



Sensemaking of Wisdom Pedagogy Research in Education

Maria Jakubik

*Eötvös Loránd University (ELTE), Budapest, Hungary
maria.jakubik@ppk.elte.hu*

Purpose: This paper asks: How has wisdom pedagogy research evolved in education from 1980 to 2022, and what are its characteristics and possible future trends?

Study design/methodology/approach: The study applied the science mapping technique of Bibliometric Analysis together with the three-step sensemaking approach for interpreting the quantitative findings. VOSviewer was used for analysis and visualisation.

Findings: The results show 128 wisdom pedagogy articles in the Web of Science Core Collection database published from 1980 to 2022. The results revealed that wisdom pedagogy is not yet an independently established discipline in education, but it is a fast-growing research area.

Originality/value: To the best of our knowledge, this is the first study to explore the landscape of wisdom pedagogy research in education with Bibliometric Analysis for four decades.

Introduction

What is the purpose of education in the 21st century?

This question has been asked throughout the history of education since Socrates, Plato, and Aristotle. Currently, there is strong criticism (Magnússon & Rytzler, 2022, pp. 15–31) against moving toward an education that operates on business principles (marketisation); shifting education from being a public good to private good; shifting towards focusing on solving political and social problems (educationalisation); and shifting from teaching to learning, focusing solely on learning outcomes like skills, knowledge, and competences.

Gert Biesta, as an educational philosopher, criticises this ‘learnification’ paradigm in education because it gives secondary importance to teaching. In ‘learnification’ paradigm, teaching is regarded as facilitating the learning process of the students, and “the role of teacher has become more that of a facilitator than of a source of knowledge and wisdom” (Biesta, 2010, p. 3). In many of his books, he argues that the three domains of education should be: qualification (i.e., knowledge, skills, competencies), socialisation (i.e., cultural traditions and practices), and subjectification as an existential dimension (Biesta, 2010, pp. 19–21, 2013, p. 64, 2022, pp. 40–57). Biesta declares that “education should always be concerned with and oriented towards three domains of purpose – qualification, socialisation, and subjectification” (Biesta, 2022, p. 60). For him, “educational questions are fundamentally *existential* questions” (Biesta, 2022, p. 9), and “education should always be aimed at enhancing the ability of pupils and students to ‘enact’ their own ‘subject-ness’” (Biesta, 2022, p. 2). He argues that the purpose of education is “to give the new generation a fair chance at their existence as subjects, ‘in’ and ‘with’ the world” (Biesta, 2022, p. 13).

The role of education and universities in supporting learners in developing their personal authenticity and strengthening their responsibility towards both other people and their environment is explored by Jakubik (2022). Ling (2020) focuses on the role of universities and argues that “universities are required to bring to bear theoretical understandings, practical experience, critical thinking, risk-taking, creativity and intellect ... The key then is *to have the wisdom to know how to use that knowledge for good rather than ill*” (Ling, 2020, p. 363,

emphases added). Educational philosopher Maxwell strongly believes that having knowledge is not enough. The aim should be to use that knowledge wisely for the benefit of all (Maxwell, 2014, 2021). He urges universities to revolutionise themselves and move towards the 'University of Wisdom' with the aim "to help humanity make progress towards as good a world as feasible" (Maxwell, 2012, p. 123).

Need for wisdom in education

The need to educate for wisdom is not new. Already, Plato (2005) wrote about the debate between Socrates and Protagoras regarding whether wisdom and virtues can be taught and, if so, how. The philosopher Russell (1956) strongly believed that wisdom can be taught, and teaching wisdom should be one of the aims of education. Already in the mid-1950s, he argued that "the world needs wisdom as it has never needed it before, and if knowledge continues to increase, the world will need wisdom in the future even more than it does now" (Russell, 1956, p. 177).

However, many authors (e.g., Diamond, 2021; Ferrari & Kim, 2019; Glück, 2019; Sternberg & Hagen, 2019) argue that wisdom research would need more attention in education. Ferrari and Kim express their concerns that "wisdom development has not been addressed in most current models of wisdom" (Ferrari & Kim, 2019, p. 348). Glück writes that "gaining a better understanding of how and under which conditions wisdom develops may be a very important goal for future research" (Glück, 2019, p. 342). Sternberg and Hagen have strong criticism of schools which "largely emphasise not wisdom, but rather the transmission of knowledge and basic cognitive skills ... schools should expand their focus from teaching knowledge and basic skills to teaching for wisdom as well" (Sternberg & Hagen, 2019, pp. 373–374). Diamond argues that only "few modern scholars focus their research efforts on understanding how an individual human comes to apprehend something like wisdom and examining how it can be taught, seeking a solution to the question of whether it is possible to teach the development of wisdom (pedagogy), what might be its constituent parts (curriculum), and if yes, then how to develop wisdom in the current era" (Diamond, 2021, pp. 9–10). Diamond is probably right that "wisdom pedagogy as a research topic" has not received the attention it should have in our time. How wisdom increases in individuals and what pedagogy will enhance in developing wisdom in education are questions we should focus on more.

Indeed, since the 1980s, wisdom has become the focus of many disciplines, and it has been intensively researched:

- (1) in psychology (Ardelt, 2004; Baltes & Staudinger, 2000; Bangen et al., 2013; Bruya & Ardelt, 2018a and 2018b; Ferrari & Kim, 2019; Glück, 2019; Jeste et al., 2010; Karami et al., 2020; Karami & Parra-Martinez, 2021; Sternberg & Hagen, 2019; Sternberg & Karami, 2021);
- (2) in management, leadership, and human resource management (Bachmann et al., 2018; Banerjee, 2014; Ekmekçi et al., 2014; Jakubik, 2021a; Jakubik & Mürsepp, 2022; McKenna & Rooney, 2005; McKenna et al., 2009; Nonaka et al., 2014; Rooney et al., 2010; Solé, 2017); and
- (3) in educational philosophy (Barnett, 2017, 2022; Diamond, 2021; Jakubik, 2021b; Maxwell, 2012, 2014, 2021; Mürsepp, 2021; Robinson, 1990).

However, in education, wisdom pedagogy research has been ignored for a long time, and it has only started to evolve since the 2000s. Therefore, to understand the evolution and current situation in wisdom pedagogy research in education, this study asks: *How has wisdom pedagogy research evolved in education from 1980 to 2022, and what are its characteristics and possible future trends?* The purpose of this study is to explore and interpret past, present,

and future emerging trends and patterns of wisdom pedagogy research in education. We utilised the Computational Social Sciences (CSS) method for data analyses and synthesis, along with the Bibliometric Analysis (BA). The Bibliometric Analysis was selected because it “is a popular and rigorous method for exploring and analysing large volumes of scientific data. It enables us to unpack the evolutionary nuances of a specific field while shedding light on the emerging areas in that field” (Donthu et al., 2021, p. 285). Science mapping techniques were applied to identify trends and patterns of the selected wisdom pedagogy articles ($n=128$) from the World of Science (WoS) database. The results will be quantitatively analysed and visualised with the freely available software VOSviewer (van Eck & Waltman, 2010), and they will be qualitatively interpreted with the three-step sensemaking approach (Lim & Kumar, 2023).

The structure of this paper

This paper has five sections. The need for more wisdom pedagogy research in education, the need to explore the landscape of wisdom pedagogy research in education, the research question, and the research objectives were presented in the Introduction. The Planning and Methods section focuses on the research process design, approach, database and sample selection criteria, data collection, and sensemaking methods. The Analysis and Results section presents the data collection and screening processes, the trends in wisdom pedagogy research in education, and BA science mapping. The Sensemaking section is about a deeper understanding of the results in three phases: scanning, sensing, and substantiating. The Conclusion section answers the research question, reflects on the quality and limitations of this research, and outlines further research directions.

Planning and methods

The previous section presented the arguments of several scholars that wisdom in education and wisdom pedagogy research in education currently need more attention. They argued that there is an obvious need for a better understanding of how the development of wisdom (pedagogy) can be fostered in education. Based on these arguments, we formulated the hypothesis as:

H: There is a need to explore trends and patterns of wisdom pedagogy research in the educational sciences.

This study explores how wisdom pedagogy has been researched in education from 1980 to 2022. The research question was:

RQ: How has wisdom pedagogy research evolved in education from 1980 to 2022, and what are its characteristics and possible future trends?

To answer this question, the science mapping technique of the BA method (i.e., citation, co-citation, bibliographic coupling, co-word, and co-authorship analyses) was selected to explore the landscape of wisdom pedagogy journal articles that were published from 1980 to 2022. Then, the three-step sensemaking method was applied for qualitative interpretations of the quantitative results to determine wisdom pedagogy characteristics and its future evolution.

Research design

Figure 1 below shows how this research was conducted. Planning, implementing, and reflecting were the three main phases of the research process. Each phase requires specific research skills. Figure 1 also indicates the outcomes and activities during the research.

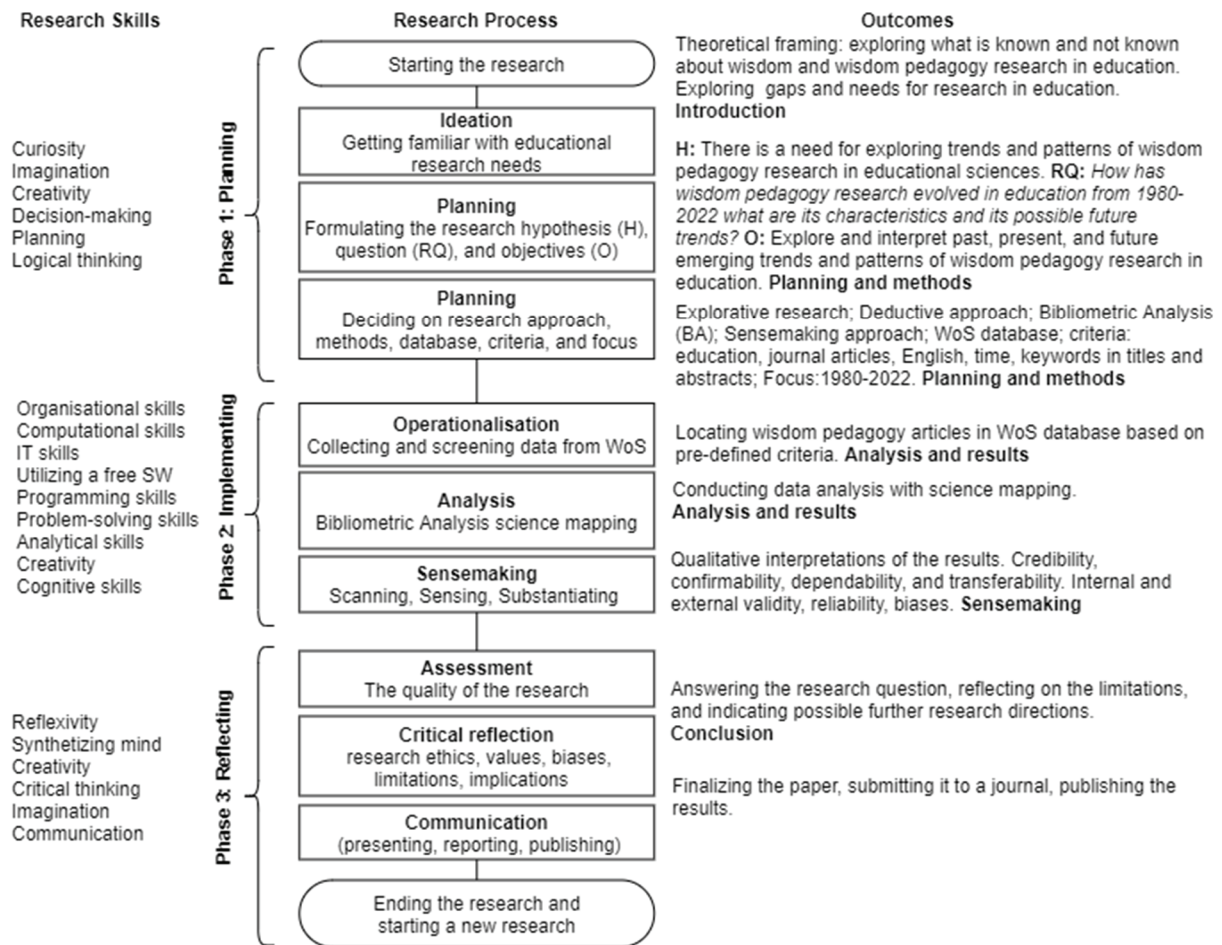


Figure 1: Research design (source: the author’s own creation)

Research philosophy and approach

This study followed a mixture of positivist and interpretivist research philosophies. Wisdom and wisdom pedagogy are socially constructed research phenomena. However, the publications are real; they are published in scientific databases. How knowledge and data were acquired in this study also has a dualistic character. On the one hand, the data are acquired through scientific methods (CSS methods, BA, science mapping) from an existing scientific database (WoS), and the data are quantitatively screened and analysed. On the other hand, the data are qualitatively analysed and interpreted with the involvement of the researcher. That means that the qualitative interpretations were not value-free. The research approach to data analysis is the exploratory deductive approach.

Criteria of database and sample selection

The Web of Science (WoS) has over 170 million full texts available in multidisciplinary fields. Furthermore, WoS is the most frequently used database for academic research. Therefore, for this research, we used it.

Sample selection (i.e., screening) criteria are based on predefined inclusion and exclusion criteria. Publications will be included when they are (1) related to education, (2) published in the predefined period (1980-2022), and (3) written in English. The exclusion criteria are: (1) not published in the selected period; (2) conference proceedings; (3) review papers; and (4) editorial material.

Methods of data collection and analysis

Data were collected from the WoS Core Collection database. Data collection and screening had three main steps: (1) locating and identifying data; (2) screening based on predefined inclusion and exclusion criteria; and (3) eligibility and inclusion for further analyses. Three data samples were identified: wisdom publications ($n=2,457$), wisdom pedagogy publications ($n=152$), and wisdom pedagogy articles ($n=128$). The data analysis and synthesis were applied to wisdom pedagogy articles with BA science mapping techniques (i.e., citation, co-citation, bibliographic coupling, co-word, and co-authorship analyses). Data analyses were conducted with computational methods. According to Nelimarkka (2023), CSS provides opportunities for (1) increasing the size of samples (e.g., $n=128$); (2) speeding up data analyses; (3) exploring things that were not possible before; (4) utilising new opportunities in exploratory analyses of data (e.g., VOSviewer); and (5) accessing digital data sources (e.g., WoS database).

To the best of our knowledge, systematic BA has not been applied to wisdom pedagogy research in the educational sciences before. Bibliometric Analysis presents the state of emerging trends and patterns regarding research topics in a selected range of publications. According to Mukherjee et al. (2022), the theoretical contributions of BA are that it discovers knowledge clusters, depicts the state of the investigating field, shows social patterns and processes, indicates the evolution of the field, and reveals knowledge gaps. They also argue that BA can improve practice by enabling an objective assessment and reporting of research productivity and impact, determining the coverage of the research, determining social dominance or hidden biases, indicating anomalies for further examination, and indicating the relative performance for equitable decision-making. In this study, BA was selected because of its theoretical and practical contributions to the research phenomenon.

Bibliometric Analysis and Systematic Literature Review (SLR) are similar methods. However, the main difference is in the amount of data handled. Bibliometric Analysis, with the computational method, is capable of handling large amounts of data, while SLR is only capable of handling smaller amounts, which can be analysed manually without needing computational methods. The steps in BA are: (1) defining the aim and scope of the research (figure 1); (2) selecting the technique; (3) collecting data; and (4) conducting the analysis and reporting the findings (Donthu et al., 2021, p. 295).

Therefore, BA was selected because it "is a popular and rigorous method for exploring and analysing large volumes of scientific data. It enables us to unpack the evolutionary nuances of a specific field while shedding light on the emerging areas in that field" (Donthu et al., 2021, p. 285). Bibliometric Analysis is gaining popularity in many fields of science, such as business, management, human resources, economics, and finance. However, it is still a very new method in the educational sciences (Brika et al., 2021). According to Donthu et al. (2021, p. 286), based on the Scopus database, the growth in the number of publications with BA increased from 170 to 1,950 from 2005 to 2020. Bibliometric Analysis can process thousands of pieces of data and produce objective, high research results. Donthu et al. (2021, p. 288) provide a summary of BA tools. According to them, besides enrichment techniques (i.e., network analysis), there are two main BA techniques: performance analysis and science mapping. This study used science mapping tools. We also benefitted from WoS analytics in mapping trends in wisdom pedagogy research from 1980 to 2022.

For visualisation of the results of data analyses, we used VOSviewer software. There are several software products available for data analysis and visualisation, such as VOSviewer, CitNetExplorer, CiteSpace, Gephi, HistCite, Pajek, Sci2, and KnowledgeMatrix Plus (Brika et al., 2021, p. 4). VOSviewer was selected because it has good mapping and visualisation features

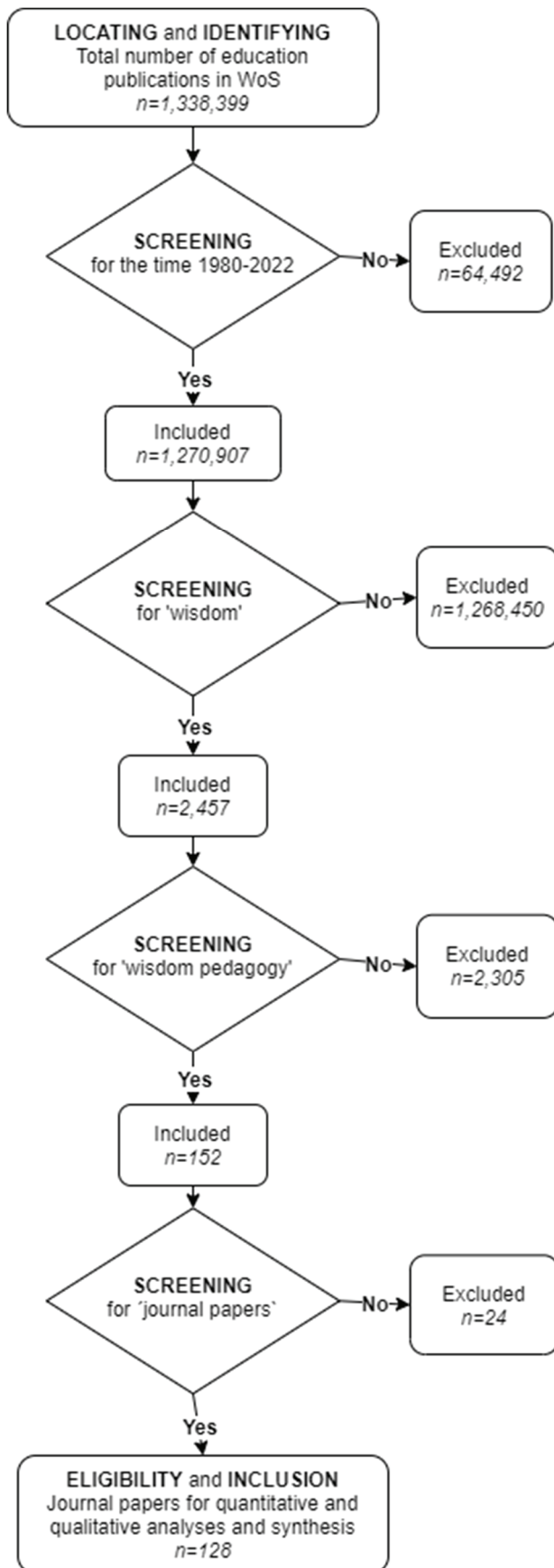


Figure 2: Data collection and screening

(van Eck & Waltman, 2010). This software has been developed for mapping and clustering analysis by Van Eck and Waltman at the University of Leiden, Netherlands.

Methods of sensemaking

This study followed the scanning, sensing, and substantiating phases of the sensemaking approach for interpreting the quantitative findings of BA. Lim and Kumar (2023) argue that because BA is an objective, descriptive, and quantitative research method, a meaningful interpretation of its results needs a qualitative approach. Furthermore, they write that “integrating sensemaking into bibliometric analysis is not merely an ad hoc exercise; it requires careful planning, strategic execution, and mindful interpretation” (Lim & Kumar, 2023, p. 3). In this study, we followed their structured guide for combining BA and sensemaking.

Analysing the results

The purpose of this study is to demonstrate emerging trends and patterns of wisdom pedagogy research in education from 1980 to 2022. After the research planning phase (figure 1), we implement the research by operationalising (collecting and screening data), analysing (BA and presenting the results), and sensemaking (synthesising and interpreting the results).

Data collection and screening with PRISMA

Figure 2 was created based on the principles of PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) (Rethlefsen et al., 2021). The main steps were locating and identifying data in the selected database, screening data (inclusion and exclusion) based on predefined criteria, eligibility, and inclusion for further analysis. Figure 2 shows the systematic data collection and screening process in education.

The total number of publications in education identified in WoS was 1,338,399. After delimiting the search to the period of 1980 to 2022 ($n=1,270,907$), 2,457 wisdom and 152 wisdom pedagogy publications remained. After excluding proceeding papers ($n=22$) and editorial material ($n=2$), 128 wisdom pedagogy articles remained for inclusion in further quantitative analysis (WoS analyses and BA).

Growth of wisdom pedagogy research in education

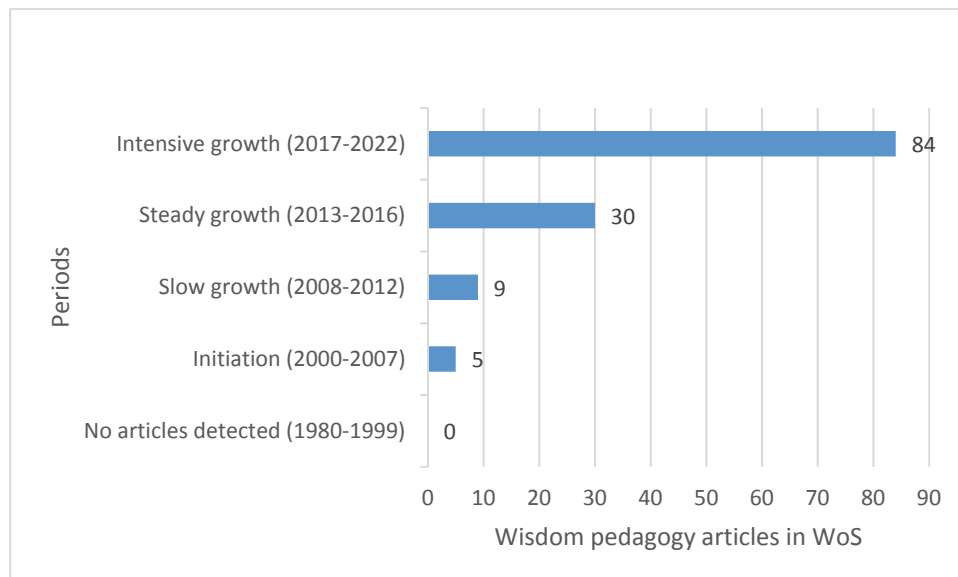


Figure 3: Evolution phases of wisdom pedagogy articles ($n=128$) from 1980 to 2022 (source: the author's own creation)

Figure 3 presents the five phases of the 128 wisdom pedagogy articles: (1) 1980 to 1999 – no wisdom pedagogy articles were detected in the WoS database; (2) 2000 to 2007 – the Initiation phase, with 5 articles; (3) 2008 to 2012 – the Slow growth phase, with 9 articles; (4) 2013 to 2016 – the Steady growth phase, with 30 articles; and (5) 2017 to 2022 – the Intensive growth phase, with 84 articles.

Bibliometric Analysis of Wisdom Pedagogy Articles ($n=128$)

Citation analysis

There were 128 *documents* located. With a minimum of 35 citations, 11 documents were found. The top 9 most highly cited documents were written by the following: Thaman (112), Dixson (81), Ironside (72), Raelin (56), Anderson (54), Burns (53), Sinclair (48), Bell (39), and Regev (37).

Altogether, there were 104 *sources*. With a minimum of 2 documents and 15 citations, 6 sources were found: Management Learning (137 citations), Teachers College Record (109), Journal of Transformative Education (54), Educational Philosophy and Theory (30), Sustainability (17), and Social Work Education (16).

267 *authors* were found in the 128 wisdom pedagogy articles. With 1 document and 55 citations of an author, 5 authors were found. The most highly cited authors were as follows: Thaman (112), Dingus (81), Dixson (81), Ironside (72), and Raelin (56).

160 *organisations* were found in 128 articles. With a minimum of 2 documents and 35 citations, 5 organisations were found: the University of Melbourne (88 citations), Ohio State University (85), the University of Wisconsin (80), RMIT University (41), and Harvard University (37).

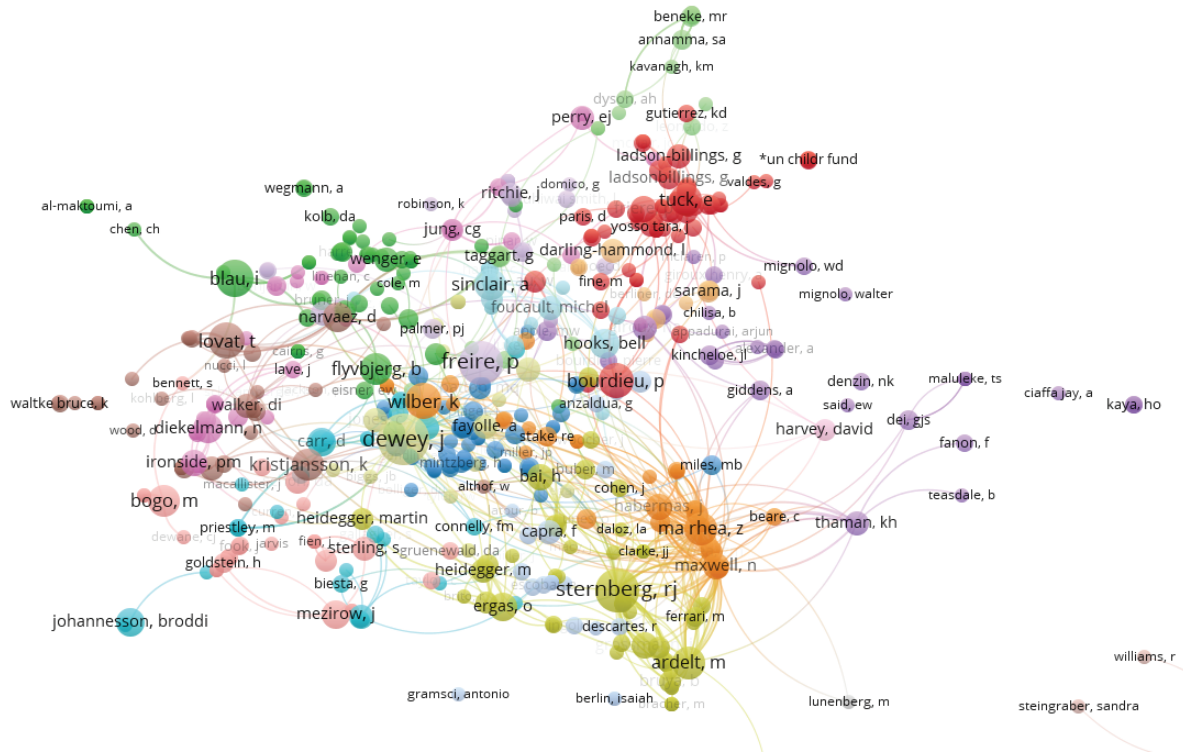


Figure 5: Co-citation analysis of cited authors (mapped n=642) (source: author, VOSviewer)

With a minimum of 2 citations, 671 cited authors were found. 642 were selected for mapping, and 19 clusters were formed (figure 9). The top five clusters had cited authors as follows: 77 (red), e.g., Tuck, Friere, Ladson-Billings, Sleeter, Tintianco-Cubales; 56 (green), e.g., Blau, Flyvbjerg, Wenger, Aristotle, Barnes, Engestrom; 55 (blue) e.g., Kessler, Avery, Pittaway, Piaget, Mintzberg, Allen; 51 (yellow) e.g., Sternberg, Heidegger, Ardel, Grossmann, Bruya, Bassett, Sharma; and 43 (violet) e.g., Thaman, Giddens, Giroux, Kincheloe, Fanon.

Bibliographic coupling analysis

Figure 6 is a cluster density map of 96 selected *documents* from a total of 128. There were 13 clusters identified. The top five were as follows: 11 (red), e.g., Bartlett, Sosa-Provencio, Villenas, Duran; 10 (green), e.g., Samson, Wallin, Farber, Regev, Cheung; 10 (blue), e.g., Raelin, Statler, Perry, Clements, Mudge; 9 (yellow), e.g., Bai, Kumar, Tyson, Wang; and 8 (violet), e.g., Thaman, Kaunda, Alexander, Luczaj. With a minimum of 54 citations, 5 documents were found: Thaman (112), Dixson (81), Ironside (72), Raelin (56), and Anderson (54).

From total of 104 *sources*, 14 were identified with a minimum of 2 documents and 1 citation. The most highly cited sources were as follows: Management Learning (137 citations), Teachers College Record (109), Journal of Transformative Education (54), Educational Philosophy and Theory (30), Sustainability (17), and Social Work Education (16).

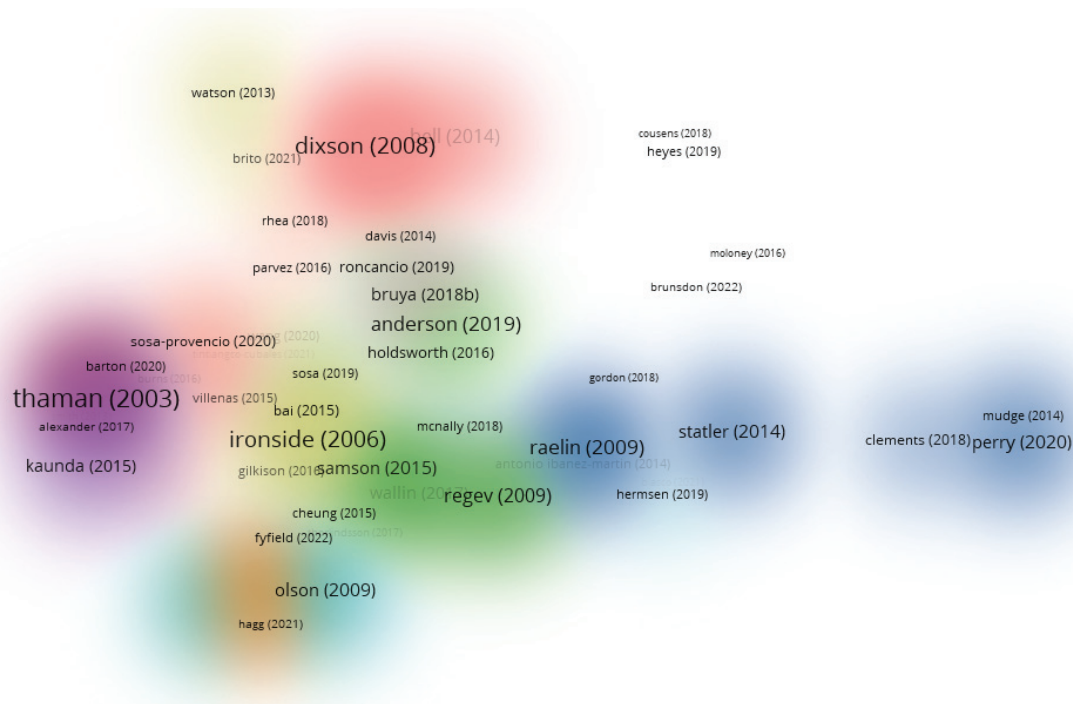


Figure 6: Cluster density map of bibliographic coupling analysis of selected documents (mapped $n=96$) (source: author, VOSviewer)

From 267 *authors*, with a minimum of 1 document and 1 citation, 183 were found. For visualisation, the largest set of authors was selected, with 142. The selected 142 authors were grouped into 11 clusters. The top five clusters were as follows: 55 e.g., Ardelt, Alexander, Sinclair, Gause, Wallin, Kumar, Wang; 16 e.g., Brown, Egler, Temper, Erickson, Babcock, Beigi; 15, e.g., Blau, Cerano, Clark, Conlon, Esmat; 15 e.g., Bartlett, Desai, Carruba-Rogel, Villenas; and 12 e.g., Bai, Burito, Helskog, Kumar, Wang, Weiss. With a minimum of 2 documents and a minimum of 1 citation of an author, 4 authors were found: Bruya (25), Avery (11), Brunsdon (2), and Ritchie (2).

From 160 *organisations*, with a minimum of 2 documents and 4 citations, 15 were identified. The most highly cited organisations were as follows: the University of Melbourne (88 citations), Ohio State University (85), RMIT University (41), Harvard University (37), and Arizona State University (34). With a minimum of 1 document and 57 citations, 5 organisations were identified: the University of South Pacific (112), the University of Melbourne (88), Ohio State University (85), St John Fisher College (81), and the University of Wisconsin (80).

Among the 35 *countries* detected, with a minimum of 2 documents and 2 citations, there were 13 countries identified. The top five were as follows: the USA (611 citations), England (195), Australia (156), Canada (85), and New Zealand (32). With a minimum of 5 documents and 0 citations, 6 countries were found: the USA (611), England (195), Australia (156), Canada (85), New Zealand (32), and Spain (19).

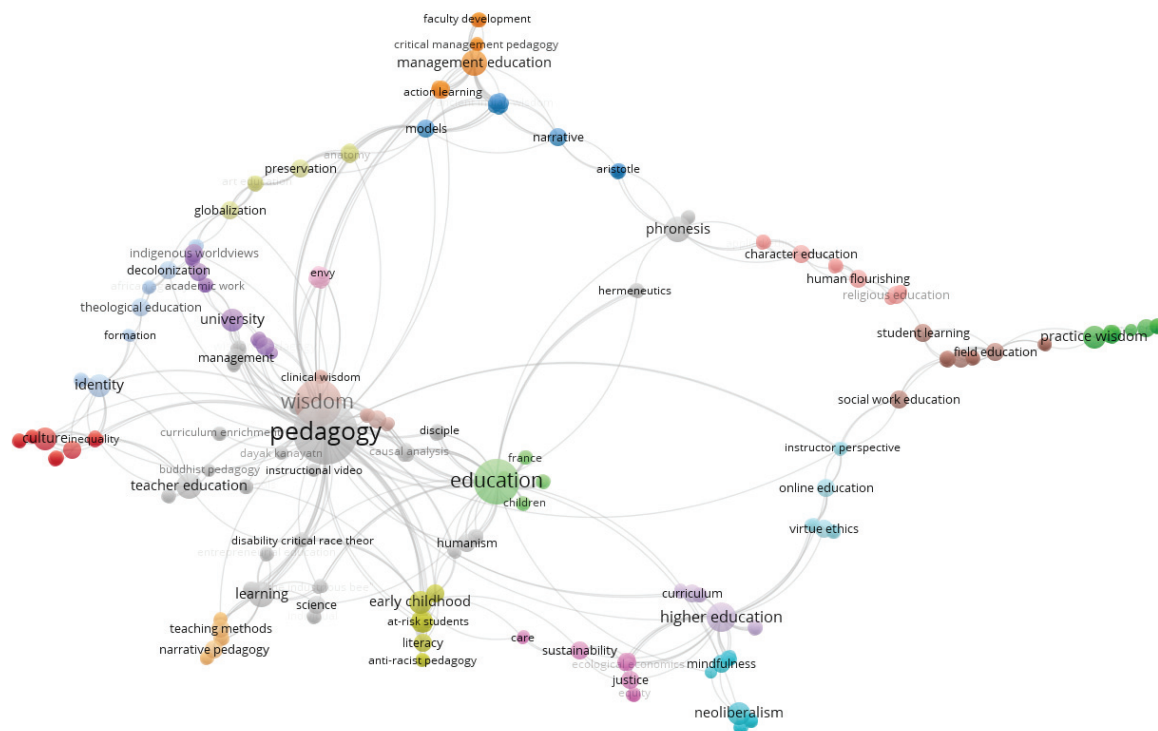


Figure 8: Co-word analysis of author keywords (mapped $n=344$) (source: author, VOSviewer)

Co-authorship analysis

From 267 *authors*, a co-authorship analysis with a minimum of 2 documents and 1 citation, 4 authors were identified. The most cited authors were: Bruya (25), Avery (11), Brunson (2), and Ritchie (2).

Co-authorship analysis of 160 *organisations*, with a minimum of 2 documents and 20 citations, found 8 organisations: the University of Melbourne (88 citations), Ohio State University (85), the University of Wisconsin (80), RMIT University (41), Harvard University (37), Arizona State University (34), the University of Florida (25), and Eastern Michigan University (25).

From 35 *countries*, with a minimum of 5 documents and 19 citations, 6 were found: the USA (611 citations), England (195), Australia (156), Canada (85), New Zealand (32), and Spain (19).

Sensemaking

In the late 1960s, Weick (1995) introduced the concept of sensemaking, defining it as a process in which people gave sense to their experiences. The characteristics of sensemaking were presented in an organisational sciences context (Weick, 1995 and 2001; Weick et al., 2005). Ancona applied sensemaking to leadership, and she argues that "sensemaking involves coming up with plausible understandings and meanings; testing them with others via action; and then refining our understandings or abandoning them in favour of new ones that better explain a shifting reality" (Ancona, 2011, p. 5). This study follows the application of sensemaking to BA proposed by Lim and Kumar (2023). They claim that the scanning, sensing, and substantiating phases of sensemaking could help us to make sense of the BA results.

The first phase of the sensemaking process: Scanning

The scanning phase of sensemaking, i.e., qualitative interpretations of BA data analyses, is essential because it gives an overview and a preliminary understanding of the explored wisdom pedagogy landscape. Lim and Kumar (2023) argue that the scanning phase of sensemaking establishes "a comprehensive initial understanding of the field's intellectual structure, highlighting the interconnectedness of various research topics" (Lim & Kumar, 2023, p. 6). A detailed and rigorous implementation of scanning provides a foundation for deeper interpretations in the next two phases of sensemaking.

The scanning started with identifying data for further analysis. Data were collected and screened based on predefined inclusion and exclusion criteria, as well as PRISMA principles from the WoS Core Collection database (figure 2). The growth and evolution of wisdom pedagogy research in education are demonstrated in Figure 3. The WoS data analysis showed an exponential increase in wisdom pedagogy research in education since the 2000s (figure 3). However, the data analyses (figure 3) also discovered that wisdom pedagogy research in education, compared with wisdom research in other disciplines, has not received enough attention for a very long time.

The scanning continued with BA science mapping of data. Bibliometric Analysis is useful for exploring "large quantities of bibliometric data to present the state of the intellectual structure and emerging trends of a research topic or field" (Donthu et al., 2021, p. 287), and when the size of samples is too large for a manual qualitative review. This study used systematic BA, science mapping techniques (citation, co-citation, bibliographic coupling, co-word, and co-authorship analyses) for analysing in depth the selected (figure 2) 128 wisdom pedagogy articles. A synthesis of the BA results is presented in Table 1.

Table 1: Synthesis of the Bibliometric Analysis (source: the author’s own creation)

Science mapping		Wisdom pedagogy articles (n=128)
(1) Citation analysis	Documents (n=128)	The high impact wisdom pedagogy articles were published by the following: Thaman (112 citations), Dixson (81), Ironside (72), Raelin (56), Anderson (54), Burns (53), Sinclair (48), Bell (39), and Regev (37).
	Sources (n=104)	The most referred sources together were as follows: Management Learning (137 citations), Teachers College Record (109), Journal of Transformative Education (54), Educational Philosophy and Theory (30), Sustainability (17), and Social Work Education (16).
	Authors (n=267)	The most influential authors were as follows: Thaman (112 citations), Dingus (81), Dixson (81), Ironside (72), Raelin (56), Maughan (54), and Pimbert (54).
	Organisations (n=160)	The most cited organisations were as follows: the University of Melbourne (88 citations), Ohio State University (85), the University of Wisconsin (80), RMIT University (41), and Harvard University (37).
	Countries (n=35)	The most influential countries were as follows: the USA (611 citations), England (195), Australia (156), Canada (85), and New Zealand (32).

(2) Co-citation analysis	Cited references (<i>n</i> =5,952)	The most cited references were as follows: Freire (13 citations), Hooks (6), Schon (5), and Sternberg (5).
	Cited sources (<i>n</i> =4,401)	(See Figure 4) The most cited sources together were as follows: Academy of Management Learning and Education (50 citations), Journal of Philosophy Education (25), Journal of Moral Education (21), Harvard Educational Review (21), and Managerial Learning (20).
	Cited authors (<i>n</i> =4,721)	(See Figure 5) The authors cited together in articles were as follows: Dewey (26 citations), Sternberg (19), Freire (19), Blau (14), Wilber (13), Lovat (13), Bourdieu (12), Ardeli (11), Ma Rhea (11), Kristjansson (10), Flyvbjerg (10), Tuck (10), Bogo (10), and Sinclair (10).
(3) Bibliographic coupling analysis	Documents (<i>n</i> =128)	(See Figure 6) Thaman (112 citations), Dixson (81), Ironside (72), Raelin (56), and Anderson (54)
	Sources (<i>n</i> =104)	Management Learning (137 citations), Teachers College Record (109), Journal of Transformative Education (54), Educational Philosophy and Theory (30), Sustainability (17), and Social Work Education (16)
	Authors (<i>n</i> =267)	Bruya (25 citations), Avery (11), Brunsdon (2), and Ritchie (2)
	Organisations (<i>n</i> =160)	the University of South Pacific (112 citations), the University of Melbourne (88), Ohio State University (85), St John Fisher College (81), and the University of Wisconsin (80)
	Countries (<i>n</i> =35)	the USA (611 citations), England (195), Australia (156), Canada (85), New Zealand (32), and Spain (19)
(4) Co-word analysis	All keywords (<i>n</i> =639)	(See Figure 7) The most frequent keywords identified from the titles and abstracts of wisdom pedagogy articles were as follows: pedagogy, education, wisdom, practice wisdom, phronesis, knowledge, management education, higher education, university, character, culture, justice, neoliberalism, teaching, and diversity.
	Author keywords (<i>n</i> =511)	(See Figure 8) The most frequent keyword given by the authors were as follows: pedagogy, education, higher education, teacher education, character education, university, wisdom, phronesis, clinical wisdom, early childhood, management education, mindfulness, humanism, and human flourishing.
(5) Co-authorship analysis	Authors (<i>n</i> =267)	Authors who most frequently published with another co-author/other co-authors were as follows: Bruya (25 citations), Avery (11), Brunsdon (2), and Ritchie (2).
	Organisations (<i>n</i> =160)	Sources that were most frequently referred together in an article were as follows: the University of Melbourne (88 citations), Ohio State University (85), the University of Wisconsin (80), RMIT University

		(41), Harvard University (37), Arizona State University (34), the University of Florida (25), and Eastern Michigan University (25).
	Countries (n=35)	Countries which were most frequently referred together in an article were as follows: the USA (611 citations), England (195), Australia (156), Canada (85), New Zealand (32), and Spain (19).

In brief, the scanning phase of sensemaking led to five interpretations of the BA results (table 1). Based on citation analyses, we discovered the relationships among highly cited articles, journals, authors, organisations, and countries of authors' affiliations. The co-citation analyses showed us the relationships among the most frequently together-cited references, journals, and authors. From the bibliographic coupling analyses, we learned about the relationships among cited documents, journals, authors, organisations, and countries. With the co-word analyses, we explored existing and future relationships among topics based on all keywords and authors' keywords' co-occurrence in publications' titles and abstracts. Finally, the co-authorship analyses revealed social interactions and relationships among authors, i.e., who most frequently published with other authors; it also presented the affiliations of co-authors, i.e., their institutions and countries.

The second phase of the sensemaking process: Sensing

In this phase, our objective was to provide a deeper, more detailed understanding of the collected (figure 2), analysed, and scanned data (table 1). This was done by establishing emerging themes, by exploring relationships between topics within a cluster, and by anticipating future research directions.

Science mapping co-word analysis of all 639 keywords (figure 7) identified 32 clusters. To gain a deeper understanding of the evolutionary character of wisdom pedagogy research through time, we analysed the keywords in the titles of wisdom pedagogy articles from the four periods (figure 3) of their publications, i.e., Initiation (2000–2007), Slow growth (2008–2012), Steady growth (2013–2016), and Intensive growth (2017–2022). In the references, there is a detailed list of publications for each period.

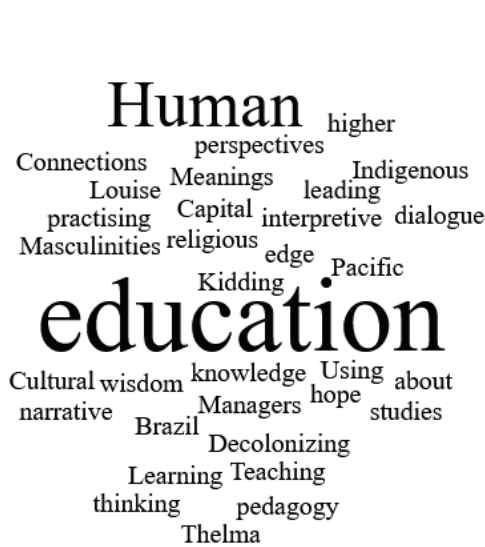


Figure 9a: Initiation period (2000–2007)



Figure 9b: Slow growth period (2008–2012)

because of the crucial role it has in cultivating wisdom in students. The selection of wisdom pedagogy was decided upon because many scholars (Diamond, 2021; Ferrari & Kim, 2019; Glück, 2019; Jakubik, 2022; Karami & Parra-Martinez, 2021; Ling, 2020; Maxwell, 2012, 2014, 2021; Russell, 1956; Sternberg & Hagen, 2019) argue that pedagogy for fostering wisdom in individuals would need more exploration. Based on these foundations, we formulated the hypothesis and the research question and designed the research process (figure 1). We decided to use the WoS Core Collection database because of its accessibility and history as a database for huge numbers of scientific publications. VOSviewer (van Eck & Waltman, 2010) software was applied because it is user-friendly, has systematic data analyses, and has excellent mapping and visualisation features.

We argue that the internal validity of our research was established by applying PRISMA principles (Rethlefsen et al., 2021) for the systematic collection, screening, and objective selection of data (i.e., 128 wisdom pedagogy articles) for further analysis with BA. VOSviewer supported rigour in our citation, co-citation, bibliographic coupling, co-word, and co-authorship analyses. We followed the three-phase sensemaking process to interpret the results. We thoroughly scanned and interpreted the results of our study (table 1). We applied additional analysis in both the sensing and substantiating phases as we aimed to establish the trustworthiness and credibility of our research findings.

Conclusion

Based on many authors' theoretical arguments, the need for more wisdom research in education was established. This study asserted the hypothesis that there was a need for exploring trends and patterns of wisdom pedagogy research in educational sciences, and it asked an explorative question: *How has wisdom pedagogy research evolved in education from 1980 to 2022, and what are its characteristics and possible future trends?* The purpose of this study was to demonstrate emerging trends and patterns of wisdom pedagogy research in education from 1980 to 2022, using the computational science method, i.e., the science mapping techniques of BA. The answer to the research question can be attained from the following research results:

- Since the 1980s, wisdom research has gained momentum in psychology, leadership, human resources, and management, but there has not been enough attention paid to how wisdom can be cultivated (pedagogy) in persons involved in higher education (Diamond, 2021; Ferrari & Kim, 2019; Glück, 2019; Sternberg & Hagen, 2019).
- The research process was carefully planned (figure 1), and research methods were selected.
- The data were collected from the WoS Core Collection database. After data screening (figure 2) from a total of 1,338,399 publications in education, we found 1,270,907 publications from 1980 to 2022. Further screening found 2,457 wisdom and 152 wisdom pedagogy publications (including 128 articles) in the WoS database. The 128 wisdom pedagogy articles were analysed in depth with BA science mapping, and the results were portrayed with the VOSviewer.
- Wisdom pedagogy research in education has slowly started to evolve since the beginning of 2000s (figure 3). This is almost two decades later than in many other disciplines, and it shows an exponential growth only since 2017, i.e., from its “Intensive growth” period (figure 3).
- The results of the BA analysis showed that wisdom pedagogy research in educational sciences is not yet a distinct and established research field. We found that the 639 total keywords and the 511 author keywords from the 128 articles were scattered, as they formed 32 and 30 small clusters, respectively (figures 7 and 8), and they did not form clear, distinct clusters. This was a valuable finding because it indicated that wisdom

pedagogy is still an emerging research field in educational sciences. It also indicated possible future trends in wisdom pedagogy, such as the moral development of future generations (moral reasoning), concerns for environmental issues (climate crises), concerns for social inequalities (anti-racism, equality, gender inequality, age discrimination, etc.), and the role of education (learning, self-awareness, self-cultivation, professional development, curriculum, interdisciplinarity, dialogue, discussion, pedagogy, etc.).

- To have a deeper understanding of the results of BA, we applied the three-phase sensemaking approach:
 - *Scanning* of the BA results (table 1) led us to a preliminary understanding of the explored wisdom pedagogy landscape. This scanning showed us the relationships among highly cited articles, journals, authors, organisations, and countries of authors' affiliations; the relationships among the most frequently together-cited references, journals, and authors; the relationships among citing documents, journals, authors, organisations, and countries; the existing and future relationships among topics; and the social interactions and relationships among authors.
 - The *sensing* phase of sensemaking provided a deeper, more detailed understanding of the results. We conducted an additional analysis of the 128 wisdom pedagogy articles (figure 9), aiming to explore the emerging themes through the four periods of wisdom pedagogy research. This additional analysis revealed the evolution of topics through time and showed possible future trends in wisdom pedagogy research. We noticed that “wisdom”, “pedagogy”, “learning”, and “teaching” all become important themes in education during the “Steady growth” (2013-2016) and “Intensive growth” (2017-2022) periods.
 - In the *substantiating* phase of sensemaking we critically reflected on the quality and trustworthiness of our findings by discussing the bases of our choices, as well as the internal and external validity of our findings.

To the best of our knowledge, this is the first systematic study to explore the evolution of wisdom pedagogy research in education with BA for over four decades. Our main conclusion is that wisdom pedagogy research in education is about 20 years later than wisdom research in other disciplines such as psychology, management, leadership, and human resources. Wisdom pedagogy research in education started to emerge in the 2000s, and it has grown exponentially since 2017.

Limitations of this study

Bibliometric Analysis has the following three main limitations (Donthu *et al.*, 2021, p. 295): (1) scientific databases can have errors, as they are not designed entirely for Bibliometric Analysis; (2) inclusion and exclusion criteria for further analysis and synthesis are defined subjectively by the researcher; and (3) it can offer only a cross-sectional and not a long-term prediction of the research field.

We actively aimed to mitigate these limitations of BA through the following: (1) careful research design (Figure 1); (2) the systematic implementation of a data screening process (Figure 2) based on PRISMA principles and predefined criteria; and (3) analysing data for five periods (figure 7) and then for four periods (figure 13) to detect emerging trends, patterns, and the evolution of wisdom pedagogy research in education. Our study was limited to the WoS database Core Collection, to two search keywords, "wisdom" and "wisdom pedagogy", and to data extracted from the titles and abstracts of articles. Furthermore, this study used only *science*

mapping techniques (citation, co-citation, bibliographic coupling, co-word, and co-authorship analyses) of BA, and only the VOSviewer was applied for visualisation.

Even though we aimed to minimise the limitations of this research, the generalizability of our findings could be disputed. Nevertheless, our aim was to explore and interpret past, present, and future emerging trends and patterns of wisdom pedagogy research in education. We believe that we achieved that with the combination of quantitative (BA) and qualitative (sensemaking) research methods. Furthermore, we believe that our research design steps (figure 1) could be applied to other fields of research. The external validity of our research means the generalizability and transferability of findings. We assess external validity as high because other researchers can follow the steps of our research and reach the same findings as we did. Furthermore, we believe that our research process could be applied to other research fields, and the findings of our research have meaning in other contexts (business, economics, sociology, politics, etc.).

Future research directions

Researchers can continue BA by applying other techniques such as *performance analysis techniques* (publication related metrics, citation related metrics, and citation-and-publication-related metrics) and *enrichment techniques* of network analysis (network metrics, clustering, and other tools for visualisation). Educational researchers are encouraged to conduct similar studies using different databases (e.g., Google Scholar) to gain a more comprehensive understanding of wisdom pedagogy research. A full-text analysis could be implemented as well.

Practical implications

The practical implications of our study are related to synthesising the emerging wisdom pedagogy models and developing teaching practices for wisdom pedagogy. There are already practical suggestions for teachers on how to teach wisdom. For example, Ferrari and Kim (2019, p. 352), referring to Sternberg's balanced curriculum, suggest that teachers need to focus on enhancing the critical, creative, practical, dialogical, and dialectical thinking of their students, helping them to apply their knowledge to the benefit of the common good, critically consider their actions, reflect on their own values, and being themselves role models for wise judgments and actions. Sternberg and Hagen (2019, p. 376) emphasise the importance of teaching students to seek a common good, balance their own interests with others, think about the short- and long-term consequences of their actions, and act with moral and ethical values. Teachers could start applying wisdom pedagogy frameworks and teaching guidelines, as well as collecting experiences and reflections from their students.

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