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What do We Know About Teacher Educators’ Perceptions of Education for Sustainable Development? A Systematic Literature Review

Antje Goller

University of Vechta, Vechta, Germany
TU Dresden, Dresden, Germany
Leipzig University, Leipzig, Germany

Marco Rieckmann

University of Vechta, Vechta, Germany

Abstract

Teacher educators prepare prospective teachers to deliver Education for Sustainable Development (ESD) in schools. Lecturers’ personal perceptions of ESD guide them in this work. While there has been some research into lecturers’ perceptions of ESD in general, teacher educators as a group have been given scarcely any consideration. As groundwork for further research in this area, the research question that is the focus of this paper is: What do we know about teacher educators’ perceptions (understanding, attitudes, ideas about implementation) of ESD? We carried out a systematic literature review, including bibliographic analysis and qualitative content analysis of all the papers identified (N = 12). We found both broad and relatively limited understanding and mainly positive but also some negative attitudes. Common perceptions and/or experiences of barriers and drivers are set out below, as are reports on implementation. We conclude that further research is needed in this important field in order to develop measures to bring about systemic change in teacher education.

Keywords: education for sustainable development, lecturers, systematic literature review, teacher education, teacher educators

Introduction

As highlighted recently by the Berlin Declaration (UNESCO, 2021), teachers are key multipliers in the promotion of Sustainable Development (SD). Teacher educators are thus responsible for preparing future teachers to deliver Education for Sustainable Development (ESD) in a professional and research-based manner. Anchoring ESD in school and university curricula is a significant milestone in this field. However, it is also essential to provide support for teachers who are already active in the field and for teacher educators who have not been trained in sustainability research. Knowledge of

the target group is required to enable this to be done properly. The research question on which this paper focuses is therefore: What do we know about teacher educators' perceptions of ESD? It seeks to establish teacher educators' understanding of ESD (e.g., their assumptions and knowledge), what (positive or negative) attitudes they have towards ESD and how they work with ESD. This study focuses on research into higher education development.

For the purposes of this paper, we use ESD as a collective term that covers both instrumental (ESD1) and emancipatory ESD (ESD2) (Barth & Rieckmann, 2016a) and transformative learning (Mezirow, 2000). Related terms are, e.g., "Education for Sustainability (EFS)", "Development Education (DE)", and "Sustainability Education (SE)". In this context, we adopt the terms used by the authors of the papers in question.

Since the integration of sustainable development has become a field of action in higher education (Murillo-Vargas et al., 2020), we examined current research on teaching academics' views on ESD in general, without focusing on ESD in teacher education in particular (for student teachers' perspectives on sustainable development see, for example, Koskela and Kärkkäinen (2021)). Studies on lecturers' attitudes towards ESD often highlight their enthusiasm and support for the concept (Aznar-Minguet et al., 2011; Christie et al., 2015; Melles, 2019). Shephard and Furnari (2013) identify four viewpoints with distinct characteristics, one of which promotes ESD and three of which do not. The authors emphasize education *for* sustainability and understand ESD as focusing "on students developing the knowledge, skills, values and dispositions necessary to achieve [sustainability]" (p. 1578). The authors therefore describe the four viewpoints as

- Those who promote sustainability and argue that sustainability should be integrated into higher education;
- University teachers who are committed to the liberal ideals of higher education within individual disciplines;
- Sustainably-minded university teachers who favor interdisciplinarity but are not focused on education for sustainability;
- Anthropocentric university teachers who are mindful of their academic freedom and their responsibility to be critical and act as the conscience of society (p. 1581f.).

These results connect well with the lively discussion on the understanding of the role of researchers in society. Is it important to be a neutral observer or should there be a place for activism? And by what rules do researchers play? (Schneidewind & Singer-Brodowski, 2014).

Although most lecturers take a generally positive view of ESD, some note that they "find the language of ESD inaccessible" (Cotton et al., 2007, p. 579) or generally view it as being only "indirectly relevant to their teaching" (Christie et al., 2015, p. 679). With regard to implementation, Christie et al. (2013) state that

"EFS is not yet widely practiced in university classrooms across disciplines. EFS has not yet prompted academics to move towards pedagogical innovation. There does however exist a practice of including critical thinking and discussions within the format of lectures and tutorials. It is within these lecture and tutorial time slots that there is space, and most importantly will, to pursue student-centered learning." (p. 405)

The authors suggest it is useful to "meet academics within their disciplinary world-views" (p. 679) in order to promote implementation in practice.

Overall, we have established that perceptions of sustainability and ESD are inconsistent across the sector, which matches since ESD is not discussed as a single concept in the context of research. We have also identified that teaching academics are in broad agreement on the importance of SD. But they evince a more varied understanding of ESD implementation, and hold a greater variety of views on how it can be achieved. Dedicated lecturers often claim to be unable to work with ESD in the way they want due to external factors or a perceived lack of competencies (for a discussion of educators' ESD competencies see Corres et al. (2020)).

Existing studies provide insight into lecturers' views on ESD in general. But as described above, the focus here is on teacher educators because of their special role as "multipliers of multipliers" in higher education: Teacher educators not only practice ESD but train teacher students to practise ESD themselves. This paper therefore presents the results of a systematic literature review (Fink, 2020) on teacher educators' views of ESD, in order to provide an overview of what is known in the field and subject it to analysis. A literature review "is a systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded word produced by researchers, scholars, and practitioners" (p. 6).

The next section describes the research design and methodology, including data collection, processing and analysis. We then present our findings and discuss connections and limitations.

Research Focus and Methodology

Our methodological approach was based on Fink (2020) and Barth and Rieckmann (2016b). As described in the introduction, we were seeking to understand what was known about teacher educators' perceptions of ESD.

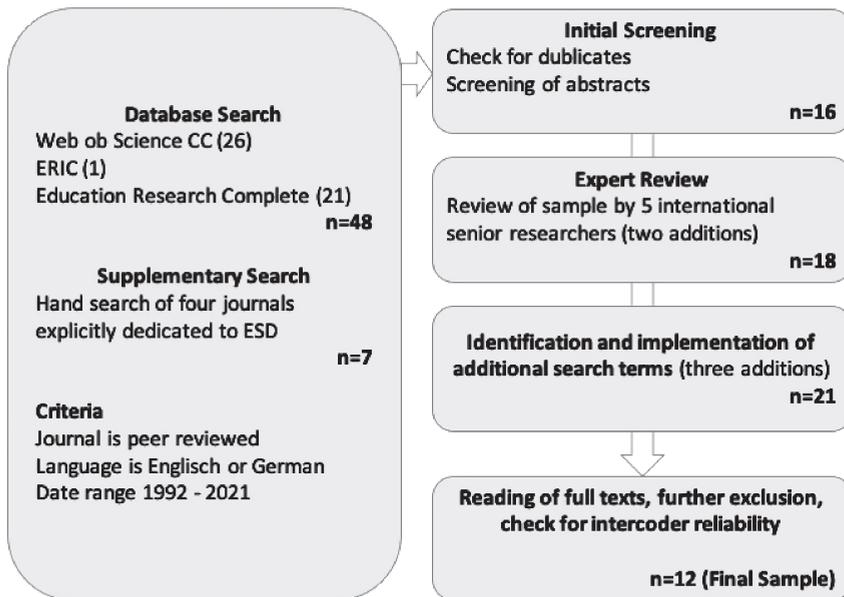
Based on our experience in the field, we assumed that the literature sample would be small. We therefore identified two focal points: (1) Our main focus was studies that contained information on teacher educators' perceptions of ESD; (2) We also included material containing information on lecturers' perceptions of specific aspects of ESD or concepts such as DE, EfS and SE, on the condition that the study be explicitly contextualized as ESD research. One example of this material was a paper on decolonizing education (Pratt & Hanson, 2020).

Data Collection

We initially searched the major databases (Web of Science Core Collection, ERIC, Education Research Complete) for papers in English and German, using the following search terms:

- "teacher education" OR "student teacher"
AND "sustainability" OR "EfS" OR "ESD*" OR "environmental education"
OR "sustainable development" OR "transformation*"
AND "lecturer*" OR "instructor" OR "professor"
- "Lehramt*" OR "Lehrer*bildung" AND "Nachhaltigkeit" OR "BNE" OR
"Bildung für nachhaltige Entwicklung" OR "Nachhaltige Entwicklung" OR
"transformativ*" AND "Dozent*" OR "Dozierend*" OR "Lehrend*" OR
"Hochschullehrer*" OR "Professor*"

Figure 1

Search and Processing Strategy

Additionally, we browsed the tables of contents of the Journal of Teacher Education for Sustainability, the Journal of Education for Sustainable Development, the International Journal of Sustainability in Higher Education and Environmental Education Research. The search took place in August 2020 and was updated in March 2021.

Where search options allowed, we browsed Abstracts and Keywords, slightly adjusted the search query where necessary, for example, by searching for full text instead. As a practical screen (Fink, 2020, p. 53f), in addition to including only two languages we excluded resources published before 1992 since that was the year international discourse on ESD started. We introduced a methodological quality screening criterion (Fink, 2020, p. 56f) by including only peer reviewed articles.

This approach generated a sample of 55 articles. After removing duplicates (5) and reading the abstracts on the basis of predefined criteria (written or oral interviews with teacher educators, explicit ESD context), a sample of 16 remained. The sample was reviewed by five international experts in ESD in higher education. A scan of the abstracts for the suggested additions led to the addition of two studies to the sample.

Our reading of the abstracts resulted in the identification of additional terms to the search such as “teacher educator”, “teaching academic*” and “university teacher*”, which produced three additional hits.

Data Processing and Coding

The full texts were read and coded (initial text work) by one of the authors. Further exclusion produced a sample of 12 texts. One main reason for exclusion was that where teacher educators were surveyed alongside other groups, their perspectives were undistin-

guishable in the presentation of results, leading to content that was not usable for our purpose.

To confirm the final sample, intercoder reliability was tested using 3 (of 12) included and 6 (of 43) excluded texts; this produced a conformity of 2/3 for included and 5/6 for excluded material. After discussing differences, a final sample of 12 was agreed upon.

Data Analysis

The small sample allowed for bibliographic review and content analysis on the basis of Qualitative Content Analysis (Kuckartz, 2016). The bibliographic review included year, journal, authors and research location. A word cloud of keywords was developed (see below) to highlight key topics. The content analysis sought to answer the main question: What do we know about teacher educators' perceptions of ESD? We derived three main categories from this question, complementing them with inductive subcategories following Kuckartz' (2016) procedure:

- Understanding (How do teacher educators understand ESD?)
- Attitude (What attitudes do teacher educators have towards ESD?)
 - Important, relevant
 - Not important, irrelevant, ambivalent
 - Feasibility
 - Drivers, Opportunities
 - Barriers, Risks
- Implementation (What do teacher educators say about how they deliver ESD?)
 - General views on ESD practice
 - Teaching tools
 - Challenges encountered

After the review was completed, we undertook quality assurance using the PRISMA guidelines (Page et al., 2021).

Findings

Bibliographic Review

Our sample (see Table 1) shows title, journal, author and affiliation and is arranged by year. Searching for publications since the start of the global ESD discourse in 1992, we found the earliest article in 2008. With a total of four articles, 2020 was the year with the highest output. This indicates growing rather than declining output in the area of research under consideration.

Most publications were found in the Australian Journal of Environmental Education (3), the Journal of Teacher Education for Sustainability (2) and the Journal of Education for Sustainable Development (2). A global map illustrates the international line-up of authors and reveals an agglomeration at Australian institutions (see Figure 2).

Table 1
Sample

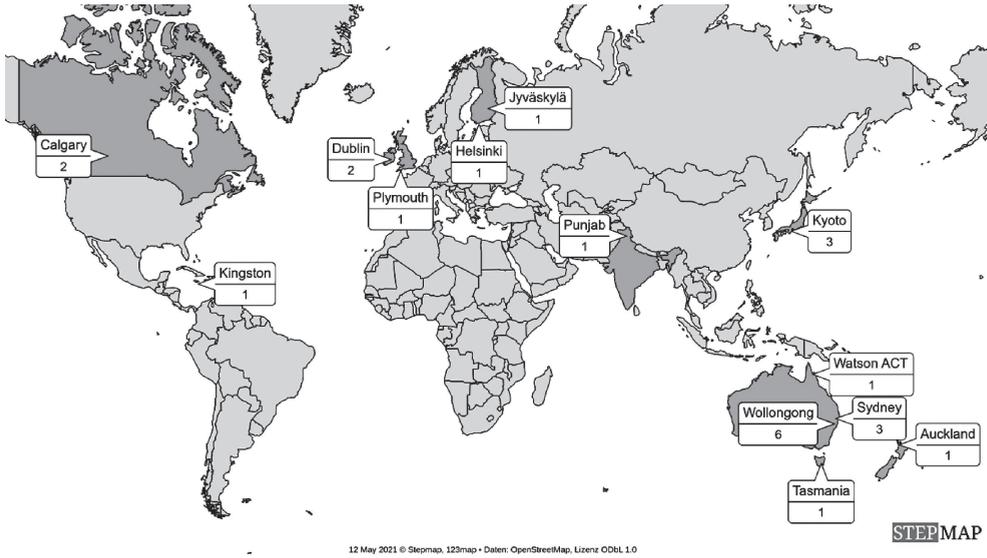
Title	Year	Author incl. Affiliation	Journal
Student Teachers' Experiences of Their Studies in Educational Science and Psychology	2008	Erika Löfström University of Helsinki, Finland	Journal of Teacher Education for Sustainability
Sustainability Education and Teacher Education: Finding a Natural Habitat?	2012	John Buchanan University of Technology, Sydney, Australia	Australian Journal of Environmental Education
Biodiversity and Education for Sustainable Development in Teacher Education Programmes of Four Jamaican Educational Institutions	2012	Marceline Collins-Figueroa University of the West Indies, Mona Campus, Jamaica	Journal of Education for Sustainable Development
Drivers and Blockers: Embedding Education for Sustainability (Efs) in Primary Teacher Education	2012	Sue Wilson Australian Catholic University, Watson ACT	Australian Journal of Environmental Education
Preparing Action Competent Environmental Educators: How Hard Could It Be?	2013	Wendy Nielsen Faculty of Education, University of Wollongong, New South Wales, Australia Peter Andersen Faculty of Education, University of Wollongong, New South Wales, Australia Vanessa Sabljak Faculty of Education, University of Wollongong, New South Wales, Australia Amy-Lee Petereit Faculty of Education, University of Wollongong, New South Wales, Australia Vanessa Hoskin Faculty of Education, University of Wollongong, New South Wales, Australia Garry Hoban Faculty of Education, University of Wollongong, New South Wales, Australia	Australian Journal of Environmental Education

See next page for continuation of table

Continuation of Table 1

Education for Sustainable Development in Initial Teacher Education: From Compliance to Commitment – Sowing the Seeds of Change	2013	Denise Summers Plymouth Institute of Education, Plymouth University, UK	Journal of Education for Sustainable Development
Education for Sustainable Development in Vietnam: Lessons Learned from Teacher Education	2015	Thi Kinh Kieu Graduate School of Global Environmental Studies, Kyoto University, Kyoto, Japan Jane Singer Graduate School of Global Environmental Studies, Kyoto University, Kyoto, Japan Tracey Jean Gannon Graduate School of Global Environmental Studies, Kyoto University, Kyoto, Japan	International Journal of Sustainability in Higher Education
Desires and Doubts on Cultural Sustainability: A Study from Aotearoa New Zealand	2019	Tahera Afrin ICL Business School, Auckland, New Zealand	European Journal of Sustainable Development
Teacher Educators' and Teacher Trainees' Perspective on Teacher Training for Sustainable Development	2020	William Nketsia Western Sydney University, Sydney, Australia Maxwell Peprah Opoku University of Tasmania, Tasmania, Australia Timo Saloviita University of Jyväskylä, Jyväskylä, Finland Danielle Tracey Western Sydney University, Sydney, Australia	Journal of Teacher Education for Sustainability
Positioning Development Education and Climate Change Education at the Heart of Teacher Education?	2020	Jennifer Liston, Trinity College, Dublin, Ireland Ann Devitt, Trinity College, Dublin, Ireland	Policy & Practice: A Development Education Review
Teacher Educators' Preparedness for Re-Orienting Teacher Education Programs for Sustainable Development in Pakistan	2020	Munawar Sultana Mirza University of Punjab	Journal of Research and Reflections in Education
Indigenous Instructors' Perspectives on Pre-service Teacher Education: Poetic Responses to Difficult Learning and Teaching	2020	Yvonne Poitras Pratt Werklund School of Education, University of Calgary, Alberta, Canada Aubrey Jean Hanson Werklund School of Education, University of Calgary, Alberta, Canada	Race Ethnicity and Education

Figure 2
Map of Research Locations



A word cloud of keywords shows that “Education for Sustainable Development” and “(Initial) Teacher Education” are the most common keywords (see Figure 3). The variety of other keywords demonstrates the range of topics the area of research is related to.

Figure 3
Word Cloud of Keywords



Content Analysis

Teacher Educators' Understanding of ESD

As expected, the texts describe the general understanding of ESD among teacher educators as inconsistent (Buchanan, 2012). Collins-Figueroa (2012), for example, identifies three dimensions of ESD in lecturers' understanding:

1. Economic sustainability (e.g., selling vegetables crops in the college's canteen);
2. Ecological sustainability (e.g., nurturing the vegetable garden);
3. Social collaboration (e.g., of all staff members and students in the project) (p. 261f).

These dimensions correspond well with the dimensions of sustainability in the three-pillar model and the prioritization inherent in the 'Vorrangmodell' (Vorage, 2019). Summers (2013) finds the majority "focused on the environment" but others also "included social and economic conceptions" (p. 212).

Wilson (2012) also identifies a "range of understandings of sustainability and perception of the issues involved in EfS" (p. 49). Similar to Summers (2013), the scholar finds that "not all lecturers were aware of the scope of EfS" (p. 49). Some lecturers were therefore already delivering EfS without realizing it. In contrast to this, Liston and Devitt (2020) find a "very broad view of what constitutes DE" (p. 66), including questions of social justice such as inclusion or antibullying. Also lecturers "admitted that they themselves were not completely aware of the collaboration of DE with the teaching of their subject and, thus, expressed a desire to learn more" (p. 67).

Nielsen et al. (2012) point out that lecturers wanted pre-service teachers to "move beyond the specific knowledge, skills and experiences to more general critical thinking" (p. 9), which could be read as an understanding of ESD itself.

Transformative Learning as a special form of ESD is addressed by Pratt and Hanson (2020). One instructor argues that the aim of transformative learning is for students "to be shifted" by the "dual impulse[s] of pushing students into discomfort – unsettling territory – while simultaneously caring for them, with the goal of transforming their understandings" (p. 11f). This understanding corresponds well with Mezirow's (2000) presentation.

Researching meaningful learning experiences in the context of ESD, Löfström (2008) finds that university teachers rank contextuality as slightly more important than students' intentionality or collaboration and constructivity. Contextuality can be understood as being similar in nature to systems thinking, which is a key competence developed by ESD (Brundiers et al., 2021).

Asked which topics they would like to include in the teacher education program, educators viewed "culture, peace and security" as more important than "ecological and environmental issues" (p. 157) which stood in contrast to, e.g., the 'Vorrangmodell', which ranked environmental issues more highly than economics and social issues. Afrin (2019) focuses on teacher education for cultural sustainability. Participating lecturers "referred to this aspect of spirituality as a motivational force for them to inspire their students" (p. 456).

Focusing on the perceived role of education in SD, Mirza (2020) states that teacher educators "were not clear about the possible role of education to address the SD issues" (p. 156). Her results indicate that "teacher educators perceive education only as a moderate factor that may influence sustainable development" (p. 156).

Teacher Educators' Attitudes to ESD

Relevance

ESD in general is mostly seen as relevant and desirable by teacher educators (Afrin, 2019; Liston & Devitt, 2020; Wilson, 2012). However, Liston and Devitt (2020) also point out that lecturers see these topics as “deeply embedded and occur[ing] naturally in students’ thinking which is the reason they do not really highlight these issues separately”. Lecturers also feel that the issues lie “in their own thinking as well and, thus, naturally influence their subject-specific lectures” (p. 66f). Thus, one respondent states: “I’ve never seen myself as having any specific responsibility for it” (p. 67). After surveying 108 lecturers, Mirza (2020) concludes they “did not perceive much relevance of SD concepts in the courses they were teaching” (p. 1).

Reasons for working with ESD are described as “both extrinsic and intrinsic, and related to changing curriculum, to secondary school student need, to the needs of student teachers and to ethical responsibility to the world” (p. 68).

Barriers and Drivers, Opportunities and Risks

Wilson (2012) considers that a “widespread emphasis on sustainability”, EfS values in society, supportive curricula and declarations, engaged lecturers from other disciplines and supportive administration and management on campus are drivers for ESD implementation (p. 51). Liston and Devitt (2020) also highlight the positive effect of supportive colleagues. However, respondents would prefer a “formal and informal initiative [that is] more explicitly stated in ITE policy and practice” to the “goodwill” that is described (p. 72).

The biggest barrier identified is a perceived lack of time (Buchanan, 2012; Mirza, 2020; Summers, 2013; Wilson, 2012). Lecturers perceive ESD as an “add-in or add-on” (Buchanan, 2012, p. 115), a or “bolt-on” (Summers, 2013, p. 214). Mirza (2020) adds a lack of “support from the management” and “freedom to incorporate SD in the course” to the list of barriers (p. 9).

The (perceived) lack of knowledge of SD and ESD is also described as a barrier (Mirza, 2020; Summers, 2013). Buchanan (2012) highlights the risk of “well-intentioned but ill-informed tree hugging” (p. 115). Because of ESD’s cross-curricular character, lecturers worry that it might be “ignored, in that no one will assume responsibility for it” (p. 115) but also that it might bring a “loss of emphasis” in their discipline” (p. 257).

Organizational factors such as big group sizes and limited facilities are also seen as barriers (Afrin, 2019; Kieu et al., 2016). Wilson (2012) adds “thinking that individuals can’t make a difference” as a barrier (p. 51).

Teacher Educators' Reported Implementation of ESD

General

Summers (2013) describes three phases of ESD implementation that teachers and lecturers can complete: culture of compliance, overcoming initial anxieties and responsibility. Buchanan (2012) adds incidental implementation to the phases mentioned above.

Values such as patience, tolerance, empathy and equal treatment (Nketsia et al., 2020) are recognized as important elements. However, working with values is also con-

sidered “potentially embarrassing” (Summers, 2013, p. 214) because it can make lecturers feel exposed.

The highest level of ESD implementation is reported in Geography (Kieu et al., 2016), Social Sciences and Science (Buchanan, 2012). Lecturers describe having trouble finding a connection between ESD and their subject (Liston & Devitt, 2020).

Teaching Tools

The methods and media deployed include documentaries (Pratt & Hanson, 2020), student research (Kieu et al., 2016), involvement of partners on campus (Collins-Figueroa, 2012), the use of personal experience (Pratt & Hanson, 2020), thinking books and field trips (Nielsen et al., 2012).

Some lecturers “saw a need for tracking of students’ exposure and engagement [...] to ensure that students received a cohesive picture to direct their EfS learning” (Wilson, 2012) while others “were opening up the possibility of our students feeling a lack of guidance for their group’s activity” (Nielsen et al., 2012). The experience of “pride about the students’ display of responsibility and problem-solving skills when faced with challenges” motivated one lecturer to try a holistic approach: “discussions about the social, economic and environmental aspects of this ecosystem opened up a whole new way of studying and writing about the environment for him and his students” (Collins-Figueroa, 2012, p. 206).

Some lecturers “prioritize[d] sustainability literacy instead of action” (Kieu et al., 2016, p. 867), while others sought to “enable the students to appreciate and experience the concept of action competence” which was observed to be very empowering (Nielsen et al., 2012, p. 100).

Challenges

A lack of knowledge, especially with regard to sensitive topics and “tensions in the classroom” are perceived as challenging (Pratt & Hanson, 2020, p. 11). Additionally, lecturers were anxious about “sounding ‘evangelical’ ” and became “almost apologetic about introducing ESD” (Summers, 2013, p. 215). Developing and identifying suitable assessment processes for ESD was also considered challenging (Buchanan, 2012; Kieu et al., 2016).

Discussion

Neither *teacher educators’ understanding of ESD* nor concepts of ESD themselves are uniform. This variety can enrich educational research and practice. Partial understanding, e.g., of ESD as being limited to environmental issues, can lead to misconceptions and limited perspectives. This in turn can inhibit systems thinking (Brundiers et al., 2021) and multi perspective approaches in general, which are crucial for teachers’ ESD competencies (Corres et al., 2020). limited understanding can also lead to the unconscious delivery of ESD. Inventories help to broaden educators’ views and uncover hidden ESD, thus empowering lecturers (Goller & Markert, 2020). We were surprised to find that some teacher educators considered social issues as more important than environmental issues, which stood in contrast to the prioritization in the ‘Vorrangmodell’. We see this diversity of perspectives as enriching the discourses around ESD. The uncertainties

described with regard to the role of education in SD can be countered through further training or the formulation of institution mission statements for teaching.

Teacher educators' attitudes towards ESD are mainly positive, which relates well with findings on lecturers in general (Aznar-Minguet et al., 2011; Christie et al., 2015; Melles, 2019). At the same time, some teaching staff did not consider it necessary to explicitly include ESD, since in their opinion teachers and students were already sufficiently aware of sustainability issues. A perceived lack of knowledge on (E)SD is highlighted as a barrier or risk, emphasizing the need for intersectional collaboration in teacher training. Given the transdisciplinary nature of SD, it seems natural that educators who are usually experts in a single discipline do not feel competent to adopt a holistic approach. A perceived lack of competence in ESD methods can be addressed through further training (Barth & Rieckmann, 2012; Scherak & Rieckmann, 2020). Lecturers also perceived there to be a lack of resources, especially, time to develop ESD in teacher training, which also corresponds with the views of school teachers and students (Nielsen et al., 2012). This can be interpreted on the one hand as an excuse, but it is also a systemic issue affecting quality and innovation at all levels of education. The issue of time was also discussed in Goller (2022), who provided an autoethnographic account of the process of implementing ESD in teacher education. The presence or absence of support from the organization and colleagues has an obvious impact, and links to research on whole-institution approaches (Rieckmann, 2018) and networks.

Teacher educators' reports on implementing ESD emphasize the challenge of combining one's own subject with ESD in a cross-sectoral manner. Our experience of workshops and discussions confirms this observation, which originates from, e.g., a) not recognizing connections, conceivably due to having only a partial understanding of ESD and/or b) the barriers of restricted time and overcrowded curricula. We agree with Christie et al. (2015) that discipline-specific discussions or training may provide support here.

The limitations of our results relate to the small sample of papers and the low number of lecturers surveyed. Articles in languages other than German or English were not considered. It is also possible that we may not have identified articles published in journals without an ESD focus.

In addition, our findings are location-specific: Teacher education works differently in every country. Teacher educators can thus develop not only a range of different job profiles but also differing understandings of their roles. As mentioned above, we found different terms for teacher educators as well as ESD. It was not possible to examine authors' reasons for choosing a particular wording and the implications of such wordings for the articles in question in this paper.

Conclusion

This systematic literature review aimed at investigating the current research on teacher educators' perceptions and attitudes towards ESD, and their implementation of it. Only 12 papers were found, which implied a need for further research in this crucial area. We learned that teacher educators could not be assumed to have a comprehensive understanding of ESD. Those who do not focus on sustainability research may only have a general understanding. Implementation in curricula is therefore important, but it is not sufficient to promote ESD. Further (preferably subject-specific) training is needed,

along with institutional support (e.g., mission statement for teaching) in order to foster the implementation of ESD.

To learn more about teacher educators' views, we are planning work to explore their subjective theories (Groeben & Scheele, 2000, 2019) on sustainability, ESD and ESD in higher education. The aim will be to contribute to the development of a scientific basis for measures to bring about systemic change in teacher education. As the Berlin Declaration sets out, we need to “invest in the capacity development of teachers and other education personnel at all levels and to ensure a whole-of-sector approach to the necessary transformation of education” (UNESCO, 2021, p. 3).

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Correspondence concerning this paper should be addressed to Antje Goller, research associate, Leipzig University, Leipzig, Germany. Email: antje.goller@uni-leipzig.de