

JYX



This is a self-archived version of an original article. This version may differ from the original in pagination and typographic details.

Author(s): Matthies, Aila-Leena; Hermans, Koen; Leskošek, Vesna

Title: Applying transdisciplinary sustainability transitions research in international social work doctoral training

Year: 2022

Version: Published version

Copyright: © 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis

Rights: CC BY-NC-ND 4.0

Rights url: <https://creativecommons.org/licenses/by-nc-nd/4.0/>

Please cite the original version:

Matthies, A.-L., Hermans, K., & Leskošek, V. (2022). Applying transdisciplinary sustainability transitions research in international social work doctoral training. *Social Work Education*, 41(7), 1541-1559. <https://doi.org/10.1080/02615479.2022.2105316>



Applying transdisciplinary sustainability transitions research in international social work doctoral training

Aila-Leena Matthies, Koen Hermans & Vesna Leskošek

To cite this article: Aila-Leena Matthies, Koen Hermans & Vesna Leskošek (2022): Applying transdisciplinary sustainability transitions research in international social work doctoral training, *Social Work Education*, DOI: [10.1080/02615479.2022.2105316](https://doi.org/10.1080/02615479.2022.2105316)

To link to this article: <https://doi.org/10.1080/02615479.2022.2105316>



© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 28 Jul 2022.



Submit your article to this journal [↗](#)



Article views: 478



View related articles [↗](#)



View Crossmark data [↗](#)

Applying transdisciplinary sustainability transitions research in international social work doctoral training

Aila-Leena Matthies ^a, Koen Hermans^b and Vesna Leskošek^c

^aKokkola University Consortium Chydenius, University of Jyväskylä, Kokkola, Finland; ^bCentre for Sociological Research, Catholic University of Leuven, Leuven, Belgium; ^cFaculty of social work, University of Ljubljana, Ljubljana, Slovenia

ABSTRACT

In the last 15 years, transdisciplinary research of sustainability transitions has become an increasingly powerful approach. We discuss it as a perspective for social work discipline, and as a theoretical-conceptual frame of a new international doctoral training and research programme in social work taking place in seven European countries. In our qualitative study, we investigate how the participating social work doctoral students reflect upon transdisciplinarity and understand the interconnectivity between environmental, ecological, and social sustainability transitions—which is widely recognised as a highly complex challenge of sustainability. The data used included the students' learning diaries from the first summer school of this programme. As core findings of the analysis five joint themes expressing the interconnectivity emerged from the data: the indispensable role of nature for all life; the economy-based causes of unsustainability; the role of human rights; the researchers' own ways of life; and the practice-relevance for SW. Our results support recent theoretical arguments that transdisciplinarity comprises not only a disciplinary thinking but a way of being, where the holistic lives of researchers merge with the content of their work. Regarding our analysis of the pedagogical and didactic arrangements promoting transdisciplinary thinking, we can encourage direct collaboration and teaching inputs with other disciplines and demonstrable practice applications.

ARTICLE HISTORY

Received 17 September 2021
Accepted 19 July 2022

KEYWORDS

Social work; social inclusion; doctoral training; transdisciplinarity; sustainability transitions research

1. Introduction

As the independent assessment group of scientists nominated by the United Nations (UN) Secretary-General reported critically in 2019, none of the UN's 17 Sustainable Development Goals (SDG) is any nearer to being achieved. In fact, for most of them, the scientists found that the global situation has worsened since the launching of the SDG programme in 2015. Cross-cutting trends impacting several goals, such as rising inequalities, climate change, and biodiversity loss, are instead moving in a negative direction (Independent Group of Scientists appointed by the UN Secretary-General, 2019).

CONTACT Aila-Leena Matthies  Aila-Leena.Matthies@ju.fi  University of Jyväskylä, Kokkola University Consortium Chydenius, Finland

© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

The scientists stressed that the key to changing direction is overcoming imbalance across the three pillars of sustainable development—the environmental, economic, and social—and appreciating the significance of their mutual interlinkages (*ibid.*). This was no new suggestion, since there exists an established global consensus that social, economic, and environmental systems need to be viewed holistically, and disciplines are urged to closer co-creation of solutions since long time (Köhler et al. 2019, 2019; Brandt et al., 2013; Loorbach et al., 2017). However, at the same time, the interconnectivity between environmental, economic, and social transitions is widely recognised as highly complex, and understanding it appears a ‘wicked problem of sustainability’ (Lehtonen et al., 2018).

Consequently, a radically new standard of learning, researching, and acting beyond immediate purview and across academic disciplines, including social work, is required, in order to change human activity towards the environment (Köhler et al. (2019). In the last 15 years, developing *transdisciplinary research* of sustainability transitions—meaning a fundamental transformation towards more sustainable society (Markard et al., 2012) – has become an increasingly powerful tool for facing complex societal challenges. This promises more than cross-, inter-, and multidisciplinary research. By definition, transdisciplinary research not only merges research from different disciplines but is transformative, as disciplines transcend themselves by consequence of mutual collaboration and influence, and as stakeholders beyond academia are included in the collaboration process (Brandt et al., 2013; Geels, 2011; Lang et al., 2012; Loorbach et al., 2017).

Discussion of social work’s contribution to sustainability transitions in a clearly transdisciplinary setting has also started to grow (Matthies & Närhi, 2017; Moore et al., 2018; Nurius & Kemp, 2014). Nurius and Kemp (2014, p. 549) describe the transdisciplinary approach as promising and relevant but also highly demanding, since transdisciplinarity demands a new level of sophistication, and more particularly, clarity about the knowledge and skills that social work brings to the table, as well as the ability to articulate these contributions to colleagues from other fields.

This paper is based on a new international doctoral training and research programme in social work taking place in seven European countries. To our knowledge, this is the first international social work doctoral programme to enter the emerging field of transdisciplinary sustainability transitions research. More precisely, the programme aims to apply the approaches of transdisciplinary sustainability transitions research (hereafter TSTR) in social work. Our research question in this qualitative empirical study was:

1. How do social work doctoral students reflect upon transdisciplinarity and, consequently, understand the interconnectivity between environmental, ecological, and social sustainability transitions?

The data in this study consisted of the doctoral students’ learning diaries, written during the first summer school organised as part of their doctoral training. Besides this main investigation, we were also interested in the question:

2. What kind of pedagogical and didactic arrangements may help overcome the challenges of the ‘wicked problem of sustainability’?

This was analysed in the learning diaries and course feedback. We first present the theoretical discussion and concepts framing both the doctoral research and training project and this study, and follow with a detailed introduction to the project, which

provides context here. After presentation of the empirical data, methods and results, we compare our results with the core discussion in the literature introduced as our theoretical framing.

2. Transdisciplinary sustainability transitions research as a perspective for social work

According to Loorbach et al. (2017, p. 599), TSTR ‘... seeks to better understand the dynamics and mechanisms of sustainability transitions and the role of agency herein to develop better analytical tools and governance strategies’. While at its outset this new research direction focused on the transitions of technical systems, such as mobility, energy, and agriculture, there was a later shift towards societal systems and governance of sustainability in, for instance, regions, cities, and neighbourhoods. Issues of power, politics, the role of civil society, grassroots initiatives, and social innovation have also been included as similarly relevant research topics (Loorbach et al. 2017).

Several scholars identify a gap between the broad awareness of transdisciplinarity’s significance for achieving more sustainable development and a lack of knowledge about how this can be learned and practiced in a way that deepens understanding of the interconnectivity between environmental, social, and economic systems (Lehtonen et al., 2018; Luthe, 2017; Salovaara et al., 2021). Responding to this dilemma, Lang et al. (2012, p. 27) conceptualised an ideal type of TSTR with four criteria: a) a focus on societally relevant problems; b) a base in mutual learning processes between researchers from different disciplines and actors outside academia; c) the aim of creating solution-oriented robust knowledge that is transferable to societal and scientific practice; and d) community-based, interactive, or participatory research methods that are appropriate as a means of achieving transformative effects.

As social work (hereafter SW) scholars we can easily recognise its many disciplinary factors encouraging and facilitating involvement in a transdisciplinary approach to sustainability. SW is an applied discipline that aims to be directly relevant to societal practices and problem-solving (Lyons, 2000; Shaw et al. 2013). SW education in most countries is already conceptualised on a multidisciplinary scientific basis, and its practical fields are inherently multi-professional and cross-sectoral. In addition, SW has established a specific collaborative methodological approach that aims to develop theories out of and in collaboration with practice (Ruch & Julkunen, 2016). At the same time, SW has a long-standing participatory tradition of involving vulnerable groups and communities. SW is also strongly rooted in human rights, anti-discriminatory practices, and the recognition of power relations (Peeters, 2012) and hegemonic orders (Garrett, 2018), which are also vital for sustainability transitions. Over the last 20 years, too, sustainability discourse has emerged in ecosocial (Boetto et al., 2020; N’rhi 2004, Matthies et al., 2001), green (Dominelli, 2012) and ecological SW (McKinnon & Alston, 2016), gathering impacts from environmental movements and integrating them into SW fields. Moore et al. (2018, p. 263) even suggest that due to the SW’s disciplinary strengths, including its commitment to social justice, community engagement, and collaborative science—practice partnerships, SW scholars are potential leaders for advancing transdisciplinary research.

To become a partner in co-creating sustainability transitions and achievement of the SDGs, the fundamental question for SW research, education, and practice is understanding how closely SW issues and their solutions depend on and are interconnected with environmental, ecological, cultural, and broader societal sustainability (Matthies & Närhi, 2017; Rinkel & Powers, 2019). Previous studies indicate that integration of sustainability issues and ecosocial approaches as a comprehensive through-flowing perspective within SW education is required, since the impact of single courses is rather low relative to the huge gap of knowledge on sustainability theories and practice across SW (Boetto & Bell, 2015; Boetto et al., 2020; Kemp, 2011).

In current disciplinary discussions of TSTR, Köhler et al. (2019; also, Bulten et al., 2021) have pointed to a tension in the role of a researcher between engagement and distance, between committed activism and impartial academic study. The dilemma can be seen in the extensive collaborative involvement of transdisciplinary researchers with stakeholders and communities, which could be seen as a risk for the general requirement for objectivity and impartial assessment in scientific research. Rigolot (2020), however, suggests that such classical dichotomies based on distinctions between the theoretical and the practical, between science and society, appear increasingly limited in the context of current research practice. Referring to French philosopher Edgar Morin, the developer of complexity theory, Rigolot argues that, as a complement to the concept of transdisciplinarity *as a discipline*, a concept of transdisciplinarity *as a way of being* could be applied. In her definition, transdisciplinarity as a way of being allows for research to be inseparable from personal life far beyond the researcher's professional activities. In this theoretical frame, the personal dispositions and expressions of researcher can be included. Transdisciplinarity as a way of being also includes the status of consciousness of the researcher (Rigolot, 2020), which is equally relevant in SW research in the field of TSTR.

3. Context: the ASTRA doctoral training programme in social work

This study was theoretically and empirically located in the context of a new international doctoral training and research project funded by the European Commission under the title 'Applying Sustainability Transition Research in Social Work Tackling Major Societal Challenge of Social Inclusion', ASTRA for short (ASTRA Project, 2022). From a disciplinary point of view, the project comprises SW doctoral training and aims to strengthen the emerging research area that combines TSTR and SW.

As our title suggests, we argue that SW's main target is to promote social inclusion and justice for all, especially the most vulnerable people and communities. ASTRA research focuses on young people facing precariousness, people with a migration background, and vulnerable local communities, which all face the highest risk of social exclusion in Europe (Eurostat, 2018; Madinipour & Weck, 2015). We argue that the persistent and complex challenge of an inclusive society demonstrates how a sustainable and fair social foundation of human life can only develop from an inherent interdependence within the overall ecological boundaries and a regenerative and distributive economy (Raworth, 2012, 2017). The global and local environmental and economic crises and injustices have significant impact on the life perspectives of the people concerned, for example, through forced migration, the dominance of a for-profit economy and unlimited economic growth, the unbalance of food surplus and food poverty, unjust use of natural resources

and the impoverishment of urban and rural communities (Dominelli, 2012; Matthies et al., 2001). Given these environmental and ecological root causes for social disasters, the leading thesis of ASTRA suggests that it is worth researching whether SW's core task, social inclusion, and social justice, can be better promoted by applying approaches from TSTR. Global SW communities have also highlighted the interconnectivity between ecological, economic, and social factors in their 2015 Global Agenda for Social Work (International Association of Schools of Social Work (IASSW), International Council on Social Welfare (ICSW) and the International Federation of Social Workers (IFSW), 2012). The Global Agenda confirms that in order to fight poverty globally and locally, SW has to support people to create other sources of income than those built on an unjust economy and over-exploitation of natural resources.

ASTRA was established by a European network of SW scholars from seven countries collaborating on ecosocial issues and sustainability. However, following our transdisciplinary approach in ASTRA, we emphasised the importance of cross-sectoral collaboration between universities, environmental organisations, and non-profit organisations. A national environmental research organisation and an international scientific non-university organisation working on public, social, and cooperative economy are therefore also part of the ASTRA consortium. Further, nine non-profit organisations are included as partners, providing practice training, supporting ASTRA's empirical research, and bringing new practical insights into the knowledge development process.

The funding provided through the European Commission's Marie Skłodowska-Curie Actions (MCSA) programme enables three years fully paid doctoral training and research for 15 Early Stage Researchers (ESRs). Globally recruited, these ESRs have backgrounds from a variety of countries in Asia, Africa, Europe, and North America. Many already have some international experience, for instance, through a master's SW degree or comparable degree from abroad.

In ASTRA, each ESR develops their own doctoral research on the joint topic starting from the pre-established themes, which comprise three thematic research groups of environmental, economic, and social sustainability transitions. The pre-established themes of the 15 ASTRA research projects—to be slightly modified by the recruited researchers themselves—are given in [Table 1](#).

Vulnerable communities refer to urban and rural spatial contexts with major socio-economic discrimination regarding rates of poverty, unemployment, and stigmatisation, including unhealthy living environments and poor infrastructure (Meade, Shaw & Banks 2016; Rinkel & Powers, 2019). The concept of precariousness which is connected to young people and migrants, refers especially to the unequal circumstances of their livelihood in regard to their experienced challenges in the labour market (Cairns et al., 2016; Castles, 2015).

Topics in the research group on Environmental Sustainability Transition address the ways the natural and built environment, including food policy and housing, interconnect with human well-being, social inclusion, and justice (Shanahan et al., 2019). Research in the Economic Sustainability group focuses on gathering knowledge about the realistic opportunities for new economic models beyond conventional businesses, such as circular, social, and solidarity economy (Borzaga et al., 2019; Chaves-Avila, 2021), which take planetary boundaries into account and improve social inclusion and justice (Raworth, 2017). The research group on Social Sustainability Transition studies the transcending

Table 1. The pre-established research themes of the ASTRA ESRs.

Target groups/ Thematic Research groups	People with a migration background	Young people in precariousness	Vulnerable communities
Environmental Sustainability Transition	The use of the public natural environment as a means of inclusion	Natural environment as a resource for sustainable well-being	Food poverty and food waste; sustainable housing
Economic Sustainability Transition	Impact of transnational female caring economy	Capability of circular economy to enable social inclusion; Sustainable impact of social inclusion programmes	Ecosocial innovations and solidarity economy; Democratic participation in economic structures
Social Sustainability Transition	SW in communities facing forced migration due to environmental crises	Participation of young migrants in rural environments; Sustainable impact of labour integration centres; Contributive justice in ecosocial inclusion projects	Role of participatory SW practices for sustainable urban communities; SW programmes cultivating sustainable local communities

role of SW and diverse community-based and innovative ecosocial grassroots projects (Matthies et al., 2019; Stamm et al., 2020) from a perspective of contributive justice, allowing due recognition and respect for social contribution (Gomberg, 2016). This can create employment and participation that will improve inclusion for the most vulnerable groups in sustainable ways from both an ecological and an economic perspective.

Although the ASTRA research groups are organised around the three pillars of sustainability and led by scientific experts in the respective disciplinary fields of environmental sciences, economics, and social sciences, each research theme is embedded in a holistic approach to sustainability transitions. Also, the ESRs receive training across all themes to assure the growth of transdisciplinarity thinking.

4. The first training event: a ten-day summer school on-screen

The ASTRA project started in October 2020 with the call and selection process for the 15 ESRs. However, Covid-19 created delays and challenges for recruitment and enrolment. Most ESRs were able to move to their destination countries and host research units in June 2021. This provided a stimulus for arranging the first of three annual 10-day summer schools, planned for that month, online rather than in person. The intensive 10-day training event opening the project thus had a strong functional networking role as well as introducing ASTRA's basic conceptual and theoretical framework. Besides intensive study of the concept of TSTR, it was important to achieve joint knowledge of the target problem before studying possible solutions promoting sustainability and SW's role in them. Based on input from other disciplines, such as environmental sciences and the economy, ESRs were introduced to current knowledge of global megatrends behind unsustainability. Four global major drivers of unsustainability were analysed in lectures. These included conceptual frames and recent research, the loss of biodiversity, challenges of global food systems, global economic dynamics, and alternative economies, which are major drivers of forced migration and human rights violations. As expected, these megatrends cross the research fields of several disciplines, including SW, and enable us to discover how environmental, economic, social, and even cultural factors combine.

Along with academic lectures, the course included online presentations by thematically related non-profit partner organisations (hereafter NPOs). They were explicitly asked to discuss how they combined ecological, social, and economic sustainability in their work, to help the ESRs translate the theoretical content of the lectures into practice. Finally, group work in the thematic research groups—although conducted online—enabled us to discuss preliminary draft plans for the individual doctoral research of the ESRs. All activities in this online summer school were planned to be interactive and to provide space for reflective and in-depth discussion. Besides a presentation of the first draft of their doctoral research, ESRs were asked to read three scientific articles, to participate actively and write a reflective learning diary as course assignments. Learning diaries are typically used in the academic education of various professions for supporting reflective learning and for achieving metacognitive competences (Clipa et al., 2012). Learning diaries can be used both for short-term and long-term (self-) documentation of the learning process (Tolland et al., 2019). At ASTRA it is equally effective in both modes: although intended to record learning at the 10-day summer school, it also

serves as the starting platform for learning transdisciplinary thinking, the core competence to be developed over the three years' training. The learning diary is thus available as a follow-up tool, which can be repeated throughout the project.

The ESRs submitted written work six weeks after summer school, with a recommended limit of 3,000 words. The guidelines prescribed no questions, but one theme to be reflected on throughout the diary: *How are the major drivers of ecological, economic, and social challenges of sustainability interconnected with each other?* The material for reflection in the learning diary consisted of the content of lectures and group work and the course reader, as well as other discussions, personal experiences, observations and insights gained during the course.

5. Data and methods

The main data for this qualitative study were these learning diaries in which the ESRs reflected upon their learning in the first ASTRA summer school. At the summer school, the ESRs were informed of the idea of using their learning diaries for a scientific paper to be offered for a special issue of an international journal addressing sustainable development goals in SW education. A detailed plan for the article was presented and discussed during the last two days of the course. The ESRs' permission to use their learning diaries as data was requested by individually signed consent letter, research notification, and a privacy notice. The data consisted of 14 learning diaries, as one of the ESRs was unable to start the programme in the first month. A data corpus of 44,408 words was received.

Regarding our research question on the ESRs' understanding of the interconnectivity between the three pillars of sustainability and their reflection on transdisciplinarity, our analysis followed a hermeneutic methodology, aiming rather to interpret and understand phenomena than to offer objective answers to exact questions. We were interested which themes might arise in the data as imaginative responses to the research question. To analyse the data, we used Miles et al. (2014) iterative analysis approach, more specifically, the two-step cycle. In the first step, we coded text fragments in which the ESRs reflected on their transdisciplinary learning content and the interconnectivity of ecological, economic, and social sustainability. In the second step, we categorised the fragments around the emerging joint core themes, enabling us to develop these themes as results for the research questions.

In our second research question, we were interested in gaining knowledge about the pedagogical and didactic elements which may foster knowledge development of TSTR from the perspective of SW research. Answers to this question were coded and interpreted in a one-stop circle, that is, without clustering or categorisations directly from the learning diaries and from course feedback collected by an online standardised evaluation questionnaire consisting of closed and open questions. Thus, this part of the qualitative content analysis focussed on relevant pedagogical-didactical aspects mentioned by the ESRs, reflecting the research question. The entire questionnaire was not directly relevant to this paper, so only answers directly connected to our second research question have been highlighted. Both of the used data in this small study represent examples of secondary usage of educational documents for research purpose, since they were not collected for the research purpose as such.

6. Research ethics and data protection

The data were provided by the ESRs in an anonymous version to the main author, who made it accessible to the co-authors with a university-based Nextcloud service folder, requiring two-step authentication to improve data security. The data collection was approved by the data protection officer of the coordinating university, and the ASTRA project's research ethics mentor in collaboration with the research ethics committee of the coordinating university as well.

The main ethical consideration was that, although anonymised, the participants could still be identified by the authors and other ASTRA supervisors, as the same data is used for mandatory study performance. It was also discussed how far participation was fully voluntary, since the researchers requesting permission were also the supervisors of the programme. There was a further question about ownership of the knowledge gained by the ESRs and reported in the learning diaries. These issues were discussed with the participants, leading finally to the solution that the ESRs gave permission to be acknowledged by name as research collaborators in this study. The numeral codes given in the data quotation in this article do not refer to the formal numbers of the 15 ESR positions in the ASTRA project but represent a random order numbering of the learning diaries.

7. Results

In answering our first research question, we identified five core themes from the data, describing how the SW doctoral students reflected upon the interconnectivity between environmental, economic, and social sustainability transitions. The themes are presented in Table 2, where four extracts as examples of the coded and categorised data are given as direct quotations from the learning diaries of the ESRs.

Theme A, *Nature as an indispensable basis for all life*, brought together reflections, which lead to deepening holistic thinking, recognition of the fatal character of environmental crises and distancing from anthropocentric thinking. The results sound promising as, although an awareness of the major global and local drivers of environmental unsustainability may generally be already present among academics at this stage of their studies, the ASTRA course enabled not only a deepening of knowledge about them but also insight into their interdependency with economic and societal structures. Above all, it allowed the insight that nature is not something outside the field of SW, but its base—humans, including SW researchers and service users have to be regarded as part of nature and the natural ecosystem.

Theme B, *The essential political and economic embedding of the issues of sustainability*, demonstrated how the reflections develop an understanding that the devastating exploitation of the planet is essentially a politically enabled process driven by economic powers. Such macro-level insights are crucial to frame sustainability research in SW. They present a clear connection to the TSTR, requiring critical rethinking of both the global structures of market economy and the overreaching dominance of economic growth as a guiding interest in assessing the legitimacy of any human action. The complex mutual connectivity between economic growth, climate change and social inequalities was also further deepened during the course.



Table 2. Emerging themes reflecting interconnectivity between environmental, economic and social sustainability transition.

A. Nature as an indispensable base for all life	B. The essential political and economic embedding of the issues of sustainability	C. Human-caused unsustainability connects to the violation of human rights	D. Sustainability transition interconnects with my own lifestyle	E. Striving towards contributions to the practice of social work
<p>... Realizing that all living things including human beings are part of nature; and our survival depends on other human and nonhuman members of the ecosystem. Realizing that ecosystem resources are finite therefore all living things must live within boundary limits. Realizing the interconnection between the environment, economic and social dimensions of life. Data 6.</p> <p>I was still occupied with the thoughts from yesterday and I generally wondered about who has to be educated about the importance of nature, the interconnections between humans and nature and the need to live sustainably? Data 9</p>	<p>Some challenges to sustainability include capitalism, neoliberalism, devaluation of indigenous perspectives, fragmentation of humans from nature because of urbanization, a shift to individualism. The root causes of sustainability are power and resources—who gets what and who decides it. Data 4</p> <p>In my opinion, the ecological crisis, that could turn out to be the ultimate one for the humanity and most of the life on Earth, is not only interconnected with but actually stems from the dominant political and economic organization of society. Data 5</p>	<p>It is obvious that human beings are the biggest threats to the ecosystem as well as biggest victims. Talking about victims, I have learned that the poor and vulnerable disproportionately suffer more for the environmental crises. Data 11</p> <p>I think that among the human-caused factors, war and politically created and sustained socioeconomic inequalities are major drivers of (un)forced migration between and within countries. However, these two drivers are strongly interconnected with other environmental factors like natural disasters that could be non-anthropogenic, but have increasingly been the consequence of human-caused global warming, as scientists warn. Data 5</p>	<p>From the summer school, I learned many new concepts that are essential for my personal and professional life. Some of these include: details about environmental drivers; ecological footprint calculation; the concept of wicked problems; the snowflake model of distributed leadership; and commercial bank money. Data 2</p> <p>It is becoming abundantly clear to me that systems are fragile and unravelling slowly. This relates to how I see the intersection of economic, environmental, and political systems that have white supremacy, colonization, capitalism, and individualism embedded into them. I have the lingering question of what we can build to replace these harmful systems. Data 11</p>	<p>The final question that puzzled me was about establishing a clear connection between social work and ecological issues. During the summer school, it was reported that many social workers found it difficult to associate social work with ecological aspects. However, after reflecting on it based on the discussions of the summer school, I tried to make a clear association. Data 2</p> <p>Social work needs to break through its bubble. Or in other words, the idea that science grows when combining with others is true for social work as well. Data 3</p>

(Continued)

Table 2. (Continued).

<p>A. Nature as an indispensable base for all life</p> <p><i>There is a growing disconnection of people from the nature which is leading to lack of knowledge and awareness about nature; social alienation and exclusion; diseases and over consumption of natural resources (. . .). There is a need to shift towards local and regional food systems and for making use of indigenous knowledge and for that approach need to be changed from top-down to bottom-up approach. Data 8</i></p> <p><i>The first and most important that I learned is that it made me reconsider my life's core principle, which was primarily human-centered . . .). Now, I realize that the natural order of things is that the ecosystem/biosphere, which is the basis of human life, comes first. Humans and their social and economic (. . .) are just part of the ecosystem. Accordingly, the focus should be on ecological justice. Data 2</i></p>	<p>B. The essential political and economic embedding of the issues of sustainability</p> <p><i>However, in order for inequalities to be tackled on a global level a very different economic approach to the dominant one is needed. (. . .) At the same time, there is also the trilemma between inequalities, growth and climate change: to get out of inequalities we need growth and globalization but to tackle climate change we should rather limit globalization and world exchanges and transport. Data1</i></p>	<p>C. Human-caused unsustainability connects to the violation of human rights</p> <p><i>One way to make such an association is by emphasizing the link between the third mandate of social work (scientific-based intervention and ethical foundations like human rights) and issues of sustainability. Based on this, it is easy to understand why social work should be interested in ecological/ sustainability issues. Data 2</i></p>	<p>D. Sustainability transition interconnects with my own lifestyle</p> <p><i>(. . .) regarding my personal lifestyle. In the past, I was not that conscious about ecological and sustainability issues. The summer school made me rethink and reflect on my individual actions and the impact I have on sustainability. Data 2</i></p>	<p>E. Striving towards contributions to the practice of social work</p> <p><i>What I missed in this first ASTRA summer school was more input from the part of social work. I would like to have seen more in terms of theory, but even more, applied practice in the direction of eco-social work. Nonetheless, I think my knowledge and perception regarding integrated approach on sustainability issues were enriched. Data 1</i></p>
<p><i>A more pluralistic economic system that ensures balance in the economy, such as the social cooperative economy, with mutual societies and non-profit businesses, could probably be a radical solution to the misalignment of returns and rewards, in economy, society, and environment. But it needs to be clarified what has to offer, how, and with which tools it could be measured, as well as the clear-cut role of social work towards that direction. Data 13</i></p>	<p><i>The pathways to human well being requires collaboration, cooperation and dialogue among different stakeholders and there is no single pathway to solve complex problems, combination of social, environmental and economic lenses is needed. The 2030 agenda also highlight the importance of social, economic and environmental lenses. Data 8</i></p>	<p><i>In as much as personal choices matter in the quest for sustainability, it may be counter-productive to approach issues from this prism. Personal choices smack of going back to the same discredited capitalism that places self-interest over others. A collective action which targets the various dimensions of sustainability appears more sustainable. Data 6</i></p>	<p><i>. . . for me this question is strongly connected to another one: On which level should social work operate regarding these issues? (. . .) in my opinion it should not happen on a micro-level but on a meso- and macro-level. I want to stress the following understanding of social work in general but when we talk about environmental issues alike: I see social workers as social change agents who should tackle the social, economic and the environmental challenges especially on the meso and macro levels of practice, that means to take part in policy making, advocacy in community organizing and functioning as multipliers for actors from civil society. Data 9</i></p>	

Theme C, *Human-caused unsustainability connected to the violation of human rights*, reflected on the one hand the major societal challenges the ASTRA research is targeting, such as forced migration, and on the other hand issues of human rights and social justice. Broadly, the results suggest that human rights—a classic element in SW—have now been recognised as centrally interconnected with issues of sustainability transition, including the emerging reflection of environmental justice.

Theme D, *interconnecting sustainability transition with one's own lifestyle*, also emerged surprisingly frequently, while the individual role of ESRs in sustainability transitions was reflected in controversy. While some noted its importance, others argued that it could even be a misleading perspective, as it focused attention on individual behaviour rather than the structural root causes of unsustainability.

Theme E, *striving towards contributions to the practice of SW*, emerged frequently in the data, although it was not directly a content of the course nor set as an object of reflection in the learning diaries. The ESRs had already broadly discussed solutions and steps towards promoting sustainability, and how SW could contribute to it. Further, while reflecting on the lectures, reading and discussions, the ESRs tended to strengthen their understanding of sustainability transition as a process of social change: how can these devastating megatrends be reversed and how can SW contribute to this process? In this way, the ESRs underscored several strengths of and options for SW regarding its possible transformative contribution as a practical action, which we think is an invaluable orientation at the beginning of doctoral studies.

8. Didactic and pedagogical tools for improving understanding of interconnectivity

Finally, based on information from the ESRs' learning diaries as well as the course feedback, we discuss which type of pedagogical settings and didactic solutions can promote a better understanding of the complex interconnectivity between the diverse areas of sustainability transition. These could serve as models of the lessons to be drawn from the data for teachers and supervisors of doctoral training and research on sustainability transitions.

First, we were encouraged to establish direct collaboration with other disciplines, even those quite distinct from SW, since the teaching inputs from our consortium members in environmental and economic sciences not only provided new knowledge but also a broader contextualisation of the research themes. This particularly helped the disciplinary thinking of SW to break out of its own 'bubble' and see itself through the eyes of other disciplines. In most cases, interactions with other disciplines about sustainability have helped the ESRs to better identify SW's own role.

Second, mixing three pedagogical elements—i.e. alongside theoretical lectures, applications from practice and possibilities for peaceful joint reflection in smaller groups—in the agenda of such courses is essential. It immediately improves the chances of developing new insights. This was challenged by the global Covid-19 pandemic, which had a major impact on project activities, including implementation of the planned summer school. This was originally intended to be on-site, but due to strict measures for preventing the spread of the disease it had to be realised as an online course. The major drawback was that, because of time constraints, the course was not yet adapted

to the new realities of virtual teaching and learning. It was too compressed, leading to what has now been termed ‘Zoom fatigue’. Although the evaluation pointed to high satisfaction with the content and reasonable satisfaction with the didactic methods of the presentations, it also demonstrated that online courses must take different pedagogical and didactic approaches to teaching and learning. Although on-line-only, according to the open answers in the feedback, ESRs regarded that their own active participation, critical discussions, and opportunities to share knowledge were essential to sharpen the argumentation that leads to innovative research questions and enable excellent research. As formulated by one ESR: “I really enjoyed the summer seminars, in particular the group discussions and small group work. I find all of the ESRs to be thoughtful and the faculty to be incredibly supportive.”

Third, we would like to emphasise the importance of input from the NPO partners, who presented a variety of practical activities contributing to sustainability transitions. These presentations were frequently mentioned both in the learning diaries and in the course feedback by the ESRs as chances to deepen a transdisciplinary thinking. This was valuable not only as a practical and lively enrichment of a summer school. Each practice input presented in the summer school, in fact, included a concrete and clear demonstration of the ways the environmental, economic, social, and cultural dimensions of sustainability are not separated but systematically interdependent from the very start. The cases presented were: a Belgian city-based action network for urban sustainability transition; an Italian consulting company in sustainability, cooperatives, and circular economy; a Portuguese environmental NGO presenting on the transition to a circular and carbon-free society; and a Slovene NGO presenting the role of civil society in sustainable transition. From their input, it was easier to gain clearer insights into the systemic interconnectivity between the diverse dimensions of (un)sustainability. All these lectures were marked as extremely relevant and didactically interesting, but they also show that transdisciplinarity includes the activation and integration of the knowledge and expertise of various social actors. As one learning diary put it: *‘Although [the NGO’s] approach and the work of [another NGO] have been applied to a restricted geographical area, they are using a promising whole-system approach that is crucial to be considered’* (Data 7).

Although we have not analysed all the course feedback for this context, some of the thematically most pertinent critical notions deserve consideration. From the sustainability perspective, it is evident that collaborative, community- and action-oriented SW attitudes should be reflected in the participatory aspects of the course from planning through to evaluation. However, that was hardly possible in this course, which took place online and in the very first month the participants were recruited and moved to their countries of destination. Another frequent critical comment concerned the space for debate, questions, and comments. We had overloaded the programme with knowledge transfer, without leaving enough communicative space. This poses special challenges to a group coming together for the first time online.

What we have learned, and what we knew from prior experience in international doctoral programmes, is that doctoral studies differ from previous educational levels exactly at the point of accumulated knowledge of PhD students and their agency. Given

the global background of the ESRs, this is vital. Active participation, critical discussion, and opportunities to share knowledge are essential for sharpening the argumentation that leads to innovative research questions and enable excellent research.

9. Conclusions

We have here aimed to strengthen knowledge about the place of SW as a discipline in the field of TSTR, providing an example from the new doctoral programme ASTRA, itself intended as a contribution to this area. The empirical data was collected during the first course of this first international SW doctoral programme in TSTR. Our core objective in this paper was to illustrate how SW students in this programme identify the interconnectivity between environmental, economic and social sustainability transitions and, through this, reflect on transdisciplinarity. From a qualitative analysis of the learning diaries, five themes emerge as main findings: the indispensable role of nature for all life; the economy-based causes of unsustainability; the role of human rights; the researchers' own ways of life; and the practice-relevance for SW. While interpreting these themes as results, we found that Themes A, B, and C unintentionally reflect not only transdisciplinarity but also the core relevance of the three disciplinary pillars of sustainability for SW: nature as the base of life, an economy that has to be changed and human rights. In contrast, Theme D refers rather to the personal positioning and subjectivisation of the researchers, while Theme E finally brings the strong professional SW perspective on the stage.

The results support the discussion that there exist concrete and practice-related transdisciplinary issues of sustainability, which are directly relevant for SW, but which are, at the same time, global drivers to a great extent. Several ESRs mentioned how the course debate on themes, such as food systems, forced migration and alternative models of economy made the interconnections more convincing.

It is worth mentioning that the diverse geographical backgrounds of the ESRs also empowered different perspectives for reflecting interconnectivity. People from the Global South argued that issues of social and economic injustice appear more urgent as opposed to the Western perspective where environmentalism is more dominating while defining sustainability.

10. Discussion

Although analysing only the beginning of a new programme, we can confirm the argument of Nurius and Kemp (2014) that SW doctoral education must and can be developed towards responsible tasks in TSTR. Further, our results also support the understanding of the transcendence of transdisciplinary thinking and that SW undergoes transition itself through such disciplinary collaboration (Moore et al., 2018; Nurius & Kemp, 2014). The ESRs reported several insights, which enable them to see SW in a larger role, identify it as being based on nature, reflect critically its connection with a growth-oriented economy, and demand a higher commitment to human rights as a sustainability issue. These themes are also addressed as transformative systemic research approaches in the rapidly expanding sustainability transitions research across various areas (Köhler et al., 2019; Schot & Steinmueller, 2019).

Compared with previous investigations in the literature that find interconnectivity between the environmental, economic, and social systems as being the ‘wicked problem’ of sustainability (Lehtonen et al., 2018; Loorbach et al., 2017), we offer slightly different arguments. Certainly, some ESRs mentioned that sustainability issues had not been discussed as interlinked with SW in their previous study, so interlinking environmental, economic, and social sustainability remains challenging. However, based on our findings, we consider rather that the ESRs’ capacity to think in transdisciplinary ways and interconnect various issues of sustainability transition with their own discipline (SW) appears to be intellectually and conceptually at a very promising level already, even after their first doctoral course. The identified interconnections are systemic, both practically and conceptually.

In conclusion, we can state that the debates in the first summer school supported a slight shift toward a new systemic and transdisciplinary thinking of sustainability transitions in a way that promises a deeper new orientation, both as a framework for the doctoral research but also as a reflection of the ESRs’ own life and thought, as presented in Themes D (way of being) and E (SW practice). For us, this appears to support Rigolot (2020) arguments that transdisciplinarity comprises not only a new disciplinary thinking but a way of being, where the holistic lives of humans as researchers merges with the content of their professional life.

Regarding the focus of this Special Issue on the specific role of SW education regarding SDGs, the international ASTRA programme as doctoral training turned the question vice-versa and asks, how TSTR—also embedded in the SDGs—can contribute to SW’s inherent task of advancing the social inclusion of its most vulnerable target groups. This transformed approach means that the SW ESRs in ASTRA are truly urged to cross disciplinary borders and engage in new types of scientific collaboration (Matthies & Närhi, 2017).

From the results of the initial training event in this unique doctoral programme, these first steps are encouraging. On this basis, we think that it is well worth introducing the ASTRA programme and the first investigated reflections of its core concerns to the broader community of SW scholars. Not only the pedagogical lectures on supporting transdisciplinary learning but also the wider relevance of the transdisciplinary research themes can hopefully inspire further course developments and exchange among scholars interested in ecosocial work.

11. Limitations

We must, however, consider the limitations of this qualitative study. Firstly, the small size of the data set does not allow for generalisations. In that regard, we would emphasise that this paper has a value beyond simply providing measurements of exact course impacts, as discussed above. We have not only introduced a new unique international doctoral programme but hopefully also highlighted and encouraged the possibilities for adding on the value of transdisciplinarity for SW as a science. Secondly, we are not yet able to differentiate how far the results drawn from the data, i.e. the reflections in the learning diaries, can be identified directly as results of the ASTRA summer school or how far this demonstrated capacity for transdisciplinary thinking can be traced back to any previously established knowledge base in education, work, and life experience from different parts of the world. This paper, therefore, has rather a descriptive character regarding course presentation and the empirical analysis of the data with categorised themes emerging as results. However, we hope

that it will deepen an understanding of what the actual content of transdisciplinary thinking in SW doctoral education may be. Further research comparing and following-up the impacts and contents of diverse educational and research-oriented efforts of SW in the TSTR field is for sure needed, and could strengthen SW as a discipline and practice as well.

Acknowledgments

We highly acknowledge the collaboration with the Early Stage Researchers Miroslav Budimir, Rebecca Conway, Svenja Fischbach, Eileen Lauster, Kang Liu, Athina Moroglou, Areen Nassar, James Obeng, Ioannis Perifanos, Shailendra Rai, Atefeh Safarabadi Farahani, Amy Shackelford, Michael Emru Tadesse, and Jeany Rose Teguihanon.

Disclosure statement

There are no conflicts of interest.

Funding

This work was supported by the European Union's Horizon 2020 Research and Innovation Programme under the Marie Skłodowska-Curie Grant Agreement (Identity number). This article reflects the authors' views and the European Commission is not responsible for any use that may be made of the information it contains.

ORCID

Aila-Leena Matthies  <http://orcid.org/0000-0001-5758-4869>

References

- ASTRA Project (2022, May 18). *Webpage to be added in the non-anonymous version*.
- Boetto, H., & Bell, K. (2015). Environmental sustainability in social work education: An online initiative to encourage global citizenship. *International Social Work, 58*(3), 448–462. <https://doi.org/10.1177/0020872815570073>
- Boetto, H., Bowles, W., Närhi, K., & Powers, M. (2020). Raising awareness of transformative ecosocial work: Participatory action research with Australian practitioners. *International Journal of Social Welfare, 29*(4), 300–309. <https://doi.org/10.1111/ijsw.12445>
- Borzaga, C., Salvatori, G., & Riccardo Bodini, R. (2019). Social and solidarity economy and the future of work. *Journal of Entrepreneurship and Innovation in Emerging Economies, 5*(1), 37–57. <https://doi.org/10.1177/2393957518815300>
- Bowles, W., Boetto, H., Jones, P., & McKinnon, J. (2018). Is social work really greening? Exploring the place of sustainability and environment in social work codes of ethics. *International Social Work, 61*(4), 503–517. <https://doi.org/10.1177/0020872816651695>
- Brandt, P., Ernst, A., Gralla, F., Luederitz, C., Lang, D. J., Newig, J., Reinert, F., Abson, D. J., & von Wehrden, H. (2013). A review of transdisciplinary research in sustainability science. *Ecological Economics, 92*, 1–5. <https://doi.org/10.1016/j.ecolecon.2013.04.008>
- Bulten, E., Hessels, L. K., Hordijk, M., & Segrave, A. J. (2021). Conflicting roles of researchers in sustainability transitions: Balancing action and reflection. *Sustainability Science, 16*, 1269–1283. <https://doi.org/10.1007/s11625-021-00938-7>
- Cairns, D., de Almeida Alves, N., Alexandre, A., & Correia, A. (2016). *Youth unemployment and job precariousness*. Palgrave Macmillan.

- Castles, S. (2015). Migration, precarious work, and rights: Historical and current perspectives. In C. U. Schierup, R. Munck, B. Likic-Brborić & A. Neergaard (Eds.), *Migration, precarity, and global governance: Challenges and opportunities for labour* (pp. 46–67). Oxford University Press.
- Chaves-Avila, R. (2021). Producing statistics on social and solidarity economy policy recommendations and directions for future research (2021). *The UN Inter-Agency Task Force on Social and Solidarity Economy (UNTFSSSE), Working Papers*. Retrieved May 19, 2022, from <https://knowledgehub.unsso.org/wp-content/uploads/2021/08/WP-2021-SSE-Stats-Chaves-Avila.pdf>
- Clipa, O., Ignata, A.-A., & Stanciu, M. (2012). Learning diary as a tool for metacognitive strategies development. *Procedia, Social and Behavioral Sciences*, 33, 905–909. <https://doi.org/10.1016/j.sbspro.2012.01.253>
- Dominelli, L. (2012). *Green social work: From environmental crises to environmental justice*. Polity Press.
- Eurostat. (2018). *People at risk of poverty or social exclusion*. Retrieved May 18, 2022, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Archive:People_at_risk_of_poverty_or_social_exclusion&oldid=327142
- Garrett, M. P. (2018). *Welfare words*. Sage.
- Geels, F. W. (2011). The multi-level perspective on sustainability transitions. *Environmental Innovation and Societal Transitions*, 1(1), 24–40. <https://doi.org/10.1016/j.eist.2011.02.002>
- Gomberg, P. (2016). Why distributive justice is impossible but contributive justice would work. *Science & Society*, 80(1), 31–55. <https://doi.org/10.1521/siso.2016.80.1.31>
- Independent Group of Scientists appointed by the UN Secretary-General (2019). The future is now – Science for achieving sustainable development. *Global Sustainable Development Report 2019*. United Nations. Retrieved August 23, 2021, from https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf
- International Association of Schools of Social Work (IASSW), International Council on Social Welfare (ICSW) and the International Federation of Social Workers (IFSW). (2012). *The Global Agenda for Social Work and Social Development Committed to Action*. Retrieved May 15, 2013, from <http://www.cswe.org/File.aspx?id=60880>
- Kemp, S. P. (2011). Recentring environment in social work practice: Necessity, opportunity, challenge. *British Journal of Social Work*, 41(6), 1198–1210. <https://doi.org/10.1093/bjsw/bcr119>
- Köhler, J., Geels, F. W., Kern, F., Markard, J., Onsongo, E., Wieczorek, A., Alkemade, F., Avelino, F., Bergek, A., Boons, F., Fünfschilling, L., Hessi, D., Holtz, G., Hyysalo, S., Jenkins, K., Kivimaa, P., Martiskainen, M., McMeekin, A., Mühlemeier, M. S. . . . Wells, P. (2019). An agenda for sustainability transitions research: State of the art and future directions. *Environmental Innovation and Societal Transitions*, 31, 1–32. <https://doi.org/10.1016/j.eist.2019.01.004>
- Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., Swilling, M., & Thomas, C. J. (2012). Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science*, 7(Supplement 1), 25–43. <https://doi.org/10.1007/s11625-011-0149-x>
- Lehtonen, A., Salonen, A., Cantell, H., & Riuttanen, L. (2018). A pedagogy of interconnectedness for encountering climate change as a wicked sustainability problem. *Journal of Cleaner Production*, 199, 860–867. <https://doi.org/10.1016/j.jclepro.2018.07.186>
- Loorbach, D., Frantzeskaki, N., & Avelino, F. (2017). Sustainability transitions research: Transforming science and practice for societal change. *Annual Review of Environment and Resources*, 42(1), 599–626. <https://doi.org/10.1146/annurev-environ-102014-021340>
- Luthe, T. (2017). Success in transdisciplinary sustainability research. *Sustainability*, 9(1), 71. <https://doi.org/10.3390/su9010071>
- Lyons, K. (2000). The place of research in social work education. *British Journal of Social Work*, 30(4), 433–447. <https://doi.org/10.1093/bjsw/30.4.433>
- Madinipour, A., & Weck, S. (2015). Social exclusion and poverty in Europe: Territorial patterns. *Local Economy: The Journal of the Local Economy Policy Unit*, 30(7), 715–720. <https://doi.org/10.1177/0269094215601628>

- Markard, J., Raven, R., & Truffer, B. (2012). Sustainability transitions: An emerging field of research and its prospects. *Research Policy*, 41(6), 955–967. <https://doi.org/10.1016/j.respol.2012.02.013>
- Martínez-Alier, J., Healy, H., Temper, L., Walter, M., Rodriguez Labajos, B., Gerber, J.-F., & Conde, M. (2011). Between science and activism: Learning and teaching ecological economics with environmental justice organisations. *Local Environment*, 16(1), 17–36. <https://doi.org/10.1080/13549839.2010.544297>
- Matthies, A.-L., Närhi, K., & Ward, D. (Eds.). (2001). *Eco-social approach in social work*. Sophi.
- Matthies, A.-L., & Närhi, K., (Eds.). (2017). The ecosocial transition of societies. In *Contribution of social work and social policy*. Oxford: Routledge.
- Matthies, A.-L., Stamm, I., Hirvilammi, T., & Närhi, K. (2019). Ecosocial innovations and their capacity to integrate ecological, economic and social sustainability transition. *Sustainability*, 11(7), 2107. Accessed 27 August 2021. <https://doi.org/10.3390/su11072107>
- McKinnon, J., & Alston, M. (Eds.). (2016). *Ecological social work: Toward sustainability*. Palgrave Macmillan.
- Meade, R., Shaw, M., & B. (Eds.). (2016). *Politics, power and community development*. Polity Press.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis*. SAGE.
- Moore, M., Martinson, M. L., Nurius, P. S., & Kemp, S. P. (2018). Transdisciplinarity in research: Perspectives of early career faculty. *Research on Social Work Practice*, 28(3), 254–264. <https://doi.org/10.1177/1049731517708033>
- Närhi, K. (2004). The eco-social approach in social work and the challenges to the expertise of social work. In *Jyväskylä studies in education, psychology and social research* 243. Jyv'skyl': University of Jyväskylä.
- Nurius, P., & Kemp, S. A. (2014). Transdisciplinarity and translation: Preparing social work doctoral students for high impact research. *Research in Social Work Practice*, 24(5), 625–635. <https://doi.org/10.1177/1049731513512375>
- Peeters, J. (2012). Social work and sustainable development: Towards a social-ecological practice model. *Journal of Social Intervention: Theory and Practice*, 21(3), 5–26. <https://doi.org/10.18352/jsi.316>
- Rambaree, K., Powers, M., & Smith, R. J. (2019). Ecosocial work and social change in community practice. *Journal of Community Practice*, 27(3–4), 205–212. <https://doi.org/10.1080/10705422.2019.1660516>
- Raworth, K. (2012). *A safe and just space for humanity: Can we live within the doughnut?*. Oxfam.
- Raworth, K. (2017). A doughnut for the anthropocene: humanity's compass in the 21st century. *The Lancet Planetary Health*, 1(2), e48–e49. [https://doi.org/10.1016/S2542-5196\(17\)30028-1](https://doi.org/10.1016/S2542-5196(17)30028-1)
- Rigolot, C. (2020). Transdisciplinarity as a discipline and a way of being: cComplementarities and creative tensions. *Humanities and Social Sciences Communications*, 7(1), 100. <https://doi.org/10.1057/s41599-020-00598-5>
- Rinkel, M., & Powers, M. C. F. (Eds.). (2019). *Social work promoting community and environmental sustainability: A workbook for social work practitioners and educators* (Vol. 3). International Federation of Social Workers (IFSW).
- Ruch, G., & Julkunen, I. (Eds.). (2016). *Relationship-based research in social work: Understanding practice research*. Jessica Kingsley Publishers.
- Salovaara, J., Pietikainen, J., & Cantell, H. (2021). Perceptions of interconnected sustainability: Students' narratives bridging transition and education. *Journal of Cleaner Production*, 281. <https://doi.org/10.1016/j.jclepro.2020.125336>
- Schot, J., & Steinmueller, E. (2019). Transformative change: What role for science, technology and innovation policy? An introduction to the 50th anniversary of the Science Policy Research Unit (SPRU) special issue. *Research Policy*, 48(4), 843–848. <https://doi.org/10.1016/j.respol.2018.12.005>
- Shanahan, D. F., Astell-burt, T., Barber, E. A., Brymer, E., Cox, D. T. C., Dean, J., Depledge, M., Fuller, R. A., Hartig, T., Irvine, K. N., Jones, A., Kikillus, H., Lovell, R., Mitchell, R., Niemelä, N. M., Pretty, J., Townsend, M., van Heezik, Y., Warber, S., & Gaston, K. J. (2019). Nature-based interventions for improving health and wellbeing: The purpose, the people and the outcomes. *Sports*, 141(7), 1–20. <https://doi.org/10.3390/sports7060141>

- Shaw, I., Briar Lawson, K., Orme, J., & Ruckdeschel, R. (2013). *The SAGE handbook of social work research*. Sage.
- Stamm, I., Matthies, A.-L., Hirvilammi, T., & Närhi, K. (2020). Combining labour market and unemployment policies with environmental sustainability? a cross-national study on ecosocial innovations. *Journal of International and Comparative Social Policy*, 36(1), 42–56. <https://doi.org/10.1017/ics.2020.4>
- Tolland, A., Mogg, R., & Bennett, A. (2019). Using learning diaries to evaluate and improve online information literacy and academic skills provision. *Journal of Information Literacy*, 13(1), 76–92. <https://doi.org/10.11645/13.1.2519>