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Efforts by universities to promote sustainability competence over the last few decades: A systematic literature review

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Abstract: Mainstreaming Sustainability Competence (SC) in higher education is very urgent, considering the need to promote education for sustainable development and sustainable development goals. The purpose of this systematic literature review (SLR) was to analyze original articles in Scopus database, related to the SC theme and its connection to higher education. Inclusion-exclusion was carried out using PRISMA model to obtain 36 articles. This SLR obtained several interesting findings. It was found that the theme of SC was first collected in the Scopus database in 2009, and the increasing SC-higher education occurred during and post-COVID-19 pandemic, namely from 2020 to 2023. Various efforts have been made by universities around the world to promote SC. Their focus is on strengthening SC to realize the ESD and achieve SDGs through strengthening active learning, strengthening students and teachers, reformulating and adapting the curriculum. It was also found that the author's country of origin is still dominated by countries in the European region, namely Spain, Sweden, England. This fact is also supported by the concern of funding sponsors from Europe in funding research and publications regarding sustainability competencies. Therefore, this theme needs to be campaigned widely on other continents, especially Asia, Africa, Oceania and America because its role and position are also important in relation to sustainability.

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Introduction

Sustainability competence (SC) relates to integrated knowledge, skills, attitudes and values; as an effort to empower every individual to take an effective role in facing the challenges and opportunities of world sustainability (Bianchi, 2020; W. Lambrechts et al., 2010). Sustainability competence (SC) is very important in higher education, especially during the industrial revolution era. The scope of SC includes various aspects such as systems thinking, future thinking, value thinking, collaboration, and action-oriented competencies. In the context of developments in the world of information or digital technology, efforts are needed to bridge the gap between students' aspirations to overcome sustainability challenges and the actual incorporation of SC in their education (Mulyadi et al., 2023; Ratinen &

Linnanen, 2022; Sá et al., 2022; Scalabrino, 2022; Schuler et al., 2018; Wang et al., 2022). Overall, SC is essential to ensure environmental, social, and economic sustainability; which means anticipating various challenges and problems that accompany it (Berglund et al., 2020; Fuertes-Camacho et al., 2019; Lenhart & Bouwma-Gearhart, 2022; Ruiz-Mallén & Heras, 2020).

The campaign regarding the urgency of SC began to be promoted in the world of higher education along with the implementation of education for sustainable development. Researchers and observers in higher education have begun to take an interest in this topic in the last three decades. Mainstreaming SC in higher education is very urgent, considering the need to promote education for sustainable development (ESD) and sustainable development goals (SDGs) (W Lambrechts et al., 2017). In this regard, based on the results of a search on the Scopus database carried out in April 2024, it was found that there were 146 publications on the theme of SC in the last 30 years or 2009-2024 (out of a total of 766 for the all-fields category). Referring to this data, the new SC theme was first documented in the Scopus database in 2009, related to the topic of bachelor engineering education competences at three European universities (Segalàs et al., 2009).

These publications need to be analyzed in depth to find interesting information, trends and newest research. One of the most recommended techniques for study and analysis is Systematic Literature Review (SLR). Systematic literature review about SC still very rare. The SLR focused on SC totaled seventh articles (by searching using " "sustainability competence" AND review" in the Scopus database). SLR relates to an assessment of key sustainability competencies (Annelin & Boström, 2022), educator competences (Corres et al., 2020), human competences (Galleli et al., 2020), and the urgency of green skills and sustainability competences (Montanari et al., 2023). So far, only two SLR-based articles has been found that is related to higher education, i.e. about service-Learning as a niche innovation for sustainability (A Álvarez-Vanegas et al., 2024) and connecting competences and pedagogical approaches (R Lozano et al., 2017). Thus, it can be said that no SLR has been found that focuses on SC and university or higher education.

Therefore, the aimed of this SLR was to compare various original articles published in collected in Scopus database related to the theme of SC and universities (higher education). It is anticipated that this SLR will make a valuable contribution to the advancement of literacy studies pertaining to individuals with disabilities. The outcomes of the data extraction process regarding the extent of scholarly investigations on SC in academic institutions globally will offer insights into the existing level of emphasis and endorsement for these subjects. Consequently, this SLR introduces a unique perspective in the realm of scholarly inquiry centered around higher education.

Research Method

Research framework

This investigation constitutes a Systematic Literature Review (SLR), a methodological approach designed to systematically identify, assess, and analyze all pertinent research findings pertaining to specific research inquiries, topics, or areas of interest (Chigbu et al., 2023; Newman & Gough, 2020). Independent study, also known as individual study, constitutes a fundamental form of research, whereas a systematic review represents a secondary level of investigation.

Research Question (RQ)

What are the publication trends and efforts by universities to promote sustainable competence over the last few decades? This aspect of the trend refers to various previous SLRs (Husamah et al., 2022a, 2022b, 2023; Nurwidodo et al., 2023).

Search article and inclusion criteria

We use the words "sustainability competence" in the disbursement menu in the Scopus database. The search was carried out using the official subscription account owned by the Universitas Muhammadiyah Malang. Data simulation uses "Analyze search results" provided by Scopus. To enrich data and analysis, we exported the data in *CSV format (for visualize data process with VOSviewer) and *RIS (for synchronized with Mendeley). The search history in Scopus is as follows: "TITLE-ABS-KEY ("sustainability competences") AND PUBYEAR>2008 AND PUBYEAR<2025 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English")) AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (SUBJAREA, "SOCI")) AND (LIMIT-TO (PUBSTAGE, "final")). The search yielded 146 articles, so they needed to be filtered (inclusion and exclusion) to focus the analysis. We use Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) in inclusion and exclusion refers to Page et al (2021), which consists of four stages, namely identification, screening, eligibility, and inclusion (Selcuk, 2019). The sequence of inclusion and exclusion is shown in Figure 1.

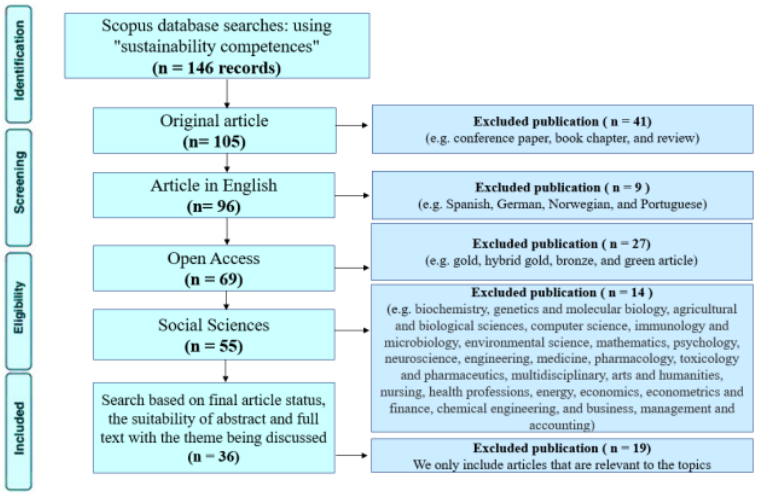

Figure 1. PRISMA flow diagram

Figure 1 shown that the initial search we found a total of 146 articles. The percentage of subjects from the various articles found, as presented in Figure 2, shows that the highest percentage is social sciences. We only take the original article, there were 105 articles that met the criteria (104 articles were excluded). We only took 96 articles in English, and excluded 9 articles (Spanish, German, Norwegian, and Portuguese). For the open access article criteria, there were 69 articles that met the criteria or 27 articles were excluded. We only use "social science" subject, we met 55 articles and 14 articles were excluded. In the

final phase, we re-examine existing articles, ensuring the articles are appropriate to the themes discussed (related to SC and universities/higher education), ensuring the full text can be accessed. Based on this, we got 36 final articles that were suitable, which means 19 articles were excluded.

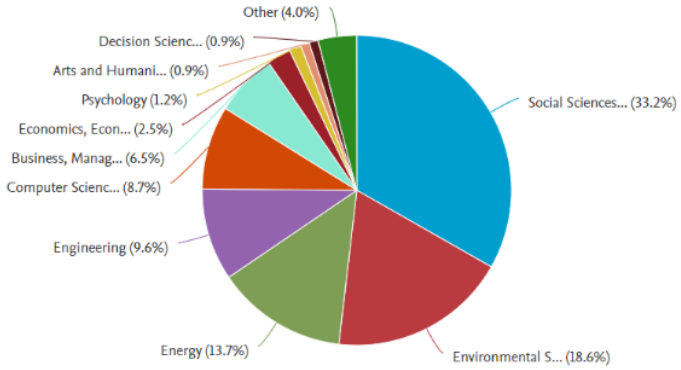

Figure 2. Document by subject area

Result and Discussion

Document by year

Figure 3 shows the number of articles in teh Scopus database, annually from 2009 to 2024. Based on Figure 3, it can be seen that the trend of publications on SC and higher education in the Scopus database tends to increase from 2020 to 2023. The issue of SC began to receive attention since 2009, although in aggregate it has clearly become the focus since 2018. We can see that during the Covid-19 pandemic, SC as part of the SDGs issue received more attention than researchers in universities. And this trend will continue to increase until post-pandemic (2022-2023). We cannot yet conclude the data for 2024 considering that this data still reaches April 2024 (there are still 8 months left, which allows for an increase in the number of articles on this friend).

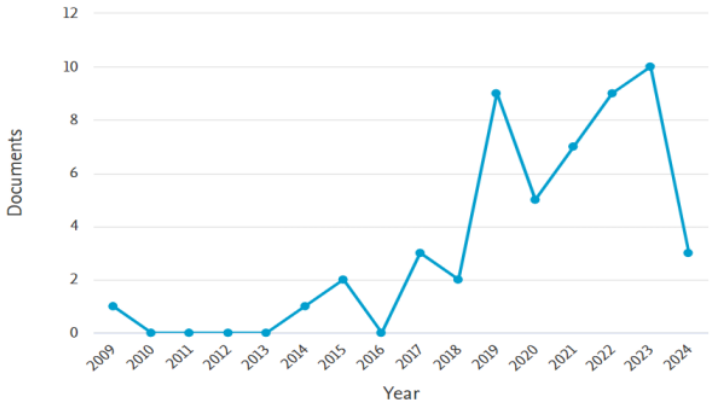

Figure 3. documents by year

Research in higher education during and after the COVID-19 pandemic has highlighted the importance of SC themes (Cato & Mathis, 2023; Gorina et al., 2023; Salem et al., 2023). The pandemic has necessitated a transformation in higher education institutions towards sustainability, digitalization and resilience (Liu & Li, 2023; Rasli et al., 2022). Various studies emphasize the need for integrating technology in ESD, with a focus on educators who are familiar with digital technologies (Shishakly et al., 2024; Van den Berg & Verster, 2023, 2023; Vlachopoulos et al., 2023). Various studies have successfully identified strategies for dealing with post-pandemic uncertainty, emphasizing resilience, change management, digital transformation, and curriculum change as key dimensions for sustainability in higher education (Jarjabka et al., 2024; Qureshi et al., 2024; Rasli et al., 2022). The evolving higher education landscape post-COVID-19 underscores the need for practice and SC to anticipate the various challenges that may occur in the future (Bozkurt, 2022; Crawford & Cifuentes-Faura, 2022; Jacques et al., 2023; Núñez-Canal et al., 2022).

Research concern or being promoted and keywords trend

The trend of research concern or being promoted related to "sustainability competence and universities" themes is presented in Table 1.

Table 1. Research concern or being promoted

No	Reference	Important aspects that are of concern/promoted
1	(Segalàs et al., 2009)	This article endeavors to introduce and enhance the research on delineating the sought-after sustainability skills for undergraduate engineering students in three technical institutions by employing the descriptors of the European Higher Education Area.
2	(Ull et al., 2014)	A research study was conducted involving a group of educators from the Teaching School at the University of Valencia, aimed at examining the perceptions and beliefs of these educators regarding the integration of sustainability concepts into their courses. The collected data provides insights into the stance of educators towards incorporating sustainability principles into the Early Childhood Education Teacher Degree and Primary Education Teacher Degree programs, fostering the development of essential competencies for sustainability.
3	(Besong & Holland, 2015)	This article presents the Dispositions, Abilities, and Behaviours (DAB) framework, which shaped the development of an intervention in the years 2013-2014 aimed at assessing sustainability competencies in graduating undergraduate students at a university establishment.
4	(Gardiner & Rieckmann, 2015)	A course “Sustainability and the Future” was formulated and implemented at the University of Vechta, located in Germany, within the framework of an action research sequence investigating essential skills for sustainability within the realm of higher education. The utilization of reflective journaling was employed to delve into the process of acquiring competencies, complemented by the conduction of focus group discussions with students subsequent to the completion of the module.
5	(Wim Lambrechts et al., 2017)	The article presents several professional development initiatives that center on sustainability within a specific higher education institution. By viewing these initiatives through the lens of organizational change, valuable perspectives are gained regarding the present integration of empowerment components in professional development efforts and the potential enhancement of these initiatives to promote the deeper incorporation of sustainability skills in higher education.
6	(Keeler et al., 2018)	This study examines five instances of city–university collaborations in three different nations regarding the transfer of solutions. Their examination indicates that grasping the motivation, the measures taken for sustainability, and the personal as well as joint sustainability skills within the city administration and the university could support the dissemination of sustainable solutions across various environments.
7	(Zhou et al., 2019)	This paper introduces an educational strategy known as collaborative learning by teaching (CLBT), characterized by its focus on the learner and their active involvement. The primary objective of this research is to investigate and assess student attitudes towards CLBT through an empirical study at a Chinese state university. The qualitative results suggest that while students encounter challenges in self-regulation, they experience notable

No	Reference	Important aspects that are of concern/promoted
		improvements in participatory learning and collaborative skills. The correlation between CLBT and sustainability proficiency warrants further examination in forthcoming research endeavors.
8	(Dlouhá et al., 2019)	The examination of sustainability competencies using this tool demonstrates the transformative aspect across a continuum from holistic reasoning to future focus for attaining transformation, and the normative aspect highlighting the synergy between individual and systemic nature of competencies. The evaluated competency models consist of competencies that are fairly balanced in both dimensions; particularly, competencies within the socio-emotional learning sphere frequently linked with envisioning change and accomplishing sustainable transformation.
9	(Rubio et al., 2019)	The primary discoveries indicate that current courses within the field of humanities and engineering endeavors, along with the culminating degree project, serve as highly suitable realms for fostering a comprehensive and introspective methodology. Correspondingly, a deficiency in addressing environmental concerns is observed in the field of Informatics Engineering, while ethical dilemmas typically remain absent in the curriculum of Industrial Engineering. Overall, a consistent and purposeful amalgamation throughout the educational programs is lacking.
10	(Shephard et al., 2019)	The study detailed in this article delves into the potential for miscommunication or misinterpretation of fundamental principles in these disciplines to impede advancements towards their goals.
11	(Alexa et al., 2020)	The primary goal of this study was to investigate how technical universities in Romania have incorporated courses into their curricula that focus on developing sustainability skills in engineering students. Findings indicated variations in the implementation of sustainability education among the universities and even among different faculties within the sampled universities, demonstrating a somewhat fragmented approach.
12	(Ayers, 2020)	This study examines the impact of a study abroad initiative, known as the Engineers without Borders Design Summit, on enhancing the development of sustainability skills among its participants. The research posits that contextualization can manifest in various forms, such as employing specific sustainability principles as constraints to shape educational settings, engaging with sustainability-oriented instructors as mentors to link education to sustainability, and enabling students to confront unsustainable practices to foster individual commitment to sustainability.
13	(Finnveden et al., 2020)	Higher education institutions (HEIs) in Sweden are mandated, in accordance with the provisions of the Higher Education Act, to advocate for sustainable development (SD). This empirical investigation stands out as an exceptional analysis encompassing all HEIs within a nation. Such an approach offers unparalleled opportunities for discerning both enablers and constraints. The significance of the governance within HEIs was underscored.
14	(Solís-Espallargas & Morón-Monge, 2020)	The findings demonstrate enhancements in the attainment of these skills, stemming not solely from self-assessment but also from the research approach undertaken within this novel endeavor. Similarly, these outcomes suggest the efficacy of the pedagogical recommendation as a potential educational approach for upholding the continuity of the science education curriculum.
15	(Napal et al., 2020)	While initially designed for the purpose of filtering multimedia materials within an educational setting, this tool (along with the indicators included) has the potential to be applied to the curation and organization of diverse resources and tasks, ultimately identifying those that enhance the development of scientific skills. Moreover, it offers educational leaders a shared framework for collaboration by aligning goals and indicators associated with skill acquisition.
16	(Urrea-Solano et al., 2021)	Based on the findings, the participants enrolled in the Bachelor's program in Early Childhood Education exhibited a superior proficiency in e-sustainable competence, particularly in the areas of general skills and the economic aspect of digital sustainability.
17	(Moreno-Pino et al., 2021)	The worldwide findings indicate a significant dearth of sustainability competencies within the field of Mathematics Education, with merely 25% presence, particularly noting that ethical competencies exhibit the lowest relative presence at 10%. Primarily, sustainability-related competencies are predominantly set at the rudimentary level of proficiency, categorized as "know".
18	(Membrillo-Hernández et al., 2021)	Reserachers proposed definition for the sustainability transversal competence is: "The student possesses the knowledge, skills and attitudes necessary for the successful performance ofthe task and the resolution ofproblems related to the challenges and opportunities for sustainability in today's world".
19	(Scharenberg et	Multilevel analyses revealed that, on an individual level, prerequisites of previous

No	Reference	Important aspects that are of concern/promoted
	al., 2021)	knowledge alongside characteristics related to ESD, such as students' engagement in activities and overall understanding of sustainability, emerged as the most influential factors in their progress. Furthermore, distinctions specific to grades and academic tracks were noted.
20	(Fodor et al., 2021)	The provided novel methodologies may facilitate the transition of focus towards sustainable development, aiding curriculum developers and policymakers in evaluating the labor market demands for skills and competencies related to sustainability. The obtained outcome could be utilized as a foundation for the development of training programs based on results, aimed at creating teaching materials with clearly defined learning objectives.
21	(Lucas Mangas et al., 2021)	The findings indicate that despite the absence of statistically significant discrepancies in the pre-test and post-test measurements, there is a discernible inclination towards enhancing personal norms regarding sustainable development. This observation underscores the need for additional investigation in this domain.
22	(Asikainen & Tapani, 2021)	This study delves into the cognitive process of teacher candidates as they interpret sustainable development and the intersection between adopting ESD in their teaching practice and entrepreneurial endeavors. The findings suggest that there is potential for profound learning experiences. Additionally, the study highlights the significance of specific entrepreneurial skills in effecting transformative action.
23	(Kioupi & Voulvoulis, 2022)	Researchers demonstrate the utilization of the evaluation instrument in a case study conducted at a University, and we formulate deductions regarding the insights it provides into how professionals in higher education can leverage its utilization.
24	(Wang et al., 2022)	The discoveries demonstrate that the efficacy of universal, widely relevant pedagogical approaches is correlated with the cultivation of students' sustainability mindset/framework and their engagement in sustainability action/communication. Additionally, the findings indicate that enhancing students' skills in sustainability mindset/framework directly influences their endorsement of the new environmental paradigm (NEP) and pro-environmental behaviors (PEBs)
25	(Zhong et al., 2022)	The document provides results from a self-reflective practitioner-as-researcher action research carried out collaboratively by the educators of case studies.
26	(Cruz-Iglesias et al., 2022)	This methodology for designing a curriculum has the potential to motivate other educational settings and scenarios in addressing the task of conceptualizing their pathway for developing sustainable competencies.
27	(R Lozano, Bautista-Puig, et al., 2022)	The study examines the importance of cultivating a sustainability competences paradigm through the promotion of sustainability education, utilization of pedagogical strategies, and enhancement of competences. It is essential to acknowledge and tackle the obstacles in order to prevent the emergence of a futile endeavor.
28	(R Lozano, Barreiro-Gen, et al., 2022)	The integration of sustainability into educational frameworks, as elucidated through the incorporation of innovative practices, offers insight into the cultivation of competencies via pedagogical methodologies. The purpose of this study is to examine this phenomenon within the context of academic disciplines.
29	(Cano García & Lluch Molins, 2022)	Higher educational institutions ought to advocate for the development of sustainability skills in their graduates as a result of its significance, a point that has been underscored amidst the pandemic. Nonetheless, there appears to be a waning emphasis on this aspect, evident in both the curriculum and the discourse among educators and students.
30	(Singh-Pillay, 2023)	The results suggest that when pre-service technology teachers (PSTTs) are encouraged to engage actively in sustainability issues within their communities, they are more likely to make well-informed decisions regarding their future role as educators, the instructional methods they intend to utilize, and the types of knowledge they aim to cultivate in students.
31	(R Lozano et al., 2023)	The regressions indicated that the Universal and Social categories are the most appropriate for the enhancement of all competence groups. The Environmental category specifically enhances the cogitative-processual competence group. These findings formed the foundation for introducing the Sustainability Teaching System (STS), which offers a more profound understanding of the pedagogical methods and sustainability competences by categorizing them and illustrating their directionality and intensity.
32	(García-Alonso et al., 2023)	This study examines the influence of a mathematics instructional scheme that enhances the creation of assignments on the subjects of mathematics and sustainability, particularly emphasizing ESD.
33	(Alejandro Álvarez-Vanegas et al., 2023)	The results indicate that educators possess a certain level of understanding regarding ESD. Nevertheless, there exists a need for enhancement, especially concerning implementation. Furthermore, discrepancies emerge between the skills they strive to cultivate in their

No	Reference	Important aspects that are of concern/promoted
		students and those they currently hold.
34	(Kadji-Beltrán, 2024)	The results demonstrate that the participants exhibited a sense of confidence and effectiveness in delivering instruction on sustainability. They also enhanced their understanding of content, pedagogy, motivation, and willingness as a result of a profound sense of duty and accountability. The entire procedure supported the advancement of analytical thinking, holistic thinking, introspection, and cooperation.
35	(Cuevas-Cancino et al., 2024)	Traditional education is no longer adequate for addressing environmental challenges; therefore, scholars, educational institutions, and policymakers are urged to establish and enact educational policies and strategies aimed at fostering a sustainable and improved future for both humankind and the planet.
36	(Vesala-Varttala et al., 2024)	The researchers concentrate on three blended intensive programs, two located in Finland and one in Hungary, in order to investigate the impact of implementing a pedagogical strategy that integrates project-based digital storytelling with reflective writing on the enhancement of students' sustainability competence both during and post the pandemic.

Table 1 shows that various efforts have been made by universities in the world to promote SC. Their focus is on strengthening SC to realize SD or SDGs through strengthening active teaching and learning, strengthening students and teachers, reformulating and adapting the curriculum at the tertiary level. This is very much in line with the keyword trend resulting from simulations with VOSviewer, as presented in Figure 4. Figure 4 shows that the word/phrase Sustainable Development is related to sustainability competence, and higher education (as the dominant phrase). These phrases then branch out and are related to teaching, active learning, students, teachers, and curriculum.

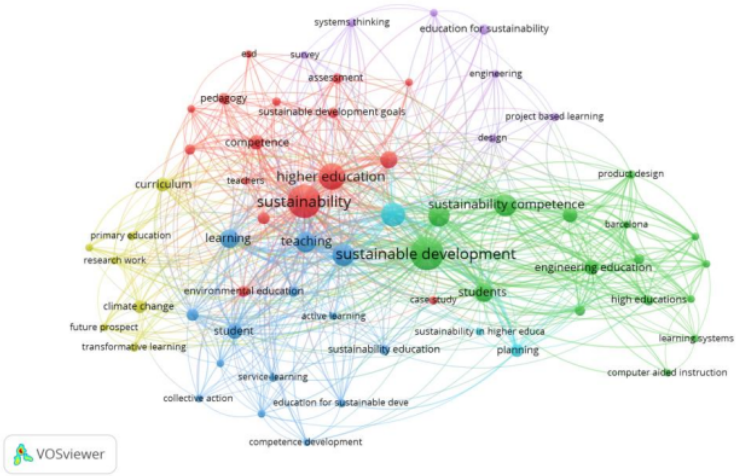

Figure 4. VOS-viewer display for type of analysis "Co-occurrence → keywords"

Sustainable development entails the overarching objective of attaining equilibrium among economic advancement, social fairness, and environmental safeguarding in order to fulfill current needs without jeopardizing the potential of forthcoming generations to fulfill their own requirements (Bengtsson et al., 2018; Emina, 2021; Lim et al., 2018; Zhao & Gómez Fariñas, 2023). Sustainability competence pertains to the knowledge, skills, and attitudes essential for individuals and entities to effectively contribute to sustainable development (Bianchi, 2020; Laasch et al., 2023; Mensah, 2019). The realm of higher

education assumes a pivotal role in cultivating sustainability competence through the incorporation of sustainability tenets across various fields of study, provision of specialized educational programs, encouragement of research on sustainability dilemmas, and cultivation of principles related to environmental stewardship and societal accountability among both students and faculty members (Besong & Holland, 2015; Cuevas-Cancino et al., 2024; García & Molins, 2022; Husamah et al., 2022b). By means of higher education, individuals can amass the requisite proficiencies to tackle intricate sustainability challenges and evolve into catalysts of constructive transformation within their communities and beyond (Dlouhá et al., 2019; Kohl et al., 2022; Žalėnienė & Pereira, 2021).

The correlation among active learning, students, teachers, and the curriculum holds significant importance in endeavors towards achieving sustainability. By embracing an active learning methodology, students engage directly in their educational journey, facilitating the cultivation of a profound comprehension of sustainability issues (Alam & Mohanty, 2023; Ghasemi et al., 2020; Pauw et al., 2015; Smeplass, 2023). Teachers assume a crucial role in establishing a conducive learning setting, fostering inclusive dialogues, and promoting cooperative learning approaches that empower students to connect sustainability principles with their own encounters (Claro & Esteves, 2021; Elsayary & Baroudi, 2023; Iraola et al., 2024; Kalamas Hedden et al., 2017; Kioupi et al., 2022; Quintero-Angel et al., 2024, 2024). Furthermore, an integrated curriculum incorporating sustainability principles guarantees that these subjects are not merely taught in isolation but are also embedded within pertinent contexts, reinforcing students' grasp of the interconnectedness among the economic, social, and environmental facets of sustainability (Gamage et al., 2022; Mondragon et al., 2023; Taylor et al., 2021).

Author's country or territory and Funding Sponsor

The trend of author's country or territory of research related to "sustaianbility competence and universities" themes are presented in Figure 5.

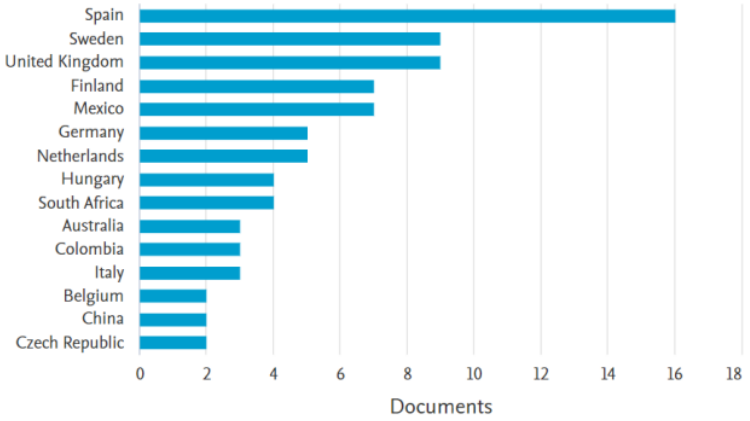

Figure 5. Author's country or territory

Based on Figure 5, it can be seen that there are 15 countries where the authors come from, dominated by countries on the European continent, namely Spain, Sweden, United Kingdom, Finland, Germany, Netherlands, Hungary, Italy, Belgium and Czech Republic .

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Meanwhile, the only other countries are Mexico (America), South Africa (Africa) and China (Asia). This fact is also supported by the concern of funding sponsors from Europe in funding research and publications regarding sustainability competence (see Figure 6). Thus, the theme of sustainable competency is still an issue that is the focus of European countries. This theme, therefore, needs to be campaigned widely on other continents, especially Asia, Africa, Oceania and America because its role and position are also important in terms of sustainability.

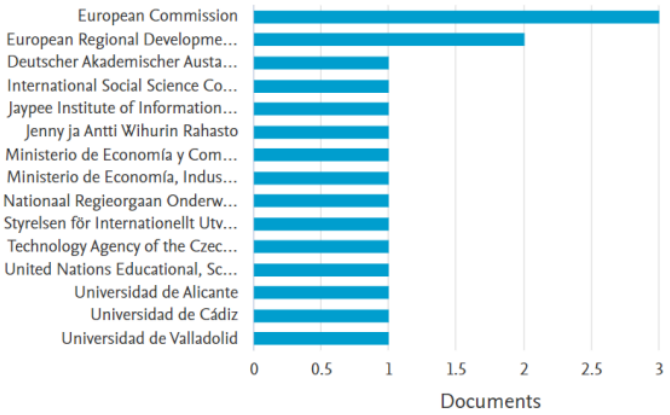

Figure 6. Funding sponsor

The concept of sustainability and the acquisition of sustainability competencies have emerged as a predominant focal point within European higher education institutions and European funding sponsor due to a myriad of contributing factors. Europe boasts a rich historical background concerning environmental preservation and sustainable growth, primarily steered by an acknowledgment of the finite nature of natural resources and the adverse ramifications of pollution and environmental deterioration (Abbasi et al., 2021; Addai et al., 2023; Ahlberg, 2009; Aydin et al., 2023; Maes & Jacobs, 2017; Mihajlov, 2006). The European Union has enforced robust regulations and endeavors aimed at fostering sustainable development, exemplified by initiatives like the Green Deal (European Investment Bank, 2014; Hedberg & Šipka, 2022; Koundouri et al., 2024). The ethos of multiculturalism and diversity prevalent in Europe cultivates an understanding of sustainability as a collective obligation among nations and establishments (Bunescu & Estermann, 2021; Dlouhá et al., 2017; Findler et al., 2019; Huda et al., 2021; Rodrigo Lozano et al., 2019; Martín Bautista-Cerro et al., 2023; Payne & O'Neil, 2019; Salvador & Comunian, 2024). Hence, European academic institutions are actively addressing these imperatives by enhancing sustainability-related academic programs and scholarly investigations, equipping forthcoming cohorts with the requisite comprehension and aptitudes to confront global predicaments.

Conclusion

This systematic literature review obtained several interesting findings. It was found that the theme of sustainability competence (SC) was first collected in the Scopus database in 2009, and the increasing trend of the SC theme and its relation to higher education occurred

during the COVID-19 and post-COVID-19 pandemic, namely from 2020 to 2023. Results Analysis of existing articles shows that various efforts have been made by universities around the world to promote SC. Their focus is on strengthening SC to realize ESD and achieve the SDGs through strengthening active learning, strengthening students and teachers, reformulating and adapting the curriculum. It was also found that the author's country of origin is still dominated by countries in the European region, namely Spain, Sweden, England. This fact is also supported by the concern of funding sponsors from Europe in funding research and publications regarding sustainability competencies. Therefore, this theme needs to be campaigned widely on other continents, especially Asia, Africa, Oceania and America because its role and position are also important in relation to sustainability.

Recommendation

This SLR fails to examine additional intriguing data, such as research content, collaborative efforts in research, research site, as well as aims and key outcomes of each publication. Thus, scholars and writers aiming to carry out SLRs on this topic should contemplate integrating these elements. The discoveries derived from this SLR could serve as a point of reference or foundation for researchers exploring literacy issues related to disabilities based on their particular concerns, requirements, and objectives.

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