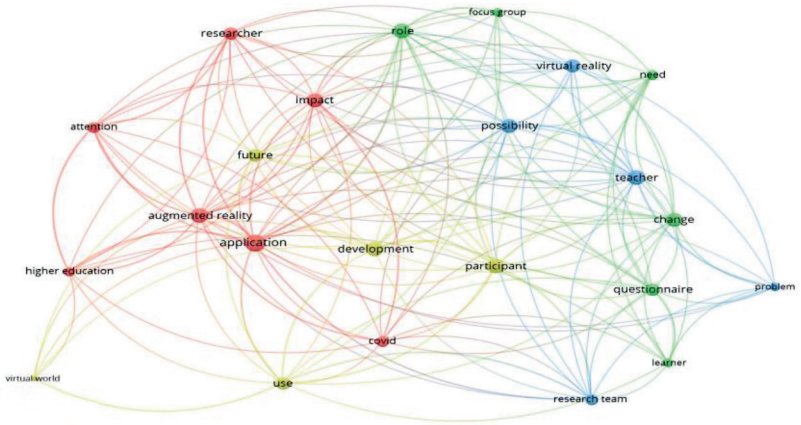
In this way, 21 results were obtained, and 12 results were generated in the Dimensions database. After eliminating duplicate results, those that do not contribute to solving the research question and those that do not contribute to solving the research question or do not provide elements that contribute to the expected sense.

Results

After loading the two databases into VOSviewer, the software was asked to identify the terms with a minimum of 3 occurrences to visualize the co-occurrence of the keywords of the selected studies.

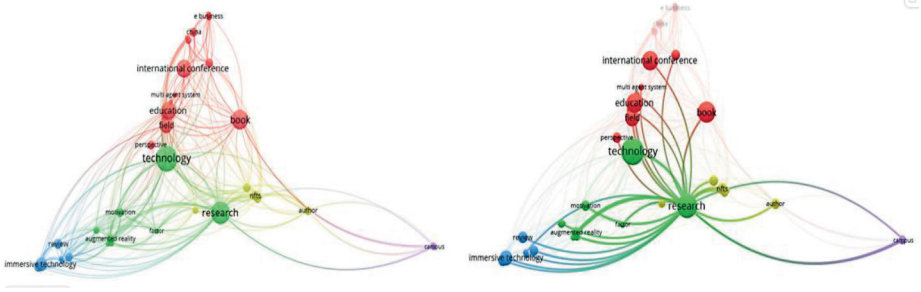
For each of these, VOSviewer calculated a relevance score, selecting 60% of the most relevant terms, i.e. 23 terms, as shown in Figure 1, identifying four clusters, each represented by a color.

Figure. 1. Most relevant terms found



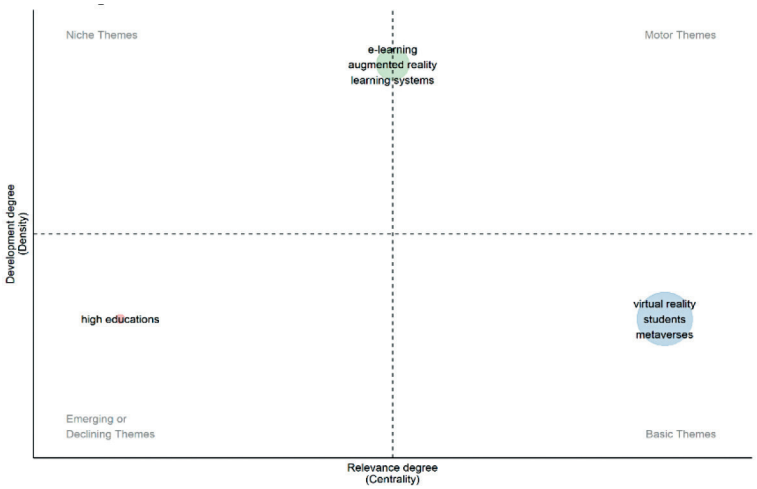
With the data from Dimensions, out of 654 terms found, 66 reach the threshold, and for each of these, VOSviewer calculates a relevance score, determining to select 60% of the most relevant terms, i.e. 40 terms, identifying five clusters, representing the networks of relationships between these terms. Among those that stand out the most are augmented reality, research, virtual reality, and learning (fig 2).

Figure. 2. Representation of clusters and their relationship networks



Now, with the use of the bibliometric software, about the information from Scopus and Dimensions, it is requested to formulate the thematic map, to visualize the topics that are causing impact in the field of interest, as shown in Figure 3 below.

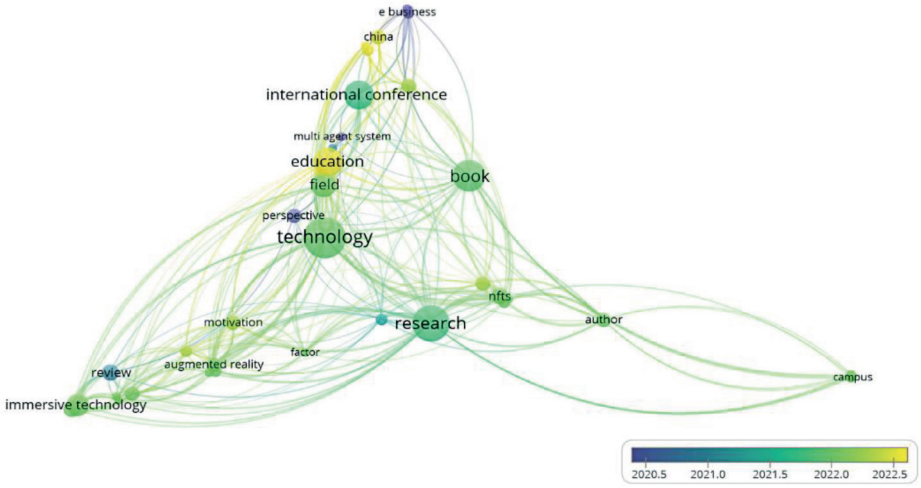
Figure. 3. Thematic map



In the scheme shows how virtual reality, students, and metaverses are basic themes in these articles, while e-learning, augmented reality, and learning systems are located between thematic niches and motor themes, standing out in terms of relevance. Finally, the high education can be read as an emerging theme.

This is complemented by the following VOSviewer map (fig 4), which shows how keywords are positioned by year. It can then be seen how, since the previous year, the relationship between keywords such as immersive technology, augmented reality, motivation, education, and research has been strengthening.

Figure. 4. Keyword positioning by year



Conclusions

It has been possible to observe the strength that the topic of the metaverse and its relationship with learning processes in higher education has been gaining in recent years.

The inclusion of the metaverse within emerging technologies and the use of new immersive technologies for education are emerging topics of interest.

Consider for its implementation the possibility of development, the impact on the academic community, the participants, the processes in which it would contribute, and its application.

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