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Analysis of Significant Learning in Higher Education: Usefulness of Fink's Taxonomy: A Systematic Review

Dra. Jaqueline Huaman Vargas[1], Ernesto Christian Ccama Ojeda[2], Carlos Alberto Coronado Zapata[3], Kevin Arturo Ascoy Flores[4], Jorge Antonio Hernández Vela[5], Jorge Antonio Hernández Vela[6]

Abstract

The present article is a systematic review with the main objective of analyzing the significance of meaningful learning, according to Fink's taxonomy, in higher education, covering the period from 2014 to 2024. Studies applying this methodology were analyzed, evaluating its impact on curriculum design, teaching, and learning. The methodological approach was based on the principles of systematic review and the guidelines of the PRISMA methodology. Primary studies published between 2014 and 2024 in English and Spanish were selected, applying rigorous inclusion criteria. A combination of academic search engines such as Scopus, Google Scholar, Dialnet, and Scielo was used, resulting in a final sample of 31 articles and theses. The findings revealed that Fink's taxonomy has promoted a greater depth of content understanding, improving critical, analytical, and practical application skills in students. However, challenges such as resistance to change by teachers and lack of resources were also identified. Overall, the review highlights the effectiveness of this taxonomy in various educational contexts and the need for curricular adaptations to maximize its impact.

Keywords: *Fink's Taxonomy, Higher Education, Learning, Review.*

Introduction

Higher education has left behind its linear paradigms focused on mere flat knowledge as a result of its limitations in real work scenarios that, very often, manifest situations that require more interconnected knowledge, as well as reflective, human, deductive and creative skills (Fallahi et al., 2009). While it is true that the cognitive gain that students seek with respect to their profession is a fundamental starting point, as Bloom indicated in his approach, this is only one dimension of everything in which students must be trained in order to become versatile and highly competent professionals (Fallahi et al., 2009; Seaman, 2012).

Given these restrictions, it has been sought to complement the learning processes of different courses with various measures, starting with redesigns in the teaching curriculum, with new general approaches, new forms of measurement and non-traditional integrated procedures with which it has sought to give merely intellectual knowledge a greater depth and context of application (Dabney & Eid, 2024). Among the most widely used preliminary perspectives over

[1] UNIVERSIDAD TECNOLOGICA DE LOS ANDES, https://orcid.org/0000-0003-4691-9496, Email: jhuamanv@utea.edu.pe
[2] Universidad Nacional de Tumbes, https://orcid.org/0000-0003-3526-8069, Email: ccoronadoz@untumbes.edu.pe
[3] Universidad Cesar Vallejo, https://orcid.org/0000-0003-2452-4805, Email: kaskoy@ucvvirtual.edu.pe
[4] Pusat Pengajian Citra Universiti & Institut Islam Hadhari, Universiti Kebangsaan Malaysia, Dr. nasrudin@ukm.edu.my.
[5] Universidad César Vallejo, Email: jhernandezv@ucvvirtual.edu.pe, ORCID 0000-0002-7990-682X
[6] Universidad César Vallejo, Email: ydamianes@ucvvirtual.edu.pe, ORCID 0000-0002-5029-249X

the last 10 years is Dee Fink's taxonomy, which proposes six key dimensions for evaluating and designing teaching in universities and graduate schools, generating what is now known as "meaningful learning". These aspects to be taken care of are: in-depth knowledge, practical application, integration, human dimension, care, and continuous learning (Irvine, 2021).

Throughout all the attempts reviewed in this research, the perspective of significant learning formulated by Fink has been evoked, so that: workshops, programs, curricular designs, types of assessment, etc., have obeyed the segmentation of competencies and measurement indicators aligned with the six dimensions already mentioned. The applications and interventions implemented in different university careers and graduate programs led to varied results and conclusions, however, solid patterns or trends can be extracted to answer the research questions formulated in this systematic review article.

In this sense, the real beginning of this study begins with the establishment of the central question and the specific derivatives, which are mentioned below:

General Question

What have been the results and limitations of proposing meaningful learning according to the Fink taxonomy in the field of higher education between 2014 and 2024?

Specific Questions

- What have been the patterns in the adaptations of curriculum design to generate significant learning according to Fink's taxonomy in the field of higher education?
- What implemented strategies have been complemented with the Fink taxonomy to generate meaningful learning in the context of higher education?
- What techniques, instruments and/or processes have been used to measure the results of implementing the significant learning of the Fink taxonomy in the field of higher education?
- What teaching competencies has the implementation of the Fink taxonomy in higher education teachers allowed to develop?
- What perceptions and experiences have higher education students expressed about the progress in their meaningful learning under the Fink taxonomy?

General Objective

To describe the results and limitations of proposing meaningful learning according to the Fink taxonomy in the field of higher education between 2014 and 2024.

Specific Objectives

- To describe the patterns of adaptation of curriculum design to generate significant learning according to the Fink taxonomy in the field of higher education.
- Identify the strategies implemented that have complemented the Fink taxonomy to generate meaningful learning in the context of higher education.
- Identify the techniques, instruments and/or processes that have been used to measure the results of implementing meaningful learning of the Fink taxonomy in the field of higher education.
- To identify the teaching competencies that have allowed the implementation of the Fink

taxonomy in higher education teachers to be developed

- To describe the perceptions and experiences expressed by higher education students about the progress in their significant learning under the Fink taxonomy.

Methodology

The focus of this research was based on the principles of a systematic review and the guidelines of the PRISMA methodology. Systematic reviews, according to Cardona et al. (2016), are investigations in which primary studies are collected, that is, research in which data and conclusions are generated based on analyzing and processing empirical data. Regarding the PRISMA methodology, it is a repertoire of sequential guidelines or steps that suggest the use of certain processes of analysis and treatment of primary research, also incorporating diagrams, tables and graphs that allow an orderly and understandable contemplation of the findings. The function of this methodology incorporated in systematic review research is to ensure the quality of meta-analyses (Barquero, 2022).

For the beginning of this research, the axial premise is to collect studies related to significant learning in the context of higher education, framing the variable in the Fink taxonomy approach and with publication dates between 2014 and 2024; this to explore what has happened regarding the issue in the last decade.

Obviously, not all the research that can be found can be included, so to ensure the quality and forcefulness of the findings, it is necessary to establish a series of parameters that enable a gradual and systematic analysis and filtering (Barquero, 2022). These guidelines are the so-called "inclusion criteria", and in the case of this study

In this case, from a preliminary perspective, the main activity has been the collection of studies with publication dates between 2014 and 2024, all showing, in different magnitudes, affinity or suitability with the variables of argumentative writing and critical thinking in populations of university students, these guidelines were taken into account:

1. The type of document had to correspond to theses or articles (not books or systematic reviews, only primary studies)
2. The years of publication had to be contained between the years 2014 and 2024
3. The main language of the document had to be Spanish or English
4. The research had to allow access to its full content (not just the abstracts)
5. It had to take into account the study variable as a very committed aspect in the body of the research
6. It was to be applied to students at the university or graduate level.

Once this list of requirements was defined, we proceeded to consult search engines that were scientifically and academically relevant. The configuration of the searches varied according to the Boolean tools and operators used by each platform, with some search engines being more practical and automatable than others. Scopus and Scielo showed greater customization options in their interface, so that 4 of the 6 inclusion criteria could be applied, enabling rapid progress with the progressive exclusion of non-relevant studies, however, the last two criteria (variable and population) were applied more slowly in the full articles downloaded in PDF. On the other hand, Google Scholar and Dialnet (the latter in its free version), implied a slower analysis due

to the limitation of their options.

To summarize the query measures according to the platform, Table 1 is presented below, which contains the search equations and the raw results before the application of the criteria:

Search Results Matrix

DATABASE	SEARCH EQUATIONS	RESULTS
SCOPUS	(TITLE-ABS-KEY ("significant learning") AND (fink) AND ("higher education")	86
GOOGLE SCHOLAR	(intitle:"significant learning" OR intitle:significant) AND (intitle:"higher education" OR intitle:university) AND fink	25
	(intitle:"meaningful learning" OR intitle:significant) AND (intitle:"higher education" OR intitle:universitaria OR intitle:universitaria) AND fink	4
DIALNET	"learning" AND "fink"	38
SCIELO	((ti:("meaningful learning"))) AND (ab:("universitária"))	1

As can be seen, in total, the raw results totaled 154 articles and theses, within which there were systematic reviews, research in which significant learning was only mentioned superficially or under Bloom's taxonomy, research in basic education institutions, in languages such as Russian, Chinese or Turkish, etc., that is, elements not aligned with the inclusion criteria.

Only in Scopus was it possible to eliminate non-primary studies, outside the time range, of languages other than English or Spanish, without access to the complete document of the article, all instantaneously with the options of its interface; while, in Scielo, only a few fewer criteria could be applied in an automated way (type of study, years of publication, language). As far as Dialnet is concerned, in its free version, it was only possible to exclude books and apply an order of the years of publication without excluding research outside the established range. In the case of Google Scholar, only an instant leak of the years of publication was achieved.

Regarding the variable and population criteria, they required a slightly more detailed analysis without the possibility of automation. The procedure was carried out by reviewing fragments of the research such as the methodology and part of the results in order to determine if the requirements were met. It was verified that significant learning was approached in a meaningful way and from the perspective of Fink's taxonomy and its respective six dimensions. In the case of verifying that the field of studies is higher education (university and postgraduate), the populations and samples described within the methodology apparatus were analyzed, thus

considering both populations and samples of students and teachers.

Although it is true that, up to this point, the 6 inclusion criteria had already been applied and those studies that did not meet these requirements had been excluded, additional steps were necessary to achieve compliance with the objectives of this review through the response to their questions, so that a tabulation was made in Microsoft Excel of all the admitted documents (42 "finalist" researches).

It should be noted that, initially, provisional research questions and objectives were posed and then, as the findings were tabulated, they were adjusted or modified according to the patterns and trends that were identified in the findings. Some research questions were withdrawn or changed because, directly, there was no material or significant trends to answer them.

As for the table that was completed with the information, it had columns regarding the years of publication, the citation in APA 7, the search engine from which the study came, the abstract, the country of origin, the methodology, the career or area of knowledge and 1 column with the material to answer the general question. as well as 6 columns according to the study's ability to answer each specific research question. Finally, a column to indicate whether the study was finally selected or rejected to be part of the body of results, discussion and conclusions.

After this tabulation, it was possible to identify a duplicate study, and 10 documents with irrelevant or inconclusive information regarding the questions of the study, so they were excluded, resulting in a total of 31 selected articles and theses.

For a visual and simplified representation of the entire process described in this methodological section, the sequence is shown in the following diagram:

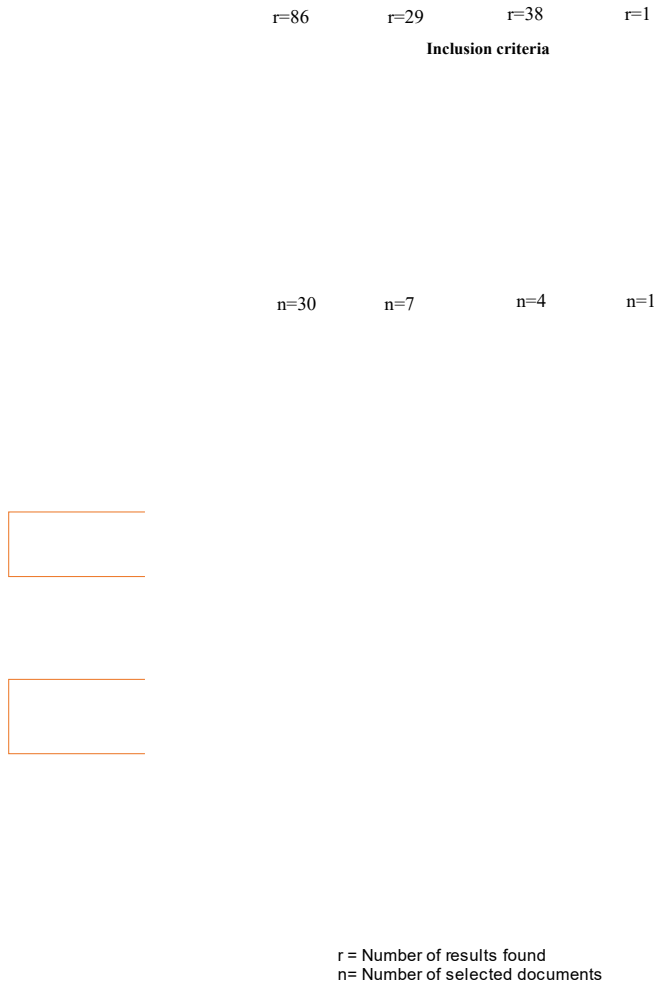

Figure 1

Results

As a result of the review, it has been possible to distinguish trends from the simplest to evaluate to the most complex to process. Some have been translated into percentage figures with an initial relevance to consider.

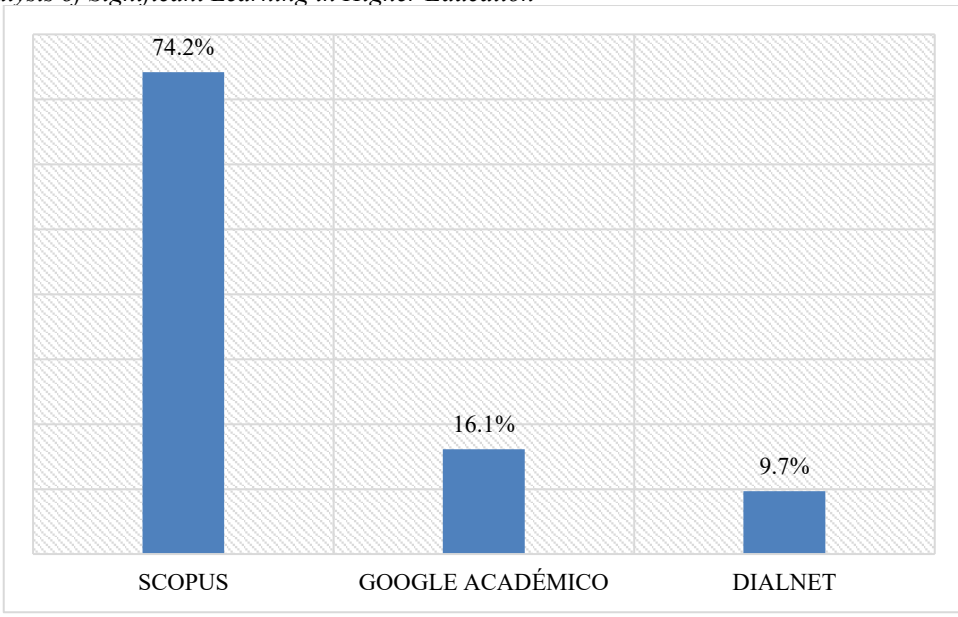

Figure 2: Final Contributions According To Search Engines. In Original Spanish Language

For example, in Figure 1, we can see the contribution of academic search engines to what would be the final repertoire of selected research. Although Dialnet had also initially contributed a small percentage of contributions during a certain part of the review process, after further analysis, the content of their contributions turned out not to be relevant enough, so they were excluded. On the other hand, Scopus has continued to be the largest contributor of quality research, which has progressively passed all the inclusion filters.

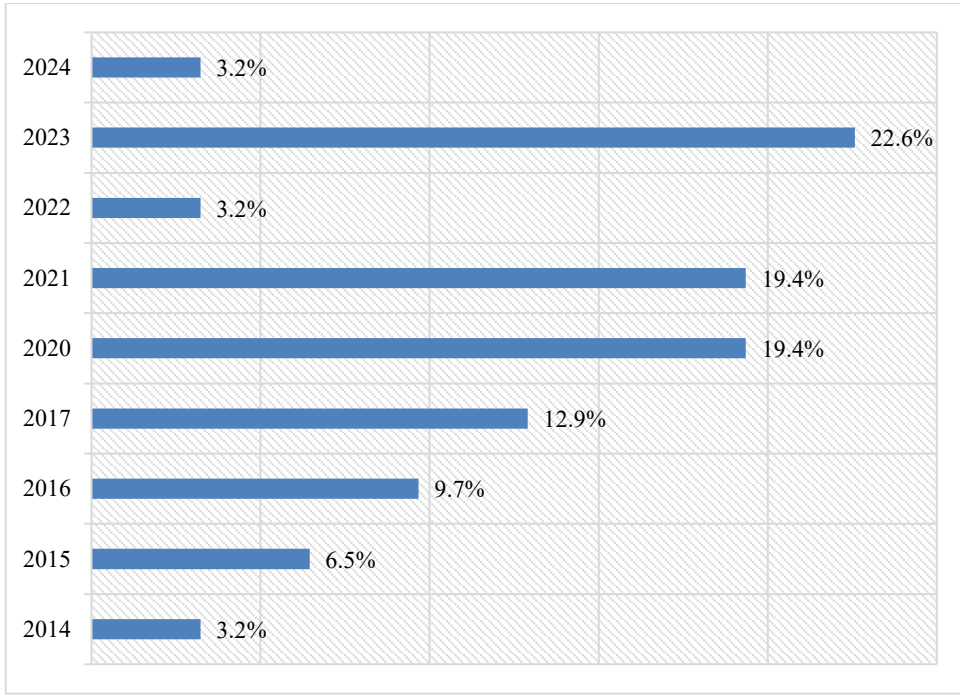

Figure 3: Contributions According To Years of Publication

Regarding the trend in the years of publication, Figure 3 shows that the years in which the most relevant studies were published were in 2020, 2021 and 2023. As a general rule, the recognized trend seems to imply that meaningful learning focused from Fink's taxonomy is a topic that has gained relevance in the last four years in terms of primary data analysis, however, much of the material discarded in this study was constituted by theoretical manifestos that spanned between 2014 and 2018.

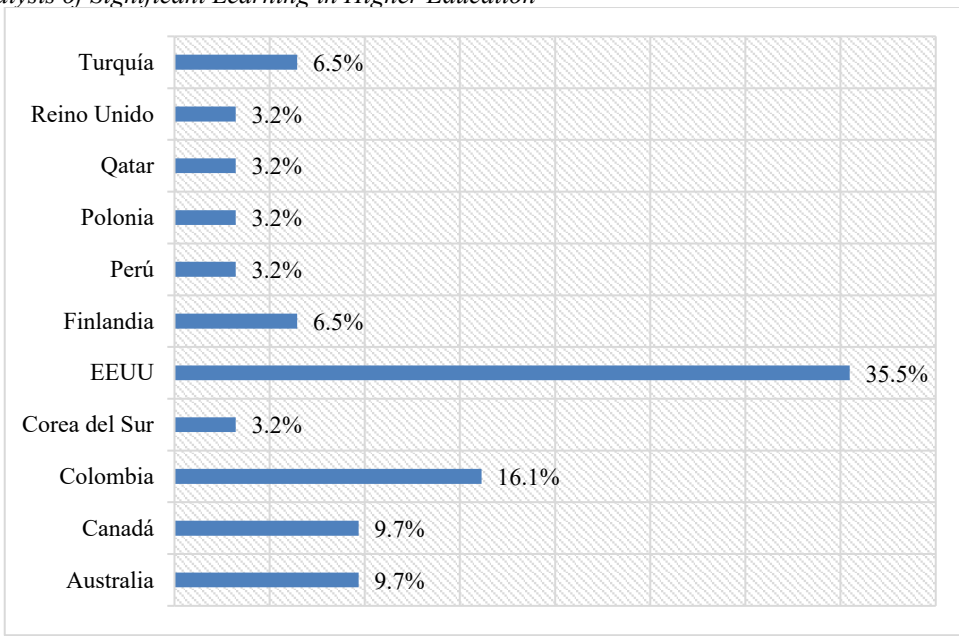

Figure 4: Contributions According To The Country Of Origin Of The Study. In Original Spanish Language

As for the countries of origin of the publications, what can be seen in Figure 4 is the majority and very prominent number of contributions from the United States regarding the implementation and measurement of results of the Fink taxonomy to generate significant learning, at least as far as applied studies are concerned. This shows the interest that the potential of this taxonomy has aroused in researchers in that country. On the other hand, Colombia was the second country with the most contributions, most of these research being postgraduate theses.

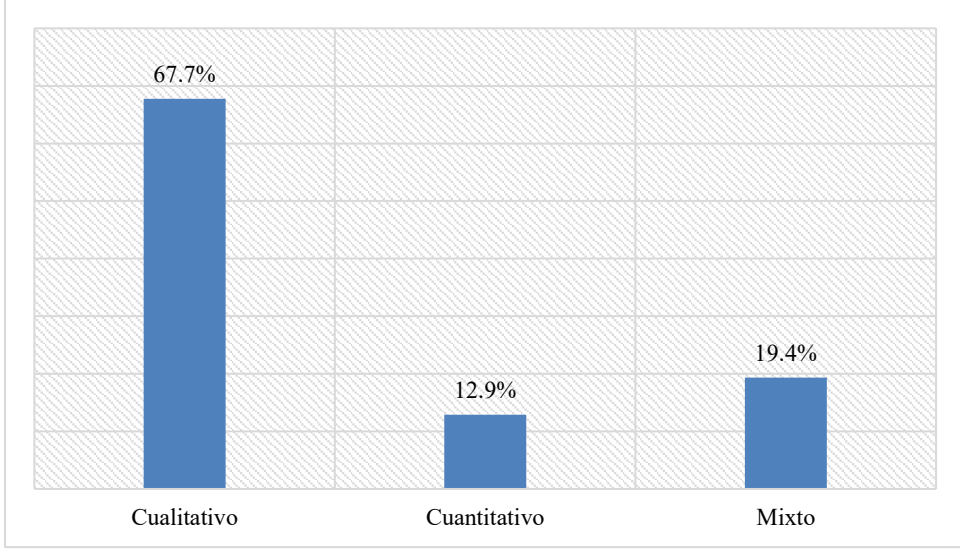

Figure 5: Methodological Approaches Used. In Original Spanish Language

Regarding the methodological approaches used, Figure 5 shows the strong inclination for qualitative paradigms, with an overwhelming difference with respect to mixed and quantitative approaches. In summary, the most commonly used procedures were case studies and the review of written reflections of students and teachers was frequently used, so the extreme relevance of the qualitative approach is understood.

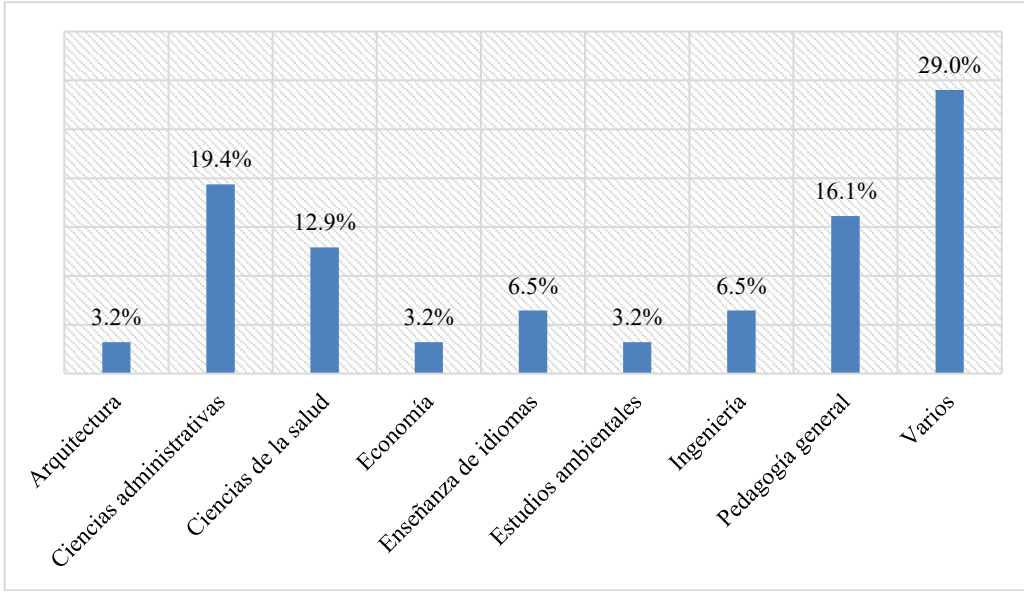

Figure 6: Educational Contexts of Application. In Original Spanish Language

Finally, Figure 6 already begins to observe trends more focused on educational contexts as such. The classification was somewhat complex because in many studies different careers and specialties were covered, while in others, the inclination to a particular context was not mentioned, but reference was made to general university pedagogy. In this sense, studies of varied context are of majority proportion, but they are followed by documents on teaching-learning in administrative sciences, general university pedagogy and those of health sciences. On the other hand, although studies in engineering, architecture, environmental studies, and economics were the least covered by the Fink taxonomy, in general, their results were promising.

These are the simplest analyses, however, a review was made that required greater processing and specificity in terms of the patterns detected to achieve the research objectives. The result of this process can be seen in the presentation, comparison and contrast of the information from each study mentioned in the discussion section.

Discussion

The application of Fink's taxonomy to promote meaningful learning has generated mixed results, showing notable benefits in higher education, but also considerable costs. Studies such as those by Rush and Landgraf (2023) and LaVelle and Yang (2021) highlight improvements in content comprehension, the development of critical and analytical skills, an increase in active student participation, and better academic outcomes. In addition, Rodriguez (2018) and Osorio (2023) point out that students report greater satisfaction with the learning process.

However, challenges such as teachers' resistance to change (Rush & Landgraf, 2023), lack of resources and institutional support (Giddings & Lefebvre, 2023), and difficulty in assessing this type of learning with traditional methods (Atkinson, 2021) persist. Unexpected outcomes have also been identified, such as students' possible over-reliance on the structure provided by the teacher (Giddings & Lefebvre, 2023) and difficulty in transferring knowledge to other contexts (Atkinson, 2021). In addition, there are disparities in outcomes among students, especially those with limited access to resources (Uribe & Pardo, 2020), and the evaluation of the success of these strategies varies significantly between studies (Rodriguez, 2018).

Regarding the adaptations of the curricular design to generate significant learning, the efforts and structures assumed present both patterns of similarity and remarkable differences.

For example, Paul et al. (2023) and Sheridan and Gigliotti (2023) integrated Fink's taxonomy into their curricular designs, but they did so in very different contexts: electrical engineering and online courses respectively. Paul et al. (2023) focused on the integration of multiple courses through a large collaborative project, which reinforced the integration and application dimensions of Fink. Instead, Sheridan and Gigliotti (2023) used Universal Design for Learning (UDL) to improve accessibility and flexibility, thereby encompassing the dimensions of fundamental knowledge and integration, and ensuring that students could learn at their own pace, which is vital in online environments.

The research of Giddings and Lefebvre (2023) and Gordon and Thomas (2018) focused on distinct areas of study—economics and environmental impact studies, respectively—but both made extensive use of practical and reflective activities. Giddings and Lefebvre (2023) used a sequential approach in their module on the minimum wage, ensuring that students applied theoretical concepts to real situations and reflected on their own learnings, thus addressing several dimensions of Fink, including application, fundamental knowledge, integration, and learning to learn. Gordon and Thomas (2018), on the other hand, employed role-playing to simulate public discussion environments, thus fostering the human dimension and care in addition to the other dimensions.

Huber et al. (2017) and Coco et al. (2014) used hands-on projects to link theoretical learning with real-world applications. Huber et al. (2017) designed a financial accounting course where students applied their knowledge in financial statement analysis of real companies, thus ensuring the fundamental knowledge, application, and integration dimensions of Fink. Coco et al. (2014) took this practice a step further by engaging industry mentors who helped students solve real business problems, covering all dimensions of Fink and fostering a deep connection between academic learning and its practical application.

Finally, Giddings and Lefebvre (2023), as well as Gordon and Thomas (2018), stood out for their reflective and practical approaches, while Huber et al. (2017) and Coco et al. (2014) showed how the application of knowledge in real-world contexts can enrich student learning and motivation. All of these approaches, although distinct in their implementation, underscore the effectiveness of Fink's taxonomy in designing curricula that not only transmit knowledge, but also develop practical, reflective, and autonomous skills in students.

On the other hand, the teaching methodologies that have been used in combination with the Fink taxonomy enriched significant learning in multiple dimensions. In this sense, Rush and Landgraf (2023), with their High-Impact Educational Practices (HIPs) and Open Educational Resources (OER), focused on community projects and collaborative learning, complementing Fink's

Foundational Knowledge and Application dimensions. Similarly, Ojasalo and Kaartti (2021) used Challenge-Based Innovation (CBI) to apply knowledge to real challenges, but with greater emphasis on innovation and human-centered design, addressing global problems and fostering the integration of multidisciplinary knowledge and social responsibility.

In the same vein, Burga et al. (2023) employed participatory action research (RAP) in an experiential course, involving students in the community and fostering persistent humanistic learning, complementing Fink's Human Dimension. On the other hand, Simsek (2020a) used Collaborative Digital Storytelling (NDC) to improve language and technological skills, also addressing the Human Dimension, but from a focus on educational innovation in language teaching.

Likewise, Albinsson et al. (2020) redesigned an Integrated Marketing Communications (IMC) course integrating sustainability and community projects, encouraging reflection and commitment to sustainability (Care). In contrast, García and Nensthiel (2015) developed Prolog Factory, a platform that simulates a manufacturing and logistics environment, allowing technical knowledge to be applied in practical situations and developing teamwork and self-learning skills (Learning to Learn).

Similarly, Refki et al. (2020) classified mentoring strategies that fostered critical thinking and collaboration in academic settings, promoting self-sufficiency and mutual support (Learning to Learn). Fish (2017), on the other hand, combined approaches by Fink, Senge, and Florez to develop communities of practice and promote a holistic vision of education, integrating systems thinking.

In this context, Rodriguez (2018) combined Bloom's and Fink's taxonomies to define specific and measurable objectives, using Bloom's hierarchical structure and Fink's holistic vision. Grassberger and Wilder (2015) applied knowledge in real environments through live case studies, promoting reflection and interest in learning through interaction with authentic customers.

Finally, Soller (2024) investigated formative feedback, showing a strong correlation between it and academic achievement (Foundational Knowledge), allowing pedagogical practices to be evaluated and improved, promoting reflection on personal and academic impact, and resonating with the dimensions of Application and Learning to Learn.

Regarding the resources for measuring the implementations of meaningful learning, according to Fink, research was found that shows a variety of evaluation techniques and instruments. Many studies focused on qualitative methods, such as written reflections, interviews, and observations, to explore the experiences and perceptions of students and teachers. Examples of these studies include the research of Burga et al. (2023), Atkinson (2021), Nazar et al. (2021), DeLuca et al. (2021), and Barton et al. (2020).

Other studies employed mixed approaches, combining qualitative and quantitative methods. Simsek (2020b) and Rodriguez (2018), for example, used qualitative data from metaphors and reflections along with quantitative analysis based on frequencies and percentages, or used Fink's taxonomy to structure learning assessment. Grassberger and Wilder (2015) also adopted a mixed approach, combining qualitative methods such as field notes and focus groups with quantitative methods.

In the quantitative field, research such as that of Uribe and Pardo (2020) and Huber et al. (2017)

used academic performance assessments, Likert scales, matrices, online platforms, and rubrics to measure the impact of new methodologies on skill development and understanding of concepts.

Some studies, such as those by Barnes and Caprino (2016) and Simsek (2020b), focused on the analysis of students' reflections using the six dimensions of Fink's taxonomy to assess how they approached meaningful learning.

Finally, studies such as that of Guevara (2021) used a wide range of instruments, including surveys, participant observation, analysis of student productions, interviews, and rubrics, to measure the results of didactic transposition.

The implementation of Fink's taxonomy in teacher education generated remarkable results in the development of teaching skills and competencies. DeLuca et al. (2021) highlighted how this taxonomy fostered student-centered formative assessment skills, collaborative learning, and reflection in teaching practice. Simsek (2020a) demonstrated how the taxonomy enhanced critical and creative thinking, the integration of digital tools, and the development of cooperation and communication skills in English teachers.

Simsek (2020b) revealed how, through a taxonomy-based mentoring project, trainee teachers gained deep pedagogical knowledge and developed interpersonal and autonomous learning skills. Nguyen (2017) highlighted the significant improvement in teaching practice, evidencing teachers' ability to identify and solve problems, adjust strategies, reflect critically, and collaborate with colleagues. Together, these studies demonstrated that Fink's taxonomy not only enriched teacher education, but also promoted deeper and more meaningful learning for students in various dimensions.

Regarding the perceptions that students had of the implementation of Fink's taxonomy to improve their meaningful learning, the findings reveal a positive impact in multiple dimensions. In Kalu et al. (2023), students perceived improvements in knowledge comprehension and retention, the development of critical and creative thinking skills, and greater active participation in the learning process. In Paul et al. (2023), the efficiency of learning and the development of positive habits are highlighted thanks to curricular integration, Fink's taxonomy, and project-based learning (PBL), which fostered collaboration and peer-to-peer learning.

The ability to relate knowledge from different courses, user-centered teaching, and empathy-based design were valued by students in Paul et al. (2023) as significant benefits of Fink's taxonomy. In Burga et al. (2023), students reflected on their increased ability to apply theoretical knowledge in practical contexts and to integrate knowledge into real-world situations, demonstrating learning that goes beyond memorization.

The human dimension of learning was highlighted in several studies. In Burga et al. (2023), the importance of empathy, ethics, and social commitment in the educational process was emphasized. In Nazar et al. (2021), the development of professional skills such as effective communication and collaboration was valued, and the importance of understanding one's own and others' emotions was reflected, as well as the need for a patient-centered approach in the field of health. In Lehtomäki et al. (2016), the human dimension was manifested in the development of empathy and commitment to inclusion and education for all.

The development of metacognitive and self-reflection skills was highlighted in Nazar et al. (2021), where it is highlighted that Fink's taxonomy promoted these skills, which are

fundamental for continuous learning and professional development. In Lehtomäki et al. (2016), students actively engaged in processes of critical reflection and self-evaluation, questioning their own assumptions and knowledge limitations. In Lee and Lee (2022), students valued self-directed and self-reflective learning, which allowed them to discover their own strengths and weaknesses, thus fostering greater self-knowledge and continuous improvement in their learning process.

In addition to these advances, students also appreciated interaction with others, self-directed learning, applicability of knowledge to real-world situations, and innovative instructional strategies, as evidenced in Lee and Lee (2022). The students highlighted that verbalizing their opinions and listening to the perspectives of their classmates allowed them to consolidate their knowledge, generate new ideas and critically reflect on different topics. The ability to apply what they learned to real-world situations provided them with a sense of accomplishment and motivation, and innovative instructional strategies, such as problem-based learning (PBL) and flipped learning (FL), promoted critical thinking and problem-solving in authentic contexts.

Conclusions

The **general objective** was to describe the results and limitations of proposing meaningful learning according to the Fink taxonomy in the field of higher education between 2014 and 2024. What was found was that between 2014 and 2024, the application of Fink's taxonomy in the field of higher education has shown mixed results in terms of benefits and limitations. The results indicate that this methodology promotes a deeper and more practical understanding of the content, improves participation and collaboration in the classroom, and enhances students' critical and analytical skills. An improvement in academic performance and greater student satisfaction have also been observed due to the diversification and relevance of learning activities.

However, these advantages come with significant challenges. Teachers' resistance to change, lack of resources and institutional support, and difficulties in assessing meaningful learning are major barriers. In addition, it has been reported that some students face cognitive overload and difficulties in transferring knowledge to contexts outside the classroom. Limitations in curriculum design and variability in the implementation and success of these strategies also complicate their uniform and effective application.

Specific **objective 1** was to identify the curricular design guidelines to generate significant learning according to the Fink taxonomy in the field of higher education. The research analyzed reveals several key guidelines for adapting curriculum design in higher education, with the aim of generating meaningful learning according to Fink's taxonomy. Highlighted guidelines include:

- **Integration of active learning experiences:** promote the active participation of students through practical and collaborative activities that facilitate experiential learning and the application of knowledge in real contexts.

- **Focus on learning outcomes:** Clearly define expected learning outcomes, aligned with Fink's dimensions of meaningful learning, such as foundational knowledge, application, integration, human, care, and reflection.

- **Designing Authentic Assessments:** Implementing assessment methods that reflect real-world tasks and challenges, allowing students to demonstrate their understanding and skills in a

contextualized and relevant way.

- **Use of educational technologies:** incorporate technological tools that facilitate access to educational resources, online collaboration and continuous feedback, improving student interaction and engagement.

- **Interpersonal and emotional competence development activities:** encourage the development of social and emotional competences through activities that promote teamwork, effective communication and empathy.

- **Projects and work focused on autonomous and self-directed learning:** stimulating students' ability to manage their own learning, set personal goals, and seek resources independently.

Specific objective 2 was to identify the implemented strategies that have accompanied the Fink taxonomy to generate meaningful learning in the context of higher education, a diversity of strategies have been identified that have their own structure, focus and activities but that, when evaluating their progress according to the dimensions of the Fink taxonomy, have shown compatibility with this vision of meaningful learning. These strategies include:

- **Participatory and collaborative methods:** such as HIPs, OER, CBI and PAR, which encourage the practical application of knowledge, innovation, social responsibility and humanistic learning.

- **Technological and innovative approaches:** such as NDC and Prolog Factory, which develop linguistic, technological and technical skills, promoting self-learning and teamwork.

- **Combination of taxonomies and pedagogical approaches:** such as Bloom and Fink, living case studies and formative feedback, which facilitate the definition of clear objectives and promote reflection and continuous improvement.

Specific **objective 3** was to identify the techniques, instruments and/or processes that have been used to measure the results of implementing the significant learning of the Fink taxonomy in the field of higher education. Researchers have adopted both qualitative and quantitative approaches to comprehensively capture the experiences and perceptions of students and teachers, although quantitative instruments and techniques were the most widely used.

Qualitative studies have highlighted the use of written reflections, interviews, ethnographic observations, and qualitative content analysis. These methods allow for a detailed understanding of the topics of meaningful learning, facilitating the identification of patterns and the deepening of the reflections and skills developed by the participants. Tools such as nVivo software and ATLAS.ti have been essential for qualitative data analysis, allowing for systematic coding and review.

In the quantitative field, academic performance evaluations, Likert scales, Excel matrices and specific rubrics have been used to analyze the impact of educational methodologies on the development of skills and the understanding of concepts. These methods provide accurate and comparable data that facilitate the evaluation of the effectiveness of teaching strategies.

Likewise, some research has combined qualitative and quantitative methods, using techniques such as elicitation of metaphors and written reflections, along with frequency and percentage analysis. These blended approaches allow for a more holistic understanding of meaningful learning, integrating qualitative and quantitative perspectives.

Specific **objective 4** was to identify the teaching competencies that have allowed the implementation of the Fink taxonomy in higher education teachers. In this sense, the advances recorded in the reviewed research have shown that the focus on meaningful learning, according to Fink, is a catalyst for the development of a wide range of essential teaching competencies. The studies reviewed highlight significant improvements in key areas such as student-centred formative assessment, critical and creative thinking, integration of digital tools, cooperation and effective communication, in-depth pedagogical knowledge, classroom management, student motivation, problem solving, adaptability to student needs, critical reflection on teaching practice and continuous professional development.

Specific objective 5 was to describe the perceptions and experiences expressed by higher education students about the progress in their significant learning under the Fink taxonomy. In general, when reviewing their written reflections and testimonies in interviews, most of the students acknowledged feeling satisfied with the achievements achieved in their way of learning and with their own multidimensional experience; however, some reported confusion and some dissatisfaction with their experience of not being able to adapt to these new paradigms.

As for those who felt satisfied, their positive perceptions consisted of feeling good about the new capacity for self-evaluation of their learning that they had acquired, allowing them to recognize the need to change or combine new strategies instead of resigning themselves to a fixed level of performance. Others also stated that their experiences were expectant in many segments, since they were exposed to real work scenarios, with concrete and practical challenges that gave more depth and meaning to their learning process. In that sense, knowledge remained fixed in their minds in an enduring way because its processing was linked to human experiences, real work tension and positive pressure to integrate their fundamental knowledge with each other to solve problems.

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