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## Transversality and Transdisciplinarity in the Curricular Design of higher education: a Systematic Review

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### Abstract

The curriculum as an operational and teleological guide of an educational proposal, expresses the formative intention of educational institutions to achieve the learning goals, which dynamize the teaching processes, and are defined from the different perspectives established, according to the curricular principles that support it. For this, the present study consisted of a systematic review with meta-analysis of scientific documents in the Web of Science database regarding the curricular principles of transversality and transdisciplinarity. The main findings show a reiterative use of transversality and transdisciplinarity when designing the curricula of different programs in HEIs. It can be concluded that these two principles of the curriculum are considered a key piece in the process of integral formation of students in undergraduate and postgraduate courses at an international level.

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*Keywords: curriculum design; transversality; transdisciplinarity; higher education.*

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### 1. Introduction

Curricular design processes in Higher Education Institutions (HEIs) have been an element of analysis in research that seeks to understand how new political structures and social demands permeate not only the content taught within academic campuses, but also the way in which these are put into practice [1], since they must be designed in a critical way that manages to attend to the realities of each era and context. And it is precisely within the framework of these curricular innovation processes that different approaches emerge, such as competency-based learning [2], STEAM model [3] and another variety of perspectives that have been adopted in a significant way in the institutions of each country.

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Currently, a particular interest has been generated to know if a curriculum with transversal and interdisciplinary characteristics or elements [4]; [5] contributes to the achievement of that academic excellence that maximizes meaningful learning and good practices. There are competencies and skills that complement each of the disciplines [6], making the training of the graduate more comprehensive from knowing, making, and being.

The objective of the study is to know the role that HEIs have given to transversality and interdisciplinarity in the process of curricular design of their different professional careers. These results will be pivotal to lay the foundations of the Curricular Design of higher education institutions based on transversality and transdisciplinarity as key concepts to achieve integral formation of students.

In accordance with the above, we will address this topic in three sections: the initial part will center on the methodology employed for orienting this topic, the subsequent section will encompass a summary of the findings, and ultimately, we will provide our concluding perspective on the matter.

## 2. Methodology

To achieve the proposed objective, a systematic review with meta-analysis was developed, which consists of the search, selection and analysis of investigations called primary sources, to later derive from them statistical results that allow showing in a more rigorous way, the study findings [9]. In this study, the bibliometric analysis approach is employed to investigate the body of literature concerning research in mathematics education. The bibliometric technique involves the utilization of quantitative data analysis to investigate, assess, and scrutinize a substantial amount of scientific information [26].

Initially, a bibliometric analysis using VOSviewer was performed to identify the occurrences [26] and links between documents searched on Scopus. The search included the following key words: curriculum design, transversality, and higher education. Following the analysis, a search for articles was carried out in the Web of Science database, using the quotation marks (“;”) as a Boolean code in the keywords: “Curricular design”. Regarding the inclusion criteria, the following was considered:

**Table 1:** Criteria for the Selection of the Publications

Criteria	Value
Data Source	Web of Science
Search Terms	Curricular design, Transversality or Interdisciplinarity
Publication Period	2021 onwards
Location	Worldwide

Source: own elaboration (2023).

Regarding the exclusion criteria, the following were considered: investigations that were not carried out in HEI contexts were discarded. This query yielded a total of 126 articles, of which only fourteen (14) documents were selected for analysis, considering that they met the previously mentioned inclusion criteria. The documents were processed through the qualitative data analysis software MaxQDA, showing the frequency with which some key words for the study were mentioned.

## 3. Results

Higher education has been transformed in search of a continuous improvement that manages to respond to the social, economic and political challenges that are presented today, for which reason, said change must start initially from the same curriculum, since this is the that guides the steps to reach the different goals set [10], where

studies have shown two components that enhance professional work and offer the possibility of finding new alternatives to joint problems of the same or different context: transversality and transdisciplinarity [11]; [12].

### 3.1. Co-occurrence analysis (keywords)

Figure 1 visualizes a keyword network in higher education and curriculum research. Nodes represent 21 keywords, their size reflecting occurrence frequency. Lines between nodes show co-occurrence, with line thickness indicating frequency. Node colors indicate clusters. Three global research clusters are evident (red, blue, green), with the red cluster being the most prominent. For the analysis, a total of 351 were included; for instance, the word curriculum had 78 occurrences and links with the 21 keywords.

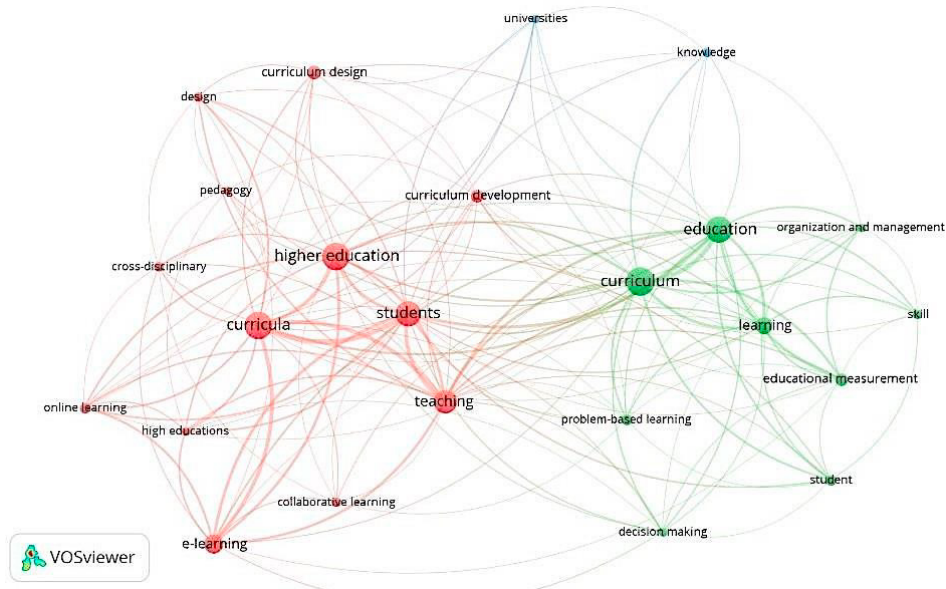


Figure 1: bibliometric analysis (n=351)

### 3.2. Frequency analysis

Furthermore, through the MaxQDA software it was possible to identify different codes derived from the frequency with which the words were repeated in the 14 reviewed studies, allowing a deeper and more semantic analysis of the documents (see Table 1).

**Table 2.** *Articles selected for study analysis.*

Year	Authors
2023	Sousa, A., et al. [15]
2023	AlRuthia, Y., et al. [13]
2022	Spencer, S. P., et al. [16]
2022	Del Savio, A., et al. [22]
2022	Pérez, A., et al. [17]
2022	Faiz-Rashid S, Idris-Islam M. [23]
2022	Mendoza, W., et al. [24]
2022	D'Avanzo, A. M. B. [21]
2022	Peredo Parada, S., et al. [18]
2022	Galoyan, T., & Songer, N. B. [12]
2022	César Toruño-Arguedas [19]
2022	Luebbers, E., et al. [14]
2021	Abdelaziz, A., et al. [20]
2021	Martí, M. M. [11]

Source: own elaboration (2023).

Regarding the codes identified, it is worth noting that some of them respond together to the same category, but for visual effects they were expressed as recognized by the program (see Figure 2).



**Figure 2.** Cloud of the most frequent words of the analyzed documents Source: own elaboration (2023).

One of the most frequent codes was Education (568), which is grouped with ‘Educación’ (131). It is followed by ‘Interprofessional’ (369), which was integrated into a category together with ‘Interdisciplinario’ (46), ‘Interdisciplinario’ (31), ‘Multidisciplinario’ (10), ‘Transdisciplinario’ (9), ‘Multidisciplinario’ (7), ‘Interdisciplinaria’ (6), and ‘Interprofessional’ (4). Curriculum appears a total of 345 times. Finally, the frequency of the ‘Transversal’ code (91) was also considered relevant for the purposes of the study. Regarding the results, it can be noted that the documents analyzed addressed these variables (see Table 2).

**Table 3.** Frequency of words analyzed by categories.

Category	Frequency
Education	568
Interprofessional	369
Curriculum	345
University	332
Design	178
Diseño curricular	149
Educación	131
Integrar	101
Transversal	91
Calidad	64
Aprendizaje	51
Curricular design	49

Source: own elaboration (2023).

**4. Conclusions**

The bibliometric analysis results show an international interest in redesigning educational methodologies, giving a transdisciplinary and transversal look at professional practice [13]; [6]; [14]. In HEIs, there has been a deep-rooted tendency to design curricular proposals framed under the principles of transversality and transdisciplinarity, as elements that ensure the systemic relationships of the curriculum and contribute to the achievement of common objectives in different contexts [23]; [6]; [24]; [14]. Moreover, these results are related to the adaptive learning frameworks, where HEIs anticipate the needs of the students considering the situation and its characteristics [7].

On the other hand, the frequency with which the code ‘Interprofessional’ is used in the framework of curricular designs, allows us to know the way in which HEIs are giving way to a collaborative work between different

disciplines. These are complementary efforts to find efficient solutions for the labor and social demands that have been presented in recent years [15]; [16]; [17].

All this search for a joint work, part of the transversal competences that are possible to intertwine when you have common objectives and clear goals towards which to direct each of the knowledge that makes up an integral professional. And it is that HEIs have seen the need to transcend their efforts towards an integrating perspective [25] that manages to encompass the different disciplinary contributions for understanding and attention to a complex reality. Therefore, it is crucial to emphasize the role of assessment, which significantly impacts both learners and educators. Assessment yields valuable insights for teachers, motivates learners, and guides their progress. It holds a pivotal role in all educational activities, shaping the instructional process based on what is assessed and how it's assessed [8].

Although the results of the current study provide useful information to researchers, academicians, program developers, and HEIs, it has some limitations. First, the findings of the current study depend on the bibliometric data obtained through our selection and exclusion criteria for the chosen publications. Second, the studies that are not on the WoS database were not considered part of this research. Addressing this issue could guarantee more extensive results in future research. Future research on this topic should consider more specific topics and the use of quantitative and qualitative methods to analyze data.

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