Sharing Good Examples, Then What?

Investigations of Contingency and Continuity in the Scaling-of-ESD-Activities-as-Learning

MARTIN MICKELESON
Abstract


This thesis aims to contribute to a deepened and nuanced understanding of scaling in environmental and sustainability education (ESE) research, specifically, to develop a conceptual framework for engaging with issues of scaling in policy and practice regarding education for sustainable development (ESD). Three research objectives are formulated.

The first objective is to develop analytical methods drawing on transactional learning theory for conducting empirical investigations of meaning making concerning educational content in scaling processes. This objective is achieved through an iterative participatory research process including, scaling researchers and practitioners, resulting in the development of the conceptual framework of Scaling-ESD-Activities-as-Learning (SEAL).

The second objective of the thesis is to examine how workshop participants’ experiences and agency create conditions for the scaling of educational content in ESE. The objective is achieved through analysis of written reflections from scaling practitioners, reports on scaling ESD-activities and participatory research workshop discussions.

The third objective is to investigate how educational content interplay with environments, such as natural and social environments, when scaling educational activities in ESE. This objective is achieved through analysis of the initial stages of scaling an ESD-activity and analysis of ESD-activities that have progressed to later stages of scaling.

Four studies address the three research objectives: in three of the studies, empirical data was generated through participatory research workshops in Sweden, South Africa and Ecuador (Paper I, II, IV), while in one study empirical data was generated through a case study of an ESD-course in Southern Africa (Paper III).

Drawing for its theoretical foundation on John Dewey’s transactional approach to learning, the thesis emphasises the importance of considering experience and aspects of contingency and continuity in learning processes.

The results of the thesis show that approaching the scaling of ESD-activities as learning enables the identification of conditions for scaling that is characterised by deep and meaningful improvement of practice, sustainability over time along with the ability to evolve when faced with changing circumstances.

The thesis contributes to ESE research with temporal perspectives on the scaling of ESD-activities, i.e. by considering contingency and continuity in the scaling process, maintaining the relevance of ESD-activities over time and through changing circumstances. Furthermore, by considering multiple, on the face disparate, scaling efforts as part of the same scaling event, the thesis highlight how each iteration of scaling an ESD-activity can constitute learning opportunities for further developing the activity at hand.

Keywords: Sustainable development, environmental and sustainability education, scaling, scaling-up, implementation gap, learning

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List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


II  Mickelsson, M. Danielsson, A. (2018) Scaling and subjectification in an ESD educational project Journal of Education for Sustainable Development (published). I proposed the idea and generated the data for the paper. The analysis was done collaboratively between Anna and I. I wrote the paper with comments from Anna.

III  Mickelsson, M., Mandikonza, C. (2020) Projecting change: scaling of the change project approach in Southern Africa. Environmental Education Research (under review). I proposed the idea for the paper. Caleb and I together generated the data. I analysed the material and wrote the paper with comments from Caleb.

IV  Mickelsson, M. (2020) "I think it works better if we have an example to help us": experiences in collaboratively conceptualizing the scaling of Education for Sustainable Development practices in South Africa. Environmental Education Research (in press). I proposed the idea for the paper. I designed the research, generated the data. Furthermore, I analysed the material and wrote the paper. In the analysis and writing processes, I have received peer review from colleagues.

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List of Concepts

The list of concepts presented below is intended as a quick reference to central concepts in the thesis. As such, the list does not present exhaustive definitions but is intended as a support in the reading of the thesis.

- **Scaling**, the chosen theoretical and analytical concept of this research project, denoting the multi-dimensional increasing of the impact of ESD-activities that is the focus of this thesis.
- **Spreading**, a generic and collective term for the varied approaches that focus on one or a few dimensions of increasing the impact of ESD-activities, including ‘up-scaling’, ‘scaling-up’, ‘scaling out’, ‘replication’, ‘expanding’, ‘rolling out’ and ‘growing’.
- **Multi-dimensional spreading**, the multi-dimensional process of, for example, ‘mainstreaming’ or ‘implementing’ of ESD-activities that include educational and learning theoretical approaches to ‘spreading’. It is used as a shared concept for the approaches taken by the four PhD studies described in Chapter 4 and discussed further in Chapter 9.
- **Scaling process**, a transactional learning process characterised by contingency and continuity in terms of scaling needing to have some degree of progressive change, i.e., be a scaling of an educational content rather than the development of an entirely new activity. This process involves the selective content of an ESD-activity that can gradually change and transform over time.
- **Environing conditions**, the spaces and places [what is usually referred to as environment] that have become enmeshed in experiences and practices. Environment is used as a state of becoming, integral to persons’ experiences.
- **Contingency and continuity**, a joint process in which change in the world is characterised by inertia, things neither wholly remains the same nor immediately changes. It is possible to track a change in which continuity is the condition for contingency and contingency reveals the continuity through the oncoming adjustment that accommodates new circumstances, rendering it continuous with what came before.
## Contents

1 Introduction .................................................................................................................. 15
  1.1 Education for Sustainable Development .......................................................... 18
  1.2 Outline of the thesis ......................................................................................... 20

2 Framing the thesis: five myths of scaling ............................................................... 22

3 Aim and research objectives .................................................................................. 24

4 Previous research ................................................................................................... 25
  4.1 Introduction ........................................................................................................ 25
  4.2 Spreading ESD-activities in ESE research ..................................................... 26
  4.3 Politics of scale and policy mobility studies in ESE ........................................ 26
  4.4 Adult education and dissemination ................................................................... 29
  4.5 Research on the scaling of ESD ....................................................................... 30
  4.6 Four critical studies on the multi-dimensional spreading of ESD .............. 34
    4.6.1 Perspectives on structures involved in spreading of ESD-activities ........... 35
    4.6.2 Perspectives on processes and encounters in the spreading of ESD-activities ............................................................................................................ 37
  4.7 Summary ........................................................................................................... 41

5 Theory .................................................................................................................... 43
  5.1 Dewey’s transactional learning theory ............................................................. 43
  5.2 Dewey’s concepts of contingency and continuity .......................................... 45
  5.3 Summary ........................................................................................................... 47

6 Methodology .......................................................................................................... 48
  6.1 Epistemology .................................................................................................... 49
  6.2 Methodology .................................................................................................... 50
    6.2.1 Participatory research approach ............................................................... 50
  6.3 Data generating methods ................................................................................... 51
    6.3.1 Workshops as a participatory research method ......................................... 52
    6.3.2 Case study method ..................................................................................... 53
    6.3.3 Writing to learn method ........................................................................... 55
  6.4 Introduction to empirical data .......................................................................... 56
  6.5 Re-Solve ........................................................................................................... 57
    6.5.1 The purposes of Re-Solve .......................................................................... 58
6.6 The Re-Solve process ................................................................. 59
Pre-Workshop preparations .......................................................... 59
Workshop 1: Conceptualisation of scaling ........................................ 60
Workshop 2: Indicative Descriptions and Scalability Indicators ....... 61
Workshop 3: Self-Evaluation of ESD-activities .............................. 62
Workshop 4: Vision and Resources ................................................. 63
Workshop 5: Action Plan ............................................................... 65

6.7 The Re-Solve workshop series ............................................... 66
6.7.1 The Swedish Re-Solve workshop series .............................. 66
6.7.2 The South African Re-Solve workshop series ..................... 68
6.7.3 The Ecuadorean Re-Solve workshop series ....................... 72

6.8 Generated empirical data ....................................................... 76

6.9 Data analysis methods ............................................................ 80
6.9.1 Abductive content and thematic analysis method ............... 80
6.9.2 PEA analysis method ........................................................ 82
6.9.3 Analytical process Paper I ............................................... 84
6.9.4 Analytical process Paper II ............................................. 86
6.9.5 Analytical process Paper III .......................................... 87
6.9.6 Analytical process Paper IV ......................................... 89

6.10 Research quality ................................................................. 91

6.11 Critical reflections on research quality considerations ............. 94

6.12 The positioning of research participants and the researcher ....... 96

6.13 Research ethics ................................................................. 98

7 Summary of the studies in the Papers ....................................... 100
7.1 The relationships between the four Papers ........................... 100
7.2 The study in Paper I ............................................................ 100
7.3 The study in Paper II ........................................................... 101
7.4 The study in Paper III ........................................................ 101
7.5 The study in Paper IV ........................................................ 102

8 Results: Theoretical and practical insights of the empirical studies .... 103
8.1 Introduction ........................................................................ 103
8.2 Theoretical insights ............................................................. 104
8.3 Scaling vocabulary .............................................................. 105
8.3.1 Scaling objects ............................................................... 105
8.3.2 Scaling subjects ............................................................ 107
8.3.3 Scaling sites ................................................................. 108
8.3.4 Scaling pathways .......................................................... 109
8.3.5 Scaling resources ......................................................... 110
8.3.6 Scaling drivers .............................................................. 110
8.3.7 Scaling vision .............................................................. 111
8.3.8 Summary ...................................................................... 112
8.4 Practical insights grounded in the empirical studies .................. 112
8.4.1 Scaling as an understandable learning process ...................... 113
8.4.2 Scaling as a selection of educational content ....................... 114
8.4.3 Scaling as a process of subjectification .............................. 117
8.4.4 Scaling as an agency formation process ............................ 120
8.4.5 Scaling as a consideration for valued beings and doings ....... 121
8.4.6 Scaling as a re-actualisation of experiences ........................ 122
8.4.7 Scaling as a potential for developing the scalability of ESD-activities ............................................................................................. 123
8.5 Summary ....................................................................................... 123

9 Discussion ............................................................................................. 125
  9.1 Introduction ................................................................................... 125
  9.2 Critical discussion ......................................................................... 129
    9.2.1 Critical reflections on the structures involved in the multi-
          dimensional spreading of ESD-activities ........................................... 129
    9.2.2 Critical reflections on the processes involved in the multi-
          dimensional spreading of ESD-activities ........................................... 131
    9.2.3 Contingency and continuity in scaling processes ............... 133
    9.2.4 Concluding remarks ............................................................... 134

10 Conclusion: synthesis of results, contributions and future research... 136
  10.1 Synthesis of the results .............................................................. 136
    10.1.1 Research objective one ........................................................ 136
    10.1.2 Research objective two ........................................................ 138
    10.1.3 Research objective three ...................................................... 138
  10.2 Contribution to previous research ........................................... 140
  10.3 Contributions to ESD practice .................................................. 143
  10.4 Contribution to ESD policy ...................................................... 145
  10.5 The five myths of scaling revisited ........................................... 147
  10.6 Future research ........................................................................... 148

11 A summary in Swedish ....................................................................... 150
  11.1 Kort sammanfattning av avhandlingen ..................................... 150
  11.1.1 Studien i artikel 1 ................................................................. 151
  11.1.2 Studien i artikel 2 ................................................................. 152
  11.1.3 Studien i artikel 3 ................................................................. 152
  11.1.4 Studien i artikel 4 ................................................................. 153
  11.2 Avhandlingens sammantagna resultat ....................................... 153

12 References .......................................................................................... 154
Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABR</td>
<td>Antibiotic resistance</td>
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<tr>
<td>CoP</td>
<td>Community of Practice</td>
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<td>CPA</td>
<td>Change Project Approach</td>
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<td>CPD</td>
<td>Continuous Professional Development</td>
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<td>DESD</td>
<td>Decade of Education for Sustainable Development</td>
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<td>EEASA</td>
<td>Environmental Education Association of Southern Africa</td>
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<td>ELRC</td>
<td>Environmental Learning and Research Centre</td>
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<td>ESD</td>
<td>Education for Sustainable Development</td>
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<td>ESE</td>
<td>Environmental and Sustainability Education</td>
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<td>GAP</td>
<td>Global Action Plan on Education for Sustainable Development</td>
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<td>IBA</td>
<td>Inquiry Based Approach</td>
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<td>MESA</td>
<td>Mainstreaming ESD in South African Universities</td>
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<td>PEA</td>
<td>Practical Epistemological Analysis</td>
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<td>PLC</td>
<td>Professional Learning Community</td>
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<td>SADC-REEP</td>
<td>Southern African Development Community Regional Environmental Education Programme</td>
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<tr>
<td>SDG</td>
<td>Sustainability Development Goals</td>
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<td>SEAL</td>
<td>Scaling-ESD-Activities-as-Learning</td>
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<tr>
<td>TKS</td>
<td>Traditional Knowledge System</td>
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<tr>
<td>ZPD</td>
<td>Zone of Proximal Development</td>
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This thesis has been a journey in itself, and I have made quite a few journeys during my years writing it, both large and small.

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1 Introduction

This thesis studies ‘scaling’ in Environmental and Sustainability Education (ESE)\(^1\). In authoritative Education for Sustainable Development (ESD) policy, up-scaling emerged as a significant concept from the evaluation of the UN Decade of Education for Sustainable Development (DESD) and the UNESCO Global Action Programme on ESD (GAP) (UNESCO, 2012, 2014c, 2014d, 2014b, 2014a). The highly influential 2012 Report on the UN Decade of Education for Sustainable Development (DESD), *Shaping the Education of Tomorrow* (UNESCO, 2012) and the evaluation report on the global implementation of ESD (UNECE, 2016), both argue that up-scaling is essential as means for the continuation of the sustainability efforts of the decade.

This conclusion is in short that there were during the DESD successful ESD-activities in formal and informal education. Meanwhile, these activities are in the documents described as seldom reaching beyond the initial context and target audience, prompting the need for up-scaling these initial ESD-activities. In its second evaluation report on the DESD, UNECE (2014) points to ESD-activities as often locally isolated, partly due to lack of expertise and financial support, and thus only partially successful during the decade. The ESD-activities are thus argued to necessitate additional efforts in terms of up-scaling. This focus on up-scaling is further emphasised in *Shaping the Future We Want* (UNESCO, 2014c) and the GAP (UNESCO, 2014b, 2014d) where the up-scaling of ESD-activities is outlined as means to accelerate overall progress towards sustainable development. Hence, up-scaling becomes a prominent expression in ESD policy speech, in evaluating the decade and in the continuation of ESD efforts during the GAP and beyond.

According to educational research (Elmore, 1996; Looi & Teh, 2015), ‘up-scaling’ is one among many terms in a great variety of notions of ‘moving activities from a small to a larger impact’ (Elmore, 1996), including ‘scaling-up’, ‘up-scaling’, ‘scaling out’, ‘replication’, ‘expanding’, ‘going to scale’, ‘mainstreaming’, ‘rolling out’, ‘growing’ and ‘developing’. Through-

\(^{1}\) ESE encompasses a range of approaches in Environmental Education (EE) and Education for Sustainable Development (ESD) that focus on several shared research interests while often interpreting these in different ways (Somerville, 2016; Stevenson, Brody, Dillon, & Wals, 2013).
out this thesis to denote these notions, the more generic term ‘spreading’ will be used.

Furthermore, this focus on up-scaling of locally successful activities in a sustainable development context reaches beyond the ESD policy sphere. For example, **Scaling Up Climate Action to Achieve the Sustainable Development Goals** (UNDP, 2016) emphasises the relation between the Sustainability Development Goals and 'up-scaling'. In this document, up-scaling climate action is presented as essential for the achievement of the Sustainable Development Goals. Also, Taylor (2014) notes that the Sustainable Development Goals (SDG) are related to the UNESCO GAP as one aim of the GAP is to support the achievement of the SDGs. While, as shown above, up-scaling has become crucial in ESD-policy since the end of the decade, I would argue that up-scaling is equally prominent in educational research and teaching practice.

In educational research and practice, there are insistent incentives to 'grow', 'up-scale', and 'scale-out' educational activities considered successful and efficient, making the notion of 'spreading' ubiquitous in educational research and practice (Spector, 2015). When educators experience that an educational activity results in a learning outcome that aligns with their educational purpose, there is often an inherent desire to share and spread this educational activity. Even though tendencies for seeking ‘best practices’ and ‘good examples’ is present in other areas, there are recurring incentives in educational policy and practice of finding recipes or generalisable solutions to make education predictable and to repeat perceived successes (Pring, 2000; Spector, 2015). Examples of this search for linear predictability is the use of pre- and suffixes, such as ‘up-scale’ and ‘scale-out’, often taken from business and industry (Ford Foundation, 2006), indicating single-dimensional processes. What makes such incentives problematic is that since education engages with human interactions in social settings, the complexity of these interactions (Spector, 2015) hinders the identification of simple causal relationships between an educational activity and learning outcomes (Pring, 2000). When coupled with a sense of urgency of 'solving' ESD challenges, the search for predictability risks outweighing careful considerations of the complexity of education. Among educational policymakers and practitioners alike, this usually involves cutting out theoretical considerations and nuanced understandings (Pring, 2000).

In addition, in Environmental and Sustainability Education (ESE)-research, ‘spreading’: the process of increasing the impact of ESD-activities, has often been approached from an under-theorised perspective. As such, 'spreading' risks becoming a one-dimensional, replication of closed-off educational content, and a lack of attempts to develop it as an educational concept contributes to this situation (Coburn & Stein, 2010; Rodgers, 2016; Stokes, 1997). Such an approach, without further consideration for learners or the educational situation, ignores the complexity of these educational
activities. Harwell (2012) and others (Denton, Vaughn, & Fletcher, 2003; Dewa et al., 2002; Elmore, 1996) argue that research has, without much critical discussion, drawn, for conceptualisations, from business and industry research, unsuited to account for the particular complexity of processes of learning. Such approaches take the form of what I refer to as shallow conceptualisations (Glasser, 2011; Naess, 1973) of spreading, lacking grounding in theoretical frameworks and the social complexity that such processes entail.

Moreover, ‘good examples' or ‘best practices' does not say much about how educational activities will turn out in other contexts and under conditions that often involve fewer resources than in the pilot projects that generated the ‘best' ESD practices (Spector, 2015). In his doctoral thesis, Lysgaard (2012) argues that such striving for ‘best practice’ turns sustainability scenarios into ideological phantasms, a desire for pinning down what he calls the big Other of ‘sustainability' and ‘climate change' (Lysgaard, 2012). Having educational activities stay principally the same when introduced to people in new contexts risks, according to De Andrade and Sorrentino (2014), imposing a universalised worldview through the scaling process. As such, there is a danger of suppressing indigenous and traditional knowledge and the prevention of contextually relevant framings of the scaling process.

In light of the reasoning above, developing ‘scaling’ as an educational concept could offer a theoretically deepening, multi-dimensional, perspective on the question of 'spreading,' i.e. increasing the impact of ESD-activities. Depending on the choice of theoretical underpinning, this educational concept will enable the exploration of different aspects of the phenomenon. Guided by the research objectives, in this research project, the focus will be on exploring the transactional relations between educational content, diverse contexts and those involved as part of scaling processes characterised by contingency and continuity. Based on the choice of focusing on the content-oriented dimension of education and learning (e.g., Selander & Kress, 2010) the research project (i) assumes a critical perspective on educational content in scaling processes and (ii) assumes a transactional perspective on learning informed by John Dewey’s theory of learning.

As such, the research project explores the scaling of ESD-activities, focusing on contingency and continuity, experience, participation, and ownership in order to study enabling and constricting conditions for scaling processes. Involving a critical theory-developing component, the research project results in the conceptual framework of Scaling-ESD-Activities-as-Learning, henceforth referred to as SEAL. To this end, the research project utilises a participatory research process, Re-Solve, to collaboratively generate scaling data from three participatory research workshop series in Sweden, South Africa, and Ecuador. As such, conditions are created for knowledge development that builds on participants' knowledge and experi-
ence. This methodological approach to data generation is in line with research methods used in Swedish didaktik\(^2\) research (Almqvist, 2005; Almqvist et al., 2008; Hansson, 2014; Kramming, 2017; Lidar, 2010; Lundqvist, 2009; Öhman & Öhman, 2013; Östman, 2010). The scaling data generated is analysed using an abductive research approach to develop the SEAL conceptual framework. Informed by transactional learning theory (Dewey, 1938) and educational scaling theory (Clarke & Dede, 2009; Coburn, 2003), the analysis emphasises qualitative scaling processes involving both spatial and temporal dimensions, characterised by depth, sustainability, a shift in ownership and evolution.

While the field of ESE includes several concepts that denote the phenomenon of increasing the impact of an ESD-activity, I will throughout this thesis use 'scaling' as my analytical concept. An initial driver for this choice and the taking up of the research project was the interest to explore the recurring concept of 'up-scaling' in ESD–policy (UNESCO, 2012, 2014c, 2014d, 2014b, 2014a). Furthermore, the use of 'scaling' by previous educational research addressing temporal dimensions of what occurs after the initial 'spreading' (Clarke & Dede, 2009; Coburn, 2003; Dede, Honan, & Peters, 2005) contributed to my choice of analytical concept.

Consequently, 'scaling' as the multi-dimensional, both spatial and temporal, increasing of the impact of ESD-activities, constitute the theoretical and analytical concept of choice in contrast to 'spreading' as a collective term for the varied approaches that focus on one or a few dimensions of increasing the impact of ESD-activities.

The approach to ‘scaling’ taken in this research project is characterised by contingency and continuity in terms of scaling in general and the scaling of ESD-activities in particular.

1.1 Education for Sustainable Development

This section outlines the understanding of Education for Sustainable Development (ESD) as an empirical field that is used throughout the thesis, specifically when discussing ESD-activities. ESD has been established as a key priority at the international level to enhance the capacity of formal and informal education to accelerate society towards sustainability (UNESCO, 2014d, 2014c; United Nations, 2015).

The DESD international implementation scheme highlights several educational principles as crucial for ESD (UNESCO, 2006). These principles include that ESD should assume a holistic perspective and engage education

\(^2\) Referring to the German and Scandinavian research tradition, not to be interpreted as ‘didactics’ is used in the English.
interdisciplinarily through a whole school approach (UNESCO, 2006). As such, ESD can employ a wide range of educational methods, including art, drama, and other experience-focused pedagogies, where learners engage as active subjects. Such inclusiveness further relates to a principle of participatory decision-making where learners contribute to the decision of how they are to learn. According to UNESCO and UNECE (UNECE, 2016; UNESCO, 2014d), education should be value-driven in the sense of acknowledging and being explicit about the underlying norms and values of ESD, enabling the critical examination of these norms and values. By encouraging critical thinking and problem solving the educational purpose is to give people the ability and confidence in engaging with sustainable development challenges. Such abilities also open for more possibilities of achieving the principle of applicability and local relevance, integrating learning experiences with the lives of learners and participants.

However, the concept of ESD itself is ambiguous and contested, and approaches to environmental and developmental problems vary within the field. In this thesis, ESD is understood as education that facilitates the development of knowledge, skills, and values that can enable individuals and communities to resolve challenges born out of unsustainable patterns of life and to strive for more sustainable futures (Ideland & Malmberg, 2014, 2015; UNESCO, 2006). This form of education draws on methods and content that aims at not creating a predetermined future but rather empowers learners to challenge unsustainable practices and explore new knowledge and approaches to wicked problems3 (Kronlid, 2014; Rittel & Webber, 1973) based on principles of sustainability (UNESCO, 2012).

To this end, it is possible to identify four principles overlapping with a general notion of quality education in ESD and the Sustainability Development Goal of Quality Education (UN, 2015b; UNESCO, 2014c). The integrative principle provides holistic perspectives, which integrates not just the often-cited three aspects of ESD: social, economic and environmental sustainability, but also spatial aspects in global, regional and local levels of ESD along with the temporal dimension of the future, present and past.

In addition, the critical principle challenges unsustainable patterns of action and the assumptions that such actions rest on, such as unlimited growth and the reduction of environments to resources for human consumption.

Meanwhile, the transformative principle of education involves building capacity and empowering people to move beyond awareness to take action in their lives and the lives of their communities in order to enact transformations towards more sustainable lifestyles.

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3 Problems that evades standardised solutions due to conditions and requirements for addressing being partially unknown, changing and contradictory.
Finally, the contextual principle of education emphasises the on-going practices and lives of people, that there is no universalisable 'best practice' for striving towards more sustainable futures. Instead, approaches to sustainability challenges need to consider differences regarding both where and when these approaches are introduced, opening the way for opportunities of learning between people with different on-going practices and lives.

ESD involves learning to ask critical questions, clarifying one’s own and other’s values, envisioning positive and sustainable futures, thinking systematically, responding through applied learning, and exploring the relationship between conserving values and social structures and innovations.

Following the contextual principle, ESD is not a standardised approach to education but takes a diverse range of forms globally. While these forms are all located within a specific education system and educational tradition (Bengtsson, 2014), they share the aims of the other three principles. These aims can be described as developing learners with diverse forms of capabilities and competencies that are able to address the environmental and sustainability challenges they face and strive for more sustainable futures.

Furthermore, the contextual principle of ESD emphasising learning in and from diverse contexts consists in considering and emphasising the views, values and ways of being of the people involved to enable them to live in societies characterised by justice, equality and environmental sustainability (Kapoor, 2009; Lotz-Sisitka, Wals, Kronlid, & McGarry, 2015; Tavernaro-Haidarian, 2019).

1.2 Outline of the thesis

In terms of outlining the thesis, following this introduction, Chapter 2 frames the knowledge object of the thesis, scaling of education and in particular scaling of ESD, with the help of an adaptation of what Looi and Teh (2015) have coined as the five myths of scaling of education. These myths constitute gaps between what we think we know about scaling and our actual knowledge of scaling.

From this framing, Chapter 3 details the research aim with three associated research objectives. To position the thesis in Environmental and Sustainability Education (ESE), Chapter 4 focuses on previous research on the 'spread' of ESD in ESE research, educational scaling research and adult education research. Furthermore, the chapter details four PhD studies that share topics of inquiry with the research project.

Chapter 5 outlines the theoretical approach of the thesis, drawing principally on Deweyan transactional learning theory, emphasising experience as well as contingency and continuity in learning processes.

In Chapter 6, the methodology of the thesis is detailed, including presenting the research context for the research project and the empirical data. Sev-
eral subchapters detail: epistemological positioning, methodology, data generation methods, empirical data generated through these methods, data analysis methods, as well as considerations for research quality and research ethics.

Summaries of the four papers that form the basis of the thesis make up Chapter 7, outlining the reasoning behind the conducted studies and how they are related.

The subsequent three chapters (Chapters 8-10) detail the results of the research project, discussions of these results, and how they contribute to research, practice and policy. Chapter 8 outlines the results as theoretical insights in the form of the conceptual framework of SEAL and practical insights regarding processes involved in the scaling of ESD-activities. Examples of these processes include scaling as the selection of educational content, subjectification and scaling as re-actualisation of participants’ experiences.

Chapter 9 critically discusses the results in relation to the four PhD studies presented in Chapter 4. The present thesis is one of five PhD studies published in the last few years with overlapping research interests, while engaging these interests with a variety of theoretical perspectives and analytical tools. This shared research space inhabited by the present thesis and theses from Southern African and Latin American colleagues offer avenues of critical exploring the results of the research project regarding the scaling of ESD-activities.

Chapter 10 offers a synthesis of the results of the research project along with contributions to ESE-research, ESD-practice and ESD-policy. These contributions are, furthermore, set in relation to the myth of scaling introduced in Chapter 2. The chapter concludes with outlining avenues for future research regarding the topic of scaling.

Finally, Chapter 11 offers a short summary of the thesis in Swedish.
Framing the thesis: five myths of scaling

Two overarching themes emerge from educational research on scaling. First, the scaling of educational activities is a complex and dynamic process (Clarke & Dede, 2009; Coburn, 2003; Coburn & Stein, 2010). Second, there is a lack of research on and conceptualisations with empirical and theoretical depth able to account for scaling as a multi-dimensional process (Denton et al., 2003; Dewa et al., 2002; Elmore, 1996; Fischer & Aubrecht, 2015; Harwell, 2012).

To make these two themes concrete and to illustrate ways of problematising scaling of ESD-activities, I draw on the five myths of scaling detailed by Looi and Teh (2015). 'Myths' of scaling are here understood as gaps between our assumptions about scaling and our knowledge of scaling. The myths of scaling are articulated to position the thesis relative to the often-used notions of 'spreading' in ESE research as well as supporting the research aim of developing a nuanced understanding of scaling.

In the thesis, the myths of scaling (Looi & Teh, 2015) are operationalised in two ways. Firstly framing the thesis topic, and secondly delineating an area of research questions. What characterises the myths of scaling is the assumption that we know things about scaling. However, research has pointed out that we do not know these things. The myths of scaling thus provide suggestions of gaps in knowledge about the scaling of ESD-activities that can be filled through theoretical and empirical research.

The first myth is the assumption that we know what scaling is, that it is a spread, replication, or expansion of an educational activity along one or a few dimensions. Drawing on Bradach (2003), Looi and Teh (2015) argue that scaling as replication is problematic since it flattens and obscures the diversity of contexts, standardising them. Such a lack of recognition is especially dubious in international educational efforts where contexts can differ widely.

The second myth is the assumption that there is no need to evaluate whether an activity is worth scaling. Simply because an activity is deemed successful in one context does not make it obvious or self-explanatory that the activity should be scaled. Such evaluation necessitates addressing questions of why an activity should be scaled.

The third myth is the assumption that we know how to scale. If we lack a clear notion of what scaling is, what is to be scaled, and why we should
scale, assumptions about how to scale become challenging to sustain. This assumption is further complicated because it is unclear if a, in some cases, successful model alone is sufficient for scaling, as indicated by Dede et al. (2005). This myth is that we think we know what is needed to manage a scaling process that has desired results. That scaling often is done through a scaffolding process of starting in capital cities where resources are more readily available also risk blinding us to the difficulties and demands on resources when engaging in scaling. As attempts are made to scale ESD-activities to areas outside these capital cities, resources can quickly become scarce.

The fourth myth is the assumption that we should scale what is considered best practices or good examples, i.e. that quality and quantity follow suit. Efforts to make educational activities more scalable pose the risk of simplifying and draining the complexity and richness of the activity, thus undermining the quality that motivated the initial scaling effort. Since ESD focuses on addressing wicked sustainability challenges that involve changing and developing values and practices, an important consideration becomes the priority between quality and scale, recognising that these can be in conflict.

The fifth myth is the assumption that a large-scale spread is imperative. This skewed quality-quantity balance implies, to use Coburn's (2003) language, that large-scale spread becomes the measure of success to the detriment of small-scale projects that have achieved depth in terms of becoming integrated into on-going practices. The argument here is that scaling often loses the adaptive and participatory qualities that are crucial to enable long-term engagement with educational projects that enable the qualitative goals of education (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005).

This chapter has outlined the five myths of scaling as a way of framing the subject of the thesis. The five myths, representing insights from scaling educational research, assists in identifying gaps between assumptions about scaling and substantiated knowledge of scaling. The gaps identified through the myths offer a framework within which results of empirical studies can be compiled. It is worth noting that the myths are not on the same level of abstraction. The first myth regarding 'what scaling is', resides on a more overarching or descriptive level while the remaining four myths constitute differing degrees of operationalisation and specificity regarding scaling.
3 Aim and research objectives

This thesis aims to contribute to a deepened and nuanced understanding of scaling in environmental and sustainability education (ESE) research, specifically, to develop a conceptual framework for engaging with issues of scaling in ESD policy and practice. Three research objectives are formulated to achieve this aim.

The first objective is to develop analytical methods drawing on transactional learning theory for conducting empirical investigations of meaning making concerning educational content in scaling processes. This objective is achieved through an iterative participatory research process where scaling researchers and practitioners negotiate and develop the conceptual framework of SEAL. (Paper I and Paper IV).

The second objective of the thesis is to examine how workshop participants’ experiences and agency create conditions for the scaling of educational content in ESE. The objective is achieved through analyses of written reflections from scaling practitioners, through analyses of reports on scaling projects, and analyses of scaling workshop discussions. (Paper II, Paper III and Paper IV).

The third objective is to investigate how educational content interplay with environments, such as natural and social environments, when scaling educational activities in ESE. This objective is achieved through analysis of the initial stages of scaling an ESD-activity and analysis of ESD-activities that have progressed to later stages of scaling. (Paper II and Paper III).

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4 Participants are here learners in that they are engaging in meaning making concerning educational content in scaling processes.
4 Previous research

4.1 Introduction

This chapter introduces previous research relevant to the inquiry conducted in my research project and presented in this thesis. The research overview details how questions relating to the spreading of ESD-activities have been addressed in research.

While ‘scaling’ has seldom been a topic for ESE-research, there is relevant ESE research, which includes studies addressing (i) the empirical process of increasing the impact of ESD-activities i.e. ‘spread’, and (ii) the dissemination and implementation of ESD policy in practice, especially in terms of critical policy mobility studies. As such, this chapter presents ESE-research relevant to the questions framed by the five myths of scaling (Looi & Teh, 2015) detailed in Chapter 2.

Similarly, relevant research is also found in adult education. As an example of research conducted within this field, the chapter presents studies on the spreading of educational innovations.

Moreover, in order to highlight significant research approaches that have attempted to address questions regarding the scaling of ESD-activities, research dealing with educational scaling is detailed, focusing on the empirical studies of scaling practices.

Finally, four PhD studies are detailed to highlight contributions from researchers sharing my research interest in the multi-dimensional increase of impact of ESD-activities. As such, several approaches are described that addresses the questions of why ESD-activities should be spread, how ESD-activities can be spread, and what parts of ESD-activities are to be spread. The justification for including these particular studies lies in it being an active and affirmative choice of highlighting contributions from researchers who have worked within a shared geographical area addressing questions of relevance for the multi-dimensional spreading of ESD-activities as an educational subject of inquiry.
4.2 Spreading ESD-activities in ESE research

Harwell (2012) and others (Denton et al., 2003; Dewa et al., 2002; Elmore, 1996; Fischer & Aubrecht, 2015) argue that research on the spread of ESD-activities lacks empirically grounded conceptualisations. They call for research that can help in understanding what makes ESD-activities possible to spread and how the process of spreading unfolds.

A similar line of reasoning lead Coburn (2003; Coburn & Stein, 2010) and Clarke and Dede (2009) to argue that processes that increase the impact of ESD-activities could be conceptualised as 'scaling' when (i) these processes engage with the contexts of those involved in increasing impact and (ii) the aim is to make the ESD activity sustainable over time. In order for the scaling to be sustainable, they argue that there needs to be a shift in ownership of the ESD-activity from the instigators of the 'scaling' towards those people who can manage and evolve the activity over time (Clarke & Dede, 2009; Coburn, 2003). Furthermore, McLaughlin and Mitra (2001) argue that to facilitate sustainable scaling, ESD-activities should become an internal part of on-going contextual practice. As such, these researchers have identified a research gap involving (i) a lack of empirically grounded studies and (ii) conceptualisations that engage with the conditions for the spreading of ESD-activities.

One approach in ESE research is to choose what ESD-activities to introduce or spread based on 'best practices' or 'good examples'. When such conceptualisations of spreading ESD-activities are presented without further qualification of this process as seen in Laurie, Nonoyama-Tarumi, Mckown, & Hopkins (2016), Nambiar & Sarabhai (2015), Sarabhai, Ravindranath, Schwarz, & Vyas (2012) and Sterling (2014), the risk is that this generates shallow notions (Glasser, 2011; Naess, 1973) and vague conceptualisations of what a ‘spreading’ process means. The use of ideas of 'good examples' or 'best practice' in educational research and practice is, furthermore, criticised by Pring (2000), Mochizuki (2008) and Spector (2015). They argue that this kind of conceptualisations regarding the spread of ESD-activities present oversimplified and mechanistic explanations of the process. Also, De Andrade and Sorrentino (2014) argue that these conceptualisations of ‘spreading’ risk designing general and standardised educational proposals for diverse groups of people that may impose a universalising worldview that in practice means that, e.g., indigenous knowledge systems are suppressed and subjugated.

4.3 Politics of scale and policy mobility studies in ESE

While there is a lack of research and critical perspectives in ESE-research regarding the conditions for the spreading of ESD-activities, there has been
significant research interest in ESE regarding the dissemination of particular policies. McKenzie (2012) describes research on the politics of scale within ESE as critically studying the relations between policy and practice in contexts across scales. 'Scales' is presented as interconnected spaces, ranging from the local to the global, with temporal histories and involving social processes related to politics (Massey, 1994; Mawhinney, 2010). Politics of scale is described by McKenzie as part of policy approaches, involving movements of 'problematics' of life in ways that generate transformations. These movements are often along what she refers to as neoliberal lines, including a ‘compression’ of the world (2012). In this research, 'scales' are approached as levels of analysis or ways of focusing on educational policy or research efforts. As such 'scale' seldom becomes a verb, things shift between 'scales' and become 'scaled'. Scales become something to explore in order to grasp the contextual character of social mobilisations related to policy.

Along similar lines regarding the dissemination of policy, Van Poeck and Lysgaard (2016) note in their article exploring the body of ESE policy research that there is a significant interest in ESE to explore, from a critical policy perspective, the politics of developing and implementing ESD policy. Within this increased interest in critical policy research, connecting sustainability, mobility and education (K. Gulson et al., 2017; K. Gulson & Symes, 2017; Hursh & Henderson, 2011; Jickling & Wals, 2008; McKenzie, 2012), policy mobility have been a prominent research topic following the mobility turn in social sciences (Bengtsson, 2014; K. Gulson et al., 2017; Peck, 2011; Peck & Theodore, 2010; Temenos & Mccann, 2013). These research interests centre on how educational policy is mobilising sustainability and how interests become enacted in policy. The aim of this research is not finding the 'best' policy, but exploring and understanding how educational policy is developed and disseminated, by whom and why. Prince (2012) argues that what becomes disseminated is not necessarily a coherent whole, but that policy moves in parts and that through the process, transformations are occurring in terms of policy and policy ideas (Peck & Theodore, 2010).

Furthermore, Aikens et al. (2016) notes that within ESE research (Ball, 2013; Ball & Junemann, 2012; Heimans, 2012; Hursh & Henderson, 2011; McKenzie, Bieler, & McNeil, 2015), there is a need to explore mobility further, as related to the actors and networks involved in policy development and enactment as well as how these actors and networks generate policy tensions and contradictions. McKenzie (2015) describes policy enactment as processes of contextual translation and adoption, how those involved in context adapt, resist or appropriate policies. Drawing on Bowe, Ball, and Gold (1992) and Ball, Maguire, and Braun (2012) an argument is presented for critical research on how sustainability as policy idea is mobilised in education (McKenzie, 2009), i.e. what ESD can become through particular practices in particular spaces. As such, policy mobility studies explore how policy
moves and how the ideas generated in policy are created and recreated, both in different contexts and in the processes of moving (K. Gulson et al., 2017; Mccann & Ward, 2012; Peck & Theodore, 2010).

One perspective on policy mobility is how ideas picked up by policymakers become vehicular ideas, possible to be appropriated for diverse purposes and in various ways (Bengtsson, 2014; McLennan, 2004; Temenos & Mccann, 2013). These vehicular ideas are characterised by McLennan (2004) as adaptive in accommodating contrasting perspectives and even dissent. Such accommodation allows for the establishment of social and cultural networks in which people with diverse objectives can subscribe to what on the surface is a shared vehicular policy idea. The necessity of adapting policy ideas to varied contexts, evolving them and moving with changes in circumstances as well as objectives is recognised. According to McKenzie et al. (2015), sustainability is an example of a vehicular idea. Sustainability, as part of educational policy, is in this argument twinning with processes and objectives of so-called neoliberalisation. As such, McKenzie et al. (2012; 2015) argues for ESE research to explore questions of policy mobility and critically consider how and why specific policy ideas become disseminated.

Part of these policy mobility studies is how contextual factors affect these processes, with 'the best' policy depending on the context and the interests at play (Dale, 1999; McLennan, 2004; Peck, 2011; Temenos & Mccann, 2013; Weyland, 2005). The argument is that pre-existing policies often become a determining factor in the dissemination of policy ideas to new contexts (Halpin & Troya, 1995). To this point, Peck and Theodore (2010) argue that policies aligned with the status quo often become disseminated.

There is thus an argument for critical and imaginative research into how sustainability as a policy idea is mobilised in education (McKenzie 2009). This research includes questions that delve into how policies are translated and adopted in context as well as how those involved in context adapt, resist or appropriate policies (Ball et al., 2012; Bowe et al., 1992). In discussing critical policy exploration McKenzie (2012) points out that 'lessons from elsewhere' in borrowing and lending policy may become vehicles for 'neoliberal' transformations of education in local contexts. In addition, there is a tendency of separating policy development and the implementation, re-establishing a divide between practice in context and policy, obfuscating the connections between varied practices across local, regional and global levels or scales, as well as over time (McKenzie, 2012; Nguyên, 2010).

McKenzie et al. (2015) suggest that dissemination involves processes of emulation, learning, competition, and coercion (Dobbin, Simmons, & Garrett, 2007; Shipan & Volden, 2008, 2012). These range from the voluntary adoption of existing policy through 'emulation', copying of policy considered successful. Often this requires that there are shared cultural and social conditions (Peck, 2011). These forms of 'emulation' are described as becoming mixed up with dissemination through 'learning' from others.
(Shipan & Volden, 2008, 2012). Learning is in this argument (Peck, 2011) considered relative, as policy paradigms determine whether a case of policy dissemination is considered successful. Competition and coercion differ from the previous processes as they involve either economic pressures or other outside demands employed by institutions (Shipan & Volden, 2008). As such, while Peck (2011) present emulation and competition as prevalent in policy research and discussion, learning is considered less frequently, which raises interests for further exploring what a learning perspective could add.

4.4 Adult education and dissemination

The question of ‘spreading’ educational innovations has also been a recurring topic outside of ESE. In adult education, research on Continuous Professional Development (CPD) has addressed the topic of spreading. CPD can be described as an intentional process, an on-going process and a systemic process (Guskey, 2002; Guskey & Yoon, 2008). It addresses questions of professional development, including a multitude of practices and contexts (Harel & Sowder, 2007; Kelchtermans, 2004).

As a step to understand the processes involved in this continuous professional development, Weißenrieder et al. (2015) note that there is a significant gap between educational innovations of CPD deemed qualitative and scaling-up these innovations. Research on CPA has focused generally on quality criteria of the educational innovation itself as indicators of the potential to disseminate these CPD innovations. Significantly, such approaches often disregard the need to maintain, and over time, make the educational innovations sustainable. Dissemination of educational innovations needs to address questions of short-term as well as long-term impacts if the innovations are to be made sustainable (Rogers, 2010; Zehetmeier, 2015; Zehetmeier & Krainer, 2011). As such, technical spreading and maintenance is not necessarily the same thing (Weißenrieder et al., 2015). Drawing on Coburn (2003; Coburn & Stein, 2010) there is a recurring emphasis (Day, 1999; Harel & Sowder, 2007; Zehetmeier, Andreitz, Erlacher, & Rauch, 2015) on those involved in spreading CPD and that educational innovations should consider and attempt to align with the beliefs of those involved.

As part of these discussions on the ‘spreading’ of educational innovations, is the outlining of several enabling conditions. These include contextual conditions such as engagement from those involved (Henze, van Driel, & Verloop, 2009) and local facilitators who can support early adopters (van Driel & Berry, 2012). Furthermore, there is a need for support networks and funding (Cobb & Smith, 2008; Henze et al., 2009; Weißenrieder et al., 2015) along with collaboration, communication and partnerships (Pegg & Krainer, 2008). Marrongelle et al. (2013) argue that when establishing these support
structures and expertise, their complexity often needs to be on par with the complexity of the desired impact. Finally, Saborit et al. (2016) question the viability of technical notions of spreading 'evidence-based practice' or 'best practices' defined by others, because such notions risk to over-simplify processes of learning, leading to a mismatch between the educational intervention and the desired impact.

4.5 Research on the scaling of ESD

The five myths of scaling detailed in Chapter 2 (Looi & Teh, 2015) are indicating a persistent limitation in the approaches of ESE research to ‘spreading’. For example, Coburn (2003; Coburn & Stein, 2010) and others (Glennan, 2004; McDonald, Keesler, Kauffman, & Schneider, 2006; Slavin & Madden, 2013) are critical of research focusing on quantitative replication of educational activities as well as of more adaptive approaches focusing on horizontal spread (Mead & Simon, 1996). Coburn (2003) argues that such notions mask the complexity inherent in these processes, and others (Denton et al., 2003; Fischer & Aubrecht, 2015; Harwell, 2012) suggest that the processes of increasing the impact of ESD-activities is generally under-researched and lacks theoretical frameworks and conceptualisations. Consequently, while there is scholarly agreement about the importance of these processes, there are different views on the relevance of different dimensions of increasing the impact of ESD-activities and how to achieve it.

According to these scholars, research on processes of increasing the impact of ESD-activities need to have conceptual ‘depth’ to include a meaningful improvement of educational and sustainability practices. Coburn (2003) along with other researchers (Glennan, 2004; McDonald et al., 2006; Slavin & Madden, 2013) argue that research often focuses on quantitative replication of projects and programs to a more significant number of sites. These researchers challenge the approach of measuring quantitative impact due to it being too limited in its scope and thus ill-fitted for education. As such, the complexity of increasing the impact of ESD-activities risks becoming masked. The purpose is not only to spread the project but also to achieve change that is meaningful to those involved and change that is sustainable over time. In addition to spreading, a conceptualisation of the process of increasing impact needs ‘depth’ for deep and meaningful improvement of practice, ‘sustainability’, in order to secure the continuous improvement of practices, and ‘a shift in ownership’ to enable those involved to have agency in the process (Coburn, 2003; Coburn & Stein, 2010). In line with this reasoning, McLaughlin & Mitra (2001) argue that it is necessary to have a process of increasing impact that reaches beyond implementation. The ESD-activity must move from being an external entity to becoming an internal part of the practice of the whole organisation. In other words, it must become
rooted in the new context by linking the educational project to questions and issues relevant and vital to the contexts where the activity is to be introduced (McLaughlin & Mitra (ibid.).

As noted above, scaling research is a relatively new area in educational research and, according to Harwell (2012), a lack of empirically supported theories of scaling has lead to a situation in which the factors that promote successful scaling of ESD-activities is partly unknown. Denton et al. (2003) argue that while different models cover different aspects of increasing the impact of ESD-activities, comprehensive theories/models within educational research is non-existent. This lack is meanwhile not limited to educational research but is also present within the fields of nursing and health, which further actualises the need for empirically grounded studies of multi-dimensional scaling processes (Harwell, 2012). To fill out this research gap, educational researchers ((Coburn, 2003; Coburn & Stein, 2010; Elmore, 1996; Harwell, 2012) have suggested using research and theories from other areas, coupled with educational research approaches. Such a research area is multisite studies in public health research. Multisite studies often follow after a single demonstration site study and in practice, make it a form of up-scaling of the project (Dewa et al., 2002). Elmore (1996) emphasises the importance of studying the scaling of educational programs to determine their purpose-oriented efficiency based on studies of empirical data. If a program is to be effectively scaled, it needs to scale what accomplishes the educative purpose.

The process of increasing the impact of ESD-activities, and how educational researchers and reformers define it is of significance both for the strategies of policymakers and reformers that want to change ESD-activities as well as for how researchers frame the question (Coburn, 2003; Hatch, 1998). The concepts used lay the ground for explicit and non-explicit assumptions about the purpose, challenges, and processes of the increasing impact of ESD-activities. According to Coburn (2003) and Hatch (1998) and other educational researchers (Elmore, 1996; McLaughlin & Mitra, 2001; Stringfield, Datnow, Ross, & Snively, 1998), this makes questions of scaling as a multi-dimensional process of increasing impact one of the most pressing issues in educational research. Especially so with regards to attaining change through education which was the purpose of the DESD and the present purpose of the GAP (Coburn, 2003; Hatch, 1998; UNESCO, 2014c, 2014b, 2014d).

Educational research emphasises the necessity of increasing the impact of ESD-activities; however, researchers differ on how to achieve this and what dimensions are relevant. Some argue for a more traditional view focused on quantitative replication of projects and programs to a more significant number of sites (Glennan, 2004; McDonald et al., 2006; Slavin & Madden, 2013). Others argue for a more adaptive concept where practitioners have
greater agency in adapting the project to the local context (Datnow, Hubbard, & Mehan, 2002; Mead & Simon, 1996; Stringfield et al., 1998).

Multiple researchers emphasise the role of the sites where scaling occurs and the need to build in affordances to the different contexts they represent (Harwell, 2012; Stemberg et al., 2013). They argue that there must exist a similarity between the original contexts of the activity and the contexts in order to say that the activity is scalable. Furthermore, Stemberg et al. (2013) represent a study of the increasing impact of ESD-activities that has a significant empirical grounding. (Dewa et al., 2002) support this form of adapting to different contexts given that the educational projects' purpose-outcome connection is retained, what Harwell (2012) conceptualises as ‘fidelity’ to the projects' selective content.

Coburn (2003) is critical of those conceptualisations which, while differing in some ways, deal primarily with the challenge of what she calls the quantitative dimension of ‘scaling’. Such conceptualisations mask the complex processes and challenges i.e. to reach out while at the same time, create meaningful change that is sustainable over time. Coburn argues for adding several dimensions to the quantitative dimension:

- Depth, deep and meaningful improvement of practice.
- Sustainability, not only sustaining a status quo but securing that practices are continuously improved.
- Shift in ownership, enabling those involved in the scaling to take ownership of the program and authority to improve it to suit their needs.

Clarke and Dede (2009; Dede et al., 2005) have further emphasised the importance of these dimensions adding ‘evolution’, which refers to when the adopters of an activity revise it and adapt it in such a way that it is influential in reshaping the thinking of its designers. This addition creates a community of practice between adopters and designers, whereby the activity evolves. In order to achieve scaling along this dimension, researchers need to learn from users' adaptations to rethink the design of activities.

Accordingly, this body of research suggests that increasing the impact of ESD-activities is not a single event, but an on-going emergent process and that efforts in this process will need to change as the process proceeds. Generally, for the ESD-activity to remain relevant in the face of sustainability challenges, this change will be done by those most intimately involved in the process.

McMaster & Fuchs (2011) point in their study to the need of balancing fidelity to the selective content of an activity with adaptivity. They indicate that once the practitioners have sufficient experience of the activity and understand the principles of the activity, flexibility in scaling could create ownership by practitioners and more sustainable scaling.
Emphasising the related questions of ownership and sustainable processes, McLaughlin & Mitra (2001) argue that, given the continuous interaction of attempts to increase the impact of reforms in differing contexts and learning of outcomes, processes need to reach further than just sustaining a status quo over time. There is a need to have continuous development and flexibility in the activities to meet changing circumstances and challenges. Referencing Brown & Campione (1996), they, therefore, view such an increase of impact as dependent on practitioners' investment in the first principles, and not only in practices. Such affordances ultimately demand the transfer of ownership and authority of the activity to be scaled, since a superficial understanding can lead to what McLaughlin & Mitra (2001) call 'lethal mutations' where the principles of the activity become violated. In addition to the need for heterogeneity and fidelity in the process of increasing impact, Harwell (2012) suggests that providing a thorough justification for the process will encourage those involved in scaling to commit.

In his study, Elmore (1996) argues that mainly organisational and incentive structures are presented in research to be significant for increasing impact. What is missing is educational ideas and projects with the purpose to change practice. Elmore argues this is related both to organisational values and to individual values where incentives come to mobilise individual values. Since it is unlikely that spontaneous diffusion will happen based on pilot projects' success, Elmore (1996) argues that efforts must increase the impact of educational activities with the purpose of changing practice.

Meanwhile, Coburn (2003), acknowledges that the dimensions of depth, sustainability, and transfer of ownership, makes measuring processes of increasing the impact of ESD-activities a tricky proposition. Emphasis is shifted from quantitative measuring the presence of activities or materials to questions of value-related, conceptual change, and principles informing educational practice. She also mentions that there are possible tensions between on the one side fidelity to the projects and the other side, allowing for reform of ownership (Coburn, 2003). Ultimately Coburn agrees with many other educational researchers that careful studying and designing of the scaling process could at least partly alleviate these challenges.

Efforts to develop a more multi-dimensional conceptualisation of the process (Duggan, Smith, & Thomsen, 2013) emphasise the complexity of increasing the impact of ESD-activities and proposes a framework for understanding it as a three-dimensional process of scaling-up in terms of the organisational dimension; scaling-out in terms of the geographical dimension, and scaling-deep in terms of a value-based dimension.
4.6 Four critical studies on the multi-dimensional spreading of ESD

In this section, four PhD studies have been chosen to exemplify several approaches to address the joint subject of inquiry, conditions for the multidimensional ‘spreading’ of ESD-activities. These PhD studies include three Southern African studies, Mandikonza (2016), Agbedahin (2016) and Tshiningayamwe (2016) as well as one study from Colombia by Chaves (2016).

While some of the PhD studies do not use 'scaling', they all engage questions regarding the multi-dimensional spreading of ESD-activities, being the focus of this chapter and of relevance to ‘scaling’ as the research topic of this thesis. The justification for including these particular studies draws on an active and affirmative choice of highlighting contributions from researchers who have worked within a shared geographical area addressing questions of relevance for spreading of ESD-activities as an educational subject of inquiry.

The three Southern African studies were selected as they represent a summary of long term ESD-activities in the Southern African context pertaining to multi-dimensional spreading of said activities. Together the studies constitute reports on the work of major educational projects, ‘Fundisa for Change’ (Tshiningayamwe, 2016), ‘Change Project Approach’ (Mandikonza, 2016) and ‘MESA’ (Mainstreaming ESD in South African Universities) (Agbedahin, 2016). Utilising a diversity of educational and learning theories these studies explore ESD-activities throughout the Southern African region. The study from Colombia (Chaves, 2016) was selected as it represents a report on more recently initiated ESD-activities in a Latin American context, posing ontological questions to multi-dimensional spreading processes. As such, these four studies are comprehensive reports on practice-research progression in the main research area of the present thesis.

These PhD studies are further utilised in the discussion (Chapter 9) to critically discuss the results of my research project and assist in the positioning of my thesis. Drawing on a number of educational and learning theories, focus in these PhD studies is placed on structural and process-oriented aspects of the multi-dimensional spreading of ESD-activities, highlighting the role of institutions and the educational system in these processes.

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5 Multi-dimensional spreading is used as a shared concept denoting the four PhD studies that share the multi-dimensional approach of ‘scaling’ used throughout this thesis. ‘Spreading’, in the latter part of the concept, is included to indicate the difference between the perspectives of the PhD studies and the chosen theoretical and analytical concept of this thesis.
4.6.1 Perspectives on structures involved in spreading of ESD-activities

In his study Mandikonza (2016) sets out, informed by Wertsch (2007) and Daniels (2010), to investigate how mediated action as part of a learning process can facilitate institutional change towards sustainability by linking individual agency with collective agency within institutions. Individual agency is in the study (Mandikonza, 2016) defined as choosing to take purposeful and intentional action after reflexive thought. Drawing on (Archer, 1995, 2000, 2007, 2009) individual agency is described as interlinked with collective agency when participants collaborate with colleagues as part of an ESD-activity. Mandikonza (2016) outlines individual-social action and collective and institutional-social practice, with references to Evetts (2011) and Iversen (2003), as a shared two-level process in which individuals collaborate and seek support for action within their institution as well as with other institutions. In terms of multi-dimensional spreading, the study (Mandikonza, 2016) argues that institutional capacity building as the alignment of individual and collective agency can bring individual capacities to bear in efforts to change institutional practices.

From a Vygotskian learning approach (Vygotsky, 1978) the study (Mandikonza, 2016) showcases how such collaborations, when people become engaged in joint contextual practices, enable people to expand their zones of proximal development (ZPD) (Daniels, 2008; Haenen, 2001; Lektorsky, 2012; Vygotsky, 1978). The argument presented (Mandikonza, 2016) is that their praxis changes and expands, as they are able, through mediatory action, to connect shared experiences with concepts and practices. This Vygotskian approach to learning is in the study (Mandikonza, 2016) utilised as a way to understand how competencies and practices, at the individual and the collective level, can be developed critically and reflexively. The suggestion is that through mediated action, the ZPD is not limited to expanding in the present, but conditions are created for a continuous expansion, forming the platform for ongoing reflexive learning engagements. Importantly Mandikonza (2016) presents these engagements as extending beyond the individual's practice to enable capacity building and changes in institutional practices as part of the multi-dimensional spreading of ESD-activities.

With this theoretical approach, the study by Mandikonza (2016) explores the mediatory role of the International Certificate in Environmental Education course in developing capacity among participants. This ESD-course aims to engage participants to reflect on ‘spreading’, mainstreaming ESE in Southern Africa to address persistent environmental and sustainability challenges. As a change project intervention, this course focused on the intersection of individual action and transformations of educational institutional structures and practices. Positioned within the broader framework of the
Southern African Development Community Regional Environmental Education Programme (SADC-REEP), this study (Mandikonza, 2016) focused on the change project course and how it could have a mediatory role in connecting individual action to the institutional structures of teacher education in order to transform institutional practices.

Based on the theoretical approach focusing on understanding agency, learning, and institutional change, I interpret Mandikonza (2016) as conceptualising ‘multi-dimensional spreading’ as institutional change through mediated action. The mediated action becomes linked with the change project, as a reflective mediatory tool. As such, the study (Mandikonza, 2016) explores the mediatory role of ESD interventions and activities of the change project for fostering changes in teacher education practices.

In the second PhD study, engaging the structures involved in the multi-dimensional spreading of ESD-activities, Agbedahin (2016) investigates how the interrelations of ESD practices with institutions and organisational structures are crucial for the mainstreaming of said practices. These practices are understood as positioned within what she calls a laminated system (Bhaskar & Danermark, 2006; Nunez, 2013). With ‘laminated system’, Agbedahin is outlining a system that enables the description of social realities (social structures and institutions) as arranged in patterns of interdependency (2016).

Based on Cutter et al. (2015), the study (Agbedahin, 2016) approaches sustainability as a cross-cutting and multi-dimensional challenge that involves aspects of both nature and society. Of particular interest is how the relation to different levels of institutions and organisations can support the mainstreaming of ESD in university settings. Agbedahin (2016) uses Bhaskar (2013), to approach practices and their positions within multiple institutional and organisational levels views from a perspective in which social institutions and structures only exist through the reproducing efforts of on-going practices. This approach opens the door for reciprocal relations between practices and structures. The positioning of practices within this multi-level system of structures and institutions is integral to the practice, while both the meaning and impact of practices (ESD-activities) come to transform these structures and institutions. The focus of the study (Agbedahin, 2016) is on the mainstreaming of ESD into university institutional functions and practices by course participants. This focus involves empirical investigations of the International Training Programme (ITP) focusing on university educators' mainstreaming of ESD within the MESA (Mainstreaming of Environment and Sustainability in African) Universities Partnership program.

By focusing on the significance of ESD practices' positions within institutions and social structures, Agbedahin (2016) brings to the fore discussions regarding 'points of contact' that link practices to social structures. Drawing on the notion of an inseparable laminated system (Bhaskar & Danermark,
Agbedahin (2016) takes a social learning perspective in the study drawing on Tábara (2015) to view ‘multi-dimensional spreading’ as ‘an open-ended, reflexive and sequential process of structural change induced by agency’ (p.77). Central to this notion of social learning in the study (Agbedahin, 2016), are changes of social structures and how changes can be analytically understood and enabled through reflexively exploring its relation to agency, context, and structures (Tábara, 2005).

Connecting back to the position-practice approach, Agbedahin (2016) draws on Tábara’s (2015) notion of social learning in terms of creating new and changed social conditions such as institutions and collective as well as individual rules and norms. This social learning perspective recognises the interconnections of social structures and agency on both collective and individual levels but for analytical purposes, addresses them as separate. As such, I interpret Agbedahin (2016) to conceptualise scaling as a movement of position-practices in laminated systems. ESD-activities are in this conceptualisation understood as practices whose meanings are conditioned on their position within a system of social structures, which are only possible to separate analytically. To move an ESD-activity to a new position within the system would then necessitate a re-evaluation of the form and meaning of the said activity.

Collective practice and its relation to individual practice can be brought into dialogue with the position-practice perspective within a laminated system as presented by Agbedahin (2016). Such relations highlights how individual and collective practices discussed by Mandikonza (2016) will take different forms depending on where, within the laminated system, the practices are located and to how the collective practices relate to the individual practices.

4.6.2 Perspectives on processes and encounters in the spreading of ESD-activities

In her study, Tshiningayamwe (2016) explores the capabilities, conversion factors and functionings of Life Sciences teachers when engaging with biodiversity knowledge as part of three Professional Learning Communities (PLCs). The notion of learning PLCs presented in Tshiningayamwe (2016) draws on Vygotsky (1978) with learning as not an activity limited to individuals, but rather as an inherent social occurrence. The study
(Tshiningayamwe, 2016), describes learning processes, involving the education of teachers, as situated in continuously transforming conditions of contingent educational contexts. To create continuity under such contingent conditions and to enable teachers to develop their knowledge through processes of proximal development teachers' learning is presented as taking its starting point in their experiences, and how they make meaning of these experiences. As such, teachers' ability to engage in reflective practices regarding not just knowledge creation but also their teaching and learning within diverse social settings becomes crucial (Brody & Hadar 2011).

Furthermore, contingency also permeates the kind of knowledge and learning teachers within PLCs will acquire. Educational efforts even within the same educational programme, such as in the case of the study (Tshiningayamwe, 2016), will need to be adapted based on who is involved and their past experiences. Drawing on Hord (2008), the knowledge creation involved in the PLCs is outlined as on-going collaborative reflections, centered on the teachers' reflections and the social contexts in which the teachers operate. As such, the study illustrates how the teachers' reflections support developing a degree of continuity in their teaching and learning under contingent conditions.

With support in Stoll et al. (2006), the study (Tshiningayamwe, 2016) outlines PLCs as providing conditions for collaborative reflection and sharing of practices that support participants interrogating their joint learning. Through collective and collaborative actions of inclusive and reflective learning sharing of knowledge is supported, which promotes growth in participants' ability to address sustainability challenges (Stoll et al. 2006). Importantly, as part of engaging in PLCs, the participants are described, referencing Brody and Hadar (2011), as becoming learners in addition to what other roles they have as part of the community or other social circumstances. PLCs are thus described by Tshiningayamwe (2016) as communities that offer crucial support and structures for professionals to engage in collective development action of their choosing.

Tshiningayamwe (2016) acknowledges that a crucial way of understanding the Life Science teachers in the study is assuming a community of practice (CoP) perspective. Utilising perspectives from Wenger, McDermott and Snyder (2002) these communities are described as, through continuous interactions with the purpose of knowledge co-generation, jointly creating deeper expertise regarding a common concern, issue or interest.

Within a capability approach framework (Crocker & Robeyns, 2009; Kronlid, 2014; Robeyns, 2006; Sen, 1999) the study (Tshiningayamwe, 2016) explores valued beings and doings along with associated conversion factors. The PLCs involved in the study (Tshiningayamwe, 2016) was part of a national teacher education programme aimed at enhancing transformative environmental learning, named Fundisa for Change.
In the study (Tshiningayamwe, 2016), an important concept is the notion of peoples' capabilities, drawing on the writings of Sen (Sen, 2003, 2007) and Nussbaum (2003). Capabilities are here described as the substantial freedom for individuals to realise alternative combinations of valued beings and doings as lives they have reason to value. Enabling these capabilities is the creation of opportunities among people to mobilise their resources in realising the kind of lives they value as related to addressing ESD challenges. Drawing on Robeyns (2005b, 2005a), Tshiningayamwe (2016) outlines this as ‘conversion factors’ that enable individuals to convert resources into functionings (realised valued beings and doings) in the frame of educational practice. This notion of conversion factors is further nuanced with an analytical separation of social, environmental and personal conversion factors.

Based on Sen (1999) and Archer (1995) agency is approached as the ability of people to act according to what they value and to do this in a reflexive, creative, innovative, and purposeful way. These actions involve a choice that has the potential to either reproduce or transform social structures and cultures. As such, Tshiningayamwe (2016) utilising Cundill et al. (2014) defines ‘agency as an important aspect of Life Sciences teachers capabilities, which refers to their ability to act, think, value and do.’ (p.40).

Based on this capabilities approach perspective, I interpret the study to present a conceptualisation of ‘multi-dimensional spreading’ as a process of ESD expanding people's capabilities, including how ESD may create conversion factors that enable such expansion of capabilities. As such, the expansion of functionings among people involved in the national teacher education programme is crucial for the study.

In her study Chaves (2016) outlines how the ‘deep’ learning processes needed for transitioning towards a more sustainable world can be achieved by weaving together concepts of social learning, ontological encounters, new social movements and buen vivir (good living). The study (Chaves, 2016) approaches the question of sustainability from the perspective of a professed Latin American perspective, focusing on decolonisation (Escobar, 2010). Decolonisation thus becomes a crucial sustainability goal, including a widening of ESD-activities to involve ‘multi-dimensional spreading’ with other educational purposes than addressing climate change.

Focusing on the ‘up-scaling’ and ‘out-scaling’ of decolonisation of knowledge and knowledge production, the study utilises the idea of ‘ontological encounters’. Drawing on Holbraad et al. (2014) and de Castro (2015) the study approaches ontology from the notion of ‘what could be’, emphasising that in ESD-activities existence can and often should become enacted in multiple forms and that the resulting encounters involve ‘ontological politics' (Mol, 2002). This process is described as a negotiation involving human collectives (politics) engaging in jointly making worlds possible. Related to ‘multi-dimensional spreading’, this involves how different ontologies can meet under equal conditions sharing perspectives and jointly address sus-
tainability challenges. Chaves (2016) present processes for how to create and facilitate spaces for ontological encounters. In these ontological encounters (Blaser, 2010; Escobar, 2012), there is an emphasis on an ontological ‘pluriverse’ of overlapping and interwoven worlds of being and knowing. The emergence of such a pluriverse entails processes of inclusion and articulation, involving participants representing varied ontologies. As part of such processes, the study emphasises the risk of ontological inflexibility as well as adverse power relations. Chaves (2016) positions the decolonisation of knowledge within the concept of buen vivir or good living (Gudynas, 2011). Buen vivir becomes in the study (Chaves, 2016) approaches and perspectives on the meaning of living a good life characterised by environmental responsibility. While the concept of ‘buen vivir’ has roots in indigenous ontologies, the study (Chaves, 2016) asserts the necessity of exploring how different groups envision the living of a good life. One way of conducting such an exploration would be to draw on the capability approach outlined by Tshiningayamwe (2016). The focus would then be to put squarely on people's valued beings and doings and how the ‘spreading’ process can enable freedom for people to realise valued lives whether or not it directly draws on concepts such as ‘buen vivir’. Connecting back to the questions of ontological encounters, Chaves (2016) focuses on the potential in reimagining the origins of our knowledge and what it can enable and limit in terms of addressing sustainability challenges.

The relevance of ‘multi-dimensional spreading’ in the study (Chaves, 2016) becomes more pronounced when discussing the importance of contextualised knowledge and participation from the local community for addressing local challenges along with the transformation of conditions of inequity and exclusion. There is an argument for greater creativity to address these challenges and the agency of teachers in terms of utilising contextualised knowledge and practices.

More specifically, the study centres on transformative Civic Ecology Practices and how these can be ‘scaled’ both up and out through networks. These networks include bioregional as well as national networks and are exemplified in the study by C.A.S.A (Council of Sustainable Networks of the Americas) and its annual gathering ‘El Llamado de la Montaña’. The multi-dimensional ‘spreading’ process is here described as the promotion of principles and methodologies that create spaces for, and facilitate, shared reflection with the aim of creating openness for diverse ways of generating co-created visions and practices in communities. As such, the strategies for ‘up-scaling’ and ‘out-scaling’ of sustainability practices for transformative learning, presented by the study, centres on the creation of spaces in which people and institutions with diverse ontological perspectives can engage in dialogue and capacity building to generate joint action in the face of sustainability challenges.
The study (Chaves, 2016) sees the potential for the ‘spreading’ of ESD-activities along multiple dimensions, including the creation of transboundary spaces of an ontological pluriverse, drawing on ideas of boundary-crossing (Akkerman & Bakker, 2011a, 2011b). The aim is for these spaces to generate a critical mass along with diversifying perspectives, in which those involved experience a diversity of ways of thinking, feeling and acting.

The study's discussion on 'multi-dimensional spreading' conceptualises it as a joint process involving diverse perspectives and as a process of joint knowledge creation resulting from ontological encounters. This process is outlined in terms of how contextual knowledge and ontologies of the participating local communities are acknowledged. An example presented in the study is a rural development project involving an indigenous community (Chaves 2016). The example shows how educators are encountering the disconnection between an education system aimed at 'development', and the local realities of communities with different interests and needs based on alternative knowledge systems and worldviews. Chaves (2016) argues that ‘multi-dimensional spreading’ needs to involve a process of reconnection between a territory and the people involved as well as ontological encounters that challenge modern legacies and creates the space for new futures and visions.

To this end, the study (Chaves, 2016) posits that ‘spreading’ the principles of ‘buen vivir’, including those detailed above, involves those involved in the effort to engage in a joint critical reflection based on ontological encounters.

There are thus potential clashes between the educational content and the environment in action, i.e. the communities' local realities'. Additionally, the study (Chaves, 2016) emphasises the potential for both productive and negative clashes in ‘spreading’ processes that include different interests and needs based on alternative knowledge systems and worldviews. It is not the clashes themselves that are either productive or negative but how they are addressed. Thus, Chaves (2016) highlights the limits of ‘airdropping’ technology to a rural community with the assumption that they will engage in a specific meaning making, resulting in certain outcomes.

4.7 Summary

In this chapter, I have outlined how educational research, especially ESE, has engaged with the spreading of ESD, as policy or practice. While ESE has discussed questions of spreading in terms of policy mobility, learning perspectives have not been explored to any significant degree. A crucial research topic highlighted in the chapter relates to the conditions for spreading ESD-activities. Educational scaling research highlights that these processes
and conditions are characterised by complexity as it involves encounters with both diverse contexts and people with varied interests and objectives.

As indicated in this chapter (4.4), the topic for the research project and the results presented in this thesis has applicability that is more general beyond the research field of ESE. The research overviews of Greenhalgh et al. (2004) and Ellis et al. (2005) indicate a broad research interest outside of ESE in questions regarding moving science (research-based knowledge, models or methods) to service (behavioural change, activities or practices) with fidelity to the science as well as good outcomes. These research interests include diffusion (Green, Ottoson, García, & Hiatt, 2009; Greenhalgh et al., 2004), dissemination (Dearing, Kee, & Peng, 2017) and implementation (Century & Cassata, 2016; Penuel, Fishman, Cheng, & Sabelli, 2011). The tailoring of implementations has furthermore been discussed in knowledge translation research addressing questions of bridging the gap between what we know and what we do in practice (Bergström, Peterson, Namusoko, Waiswa, & Wallin, 2012; Kitson, 2009; Pablos-Mendez & Shademani, 2006).

Meanwhile, given the focus of this research project and the extent of the thesis and papers I have elected to not further address the applicability of the research topic and the results beyond ESE.

Looking forward, the previous research presented in this chapter contributes to the thesis at different points. Research on the scaling of ESD presented in 4.5 forms an essential theoretical background for much of the later chapters of the thesis (Chapters 8-10), as it enables me to insert my research project and the papers within an on-going discussion of the scaling of ESD-activities.

Furthermore, the research on spreading in ESE, outlined in Section 4.2 and 4.3, is addressed in Chapter 10 as part of outlining the contributions of the research project to ESE research. Also, the four critical studies detailed in 4.6 form a critical component of the discussion Chapter 9 as they constitute contrasting theoretical approaches to research on the scaling of ESD-activities studied in this thesis.
5 Theory

This chapter presents the learning theoretical perspectives forming the basis for this thesis. In the first section (5.1), outlining Dewey's transactional learning theory enables the study of individual learning processes along with the conditions for such learning processes in the scaling of ESD-activities. In the subsequent section (5.2), I expand on Dewey’s concepts of contingency and continuity, which enables me to study the temporal dimension in the learning processes of the scaling of ESD-activities. As such, drawing on contingency and continuity, I am able to qualify the transactional character of the learning processes further. Readers are advised to approach this chapter in conjunction with Chapter 4, which outlines previous research for the research project. Relevant parts of Chapter 4 will be utilised together with the learning theoretical perspectives outlined in this chapter to support the analytical arguments made throughout the thesis. Parts of this chapter presents arguments published in Mickelsson, Kronlid and Lotz-Sisitka (2018).

5.1 Dewey’s transactional learning theory

According to the pragmatist understanding, meaning making constitutes an emergent property of practices and the encounters between learner and other learners, artefacts and material, information, educators, facilitators, that occur in these practices (Hansson, 2014). A transactional view of learning thus indicates a constructivist approach to meaning making, according to which meaning is continuously constructed and reconstructed as the qualitative, meaningful, element of what is continuously becoming the subject’s environment (Dewey, 1938/1997; Dewey & Bentley, 1949/1991; Rosenblatt, 1985).

These theories emphasise participation in the sense of partaking in and sharing of mutual learning activities. Learning thus involves diverse collaborations and contributions where shared responsibilities and compromises emerge as crucial. The primary source of learning theory drawn on in this thesis is John Dewey's (Dewey, 1938/1997) pragmatist philosophy, which Swedish curriculum studies research has further expanded upon in terms of a transactional understanding of learning (Almqvist, 2005; Almqvist et al., 2008; Hansson, 2014; Kramming, 2017; Lidar, 2010; Lundqvist, 2009;
Öhman & Öhman, 2013; Östman, 2010). This understanding conceptualises learning as a dual-directional encounter of educational content with learners and educational situations, respectively. Drawing on pragmatist philosophy and the transactional learning theory, the thesis assumes that, because learning is understood as always situated in certain practices and made up of encounters and experiences in these practices, the world of social, cultural and physical contexts and processes becomes a principal object of study (Almqvist et al., 2008; Östman, 2010).

Central for Dewey’s learning theory (Dewey, 1938/1997; Dewey & Bentley, 1949/1991) is the concept of experience and how it is distributed spatially into the environment in encounters as well as temporally, extending both into past and future experiences. The theory outlines a transactional perspective on peoples relation to their social as well as the material environments. Accordingly, learning is not just something that occurs in one instance, but rather is often a continuously on-going transformation that extends over time, and which meaning changes as learners have new encounters and experiences (Dewey, 1938/1997; Wickman, 2006). Wickman (2012) argues that ‘Didactics was not just a question of the methodology of teaching a given content, but it also advanced a critical and constructive stance towards the content taught at school.’ (Wickman, 2012, p. 485). Selecting content and methods is always done in relation to particular learners at a specific place and time, for a specific educational purpose.


Central for this theory of learning is how experience is distributed spatially in the environment in and through encounters between learners and educational content and educational situations. Accordingly, Dewey emphasises that the interconnections between our everyday experience and our environment are in the learning process. Our actions exist in a single interwoven unity with the environment and relate to the environment reciprocally.

In the thesis, 'environment' is not reduced to an inert surrounding. Accordingly, the transactional view on learning highlights that spaces and places [what usually is referred to as environment] that we encounter are qualitatively enmeshed in meaning making processes as our needs, desires, emotions, actions are part of what Dewey refers to as 'environing conditions' (Kronlid, 2014, pp. 59, 60). On account of this, our environment is always in a state of becoming as it is an integral part of a person's experience; thus the
‘environment’ can neither be denied nor comprehended beforehand (Kronlid, 2014).

This on-going process of meaning making in a ‘becoming environment’ is the emergent property (or quality) of the process Dewey refers to as ‘environing’ (Dewey, 1938/1997; Dewey & Bentley, 1949/1991; Rosenblatt, 1985). In environing, certain aspects of the environment come to be reciprocally involved as part of the learning process, referred to as ‘environing conditions’ (Hansson, 2014; Kronlid, 2014). The ‘environment’ encompasses both ‘potentially’ environing conditions and ‘realised’ environing conditions. As such, ‘environment’ is the whole of what we can engage with even if we only retrospectively can know what selected parts we came to engage with. Based on Dewey (Dewey & Bentley, 1949/1991), environing conditions are the objects and events relevant to the practices and activities of those involved in scaling. In an example of a farming community, the ‘environment’ is the objects and events that become relevant to the practice of unsustainable farming and the ESD-activity that is scaled to address the unsustainable practices. The ‘environment’ is the objects and events that are relevant and forming the background for the practice of unsustainable farming. In scaling some part of this background is engaged within transactional encounters. There is thus a difference when talking of ‘environment’ in this study, between objects and events becoming environing conditions in the scaling process and object and events forming a background for the activities and practices that the scaling of ESD-activities aims to address.

According to Glassman (2001), actions exist in a single interwoven unity with an environment in a transactional relation, not reducible to an inert surrounding (Glassman, 2001). The encounters in learning processes are, therefore interwoven with an environment (described as spaces and places) that cannot be predefined but is in a perpetual state of becoming. This environment is qualitatively enmeshed in the learning process in what Dewey calls ‘environing conditions’ for our educational experiences (Kronlid, 2014).

5.2 Dewey’s concepts of contingency and continuity

Dewey (1938/1997) outlines seemingly continuous existences as contingent; with contingency and continuity encompassing a joint process. Continuity is described as the condition for contingency, while contingency reveals continuity through the oncoming adjustment. Through the ability to accommodate contingent conditions, existences are rendered continuous with what came before. As such, the notion of continuity is as an occurrence contingently evolving in a changing world. Each new present brings about a new past, oriented toward a new future. Dewey outlines a contingent reality in which those that make up this reality create contingencies and continuities in a con-
tinual adjustment to the adjustments of others. In this sense, reality is understood as open to change.

Furthermore, experience is crucial for Dewey’s notion of continuity; our current experiences constitute a function of the encounter between our past experiences and the present situation, influencing the future. Experience among learners grows and form situations oriented toward ends. These situations are unified, providing a degree of continuity, while continuously growing with the possibility of both contingency ‘disintegration’ and continuity ‘integration’. When Dewey (1938/1997) outlines the concept of a ‘problematic situation’, it involves engaging contingent problems in a contingent world. Engagement with the problems of the present, in Dewey’s view, renders the problems and solutions, not universal but contingent. This contingency also extends to any solutions we may produce, which will not be permanent. While we may spend much effort on addressing a problem, the many possibilities of the world we live in cannot be exhausted by a single set of problems or system of thought.

Based on this, Hickman (2007) notes that the pragmatist approach of Dewey involves learning to engage with the world without an expectation that our articulations of the problems are exhaustive or that our solutions are forever lasting. How we articulate the problems we face, and the solutions we devise to address them, will have a degree of continuity in that they both can be supported by earlier iterations and inform future ones, but unless they change with the changing problematic situations, they become obsolete (Hickman, 2007; Riggio, 2011).

In line with this, addressing sustainability challenges through scaling of ESD-activities should be expected to be exhaustive, thus challenging the idea that we should search for pre-existing guarantees for specific outcomes. A conceptualisation of scaling drawing of Deweyan notions of contingency and continuity needs to acknowledge that these challenges can only be addressed contingently through sustained effort. The scaling of an ESD-activity is not a guarantee of specific outcomes since adaptation in and through the scaling process is critical as part of the encounters of educational content with learner-participants and environing conditions.

Rosenthal (1996) presents notions of contingency and continuity as central for a pragmatist approach to time, time as continuously expanding out. As the present passes, quasi-discretes emerge as part of this expanding out. These quasi-discretes are themselves continuous processes and emerge through the interaction of dynamic tendencies constitutive of the on-going temporal advance. These concrete and dynamic continuities are expanding out directionally as part of on-going activities and transactions, a present to which both past and future adjust.

In summary, Dewey's (1938/1997; Dewey & Bentley, 1949/1991) theory on transactional learning, qualified with the temporal dimension of contingency and continuity, makes up the learning theoretical approach of this
thesis. Throughout the papers making up this thesis, this theoretical approach formed the basis for the analytical steps taken. To further substantiate and facilitate the analysis, specific papers drew on additional theoretical perspectives from the existing previous research on educational scaling (detailed in 4.5).

5.3 Summary

The choice of theories, as presented in this chapter, was based on how the transactional learning perspective and considerations for contingency and continuity enabled me to study the scaling of ESD-activities with focus on reciprocal learning processes and temporal dimensions. Assuming other learning theoretical perspectives would have enabled the consideration of other dimensions when studying scaling. The present research project is contrasted in Chapter 9 with four PhD studies to illustrate some of these alternative research paths. With these studies engaging research questions relevant to ‘scaling’ from diverse theoretical perspectives, Chapter 9 includes a discussion of what would be possible to study regarding scaling by assuming such theoretical perspectives.

Looking forward to how these theories are operationalised in the thesis, Dewey’s transactional learning theory has been the principal theoretical basis for the four studies reported on in the papers of this. As such, the theory continues to constitute an important theoretical perspective, especially throughout the later chapters of the thesis (Chapter 8-10). Chapter 8 operationalises the learning theory as part of outlining the results of the research project regarding the contemporaneous encounters between ESD-activities, those involved in the scaling process and the contexts in which the ESD-activities were scaled.

Furthermore, the interrelated concepts of contingency and continuity are operationalised in Chapter 9 and 10, enabling a more in-depth discussion on the temporal dimension of the scaling of ESD-activities. This aspect, highlighted by Coburn (2003) and Clarke and Dede (2009) in the scaling characteristics of sustainability and evolution, is further explored as part of the contrasting conversation in Chapter 9 with the studies presented in Chapter 4.
6 Methodology

This chapter details the research process, intending to make visible the epistemological, methodological and methods choices made in the research project. The choices of methodology, following from my choice of epistemic approach, influenced (and was influenced by) research objectives as well as framing the use of methods. Methodology is thus understood as constituting a connection between epistemology and research practice (methods), this connection having two functions: as strategies of inquiry and as the justification of methods.

While the Re-Solve has had functions as a reflective tool and a workshop process, in this research project, it was used as a research process, incorporating choices of epistemology, methodology and methods.

Drawing on Dewey’s inquiry theory (Dewey, 1929, 1938/1997) as the epistemological basis, the Re-Solve research process includes a participatory research approach as the chosen methodology justifying the use of methods to explore and make inquiries regarding scaling. As such, the Re-Solve has been developed specifically for creating knowledge regarding scaling with the next three sections detailing choices of epistemology, methodology and methods as outlined in Table 1 below.

Table 1. Re-Solve research process

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<th>Epistemology</th>
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<td>Theory of inquiry</td>
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<td>Participatory workshops</td>
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<td>Case-studies</td>
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Following these sections is a presentation of the empirical data generated throughout the research process. This presentation includes a presentation of the generic aspects of the Re-Solve research process and the workshop series as well as the descriptions of specifics regarding the three Re-Solve workshop series in Sweden, South Africa and Ecuador. Furthermore, a series of tables present the extent and composition of the empirical data for each paper.
Subsequently, choices of data analysis methods are outlined, following from the epistemological positioning and the methodological approach taken in the research project. The data analysis was conducted in two phases, representing qualitatively different forms of analysis. The first phase, conducted during the workshops, involved the facilitators, together with the participants, framing and re-framing the empirical data through reflective discussions. This process facilitated the further analysis in the second phase of the analysis, conducted after the workshops. In this phase, that constituted the principal analysis, a variety of methods were utilised, depending on the workshop series and study. In addition, the analytical process in each of the four papers is outlined as part of this section.

Thereafter, a discussion on research quality engages with questions of how quality can be expressed in the choices of epistemology, methodology and method, building on an argument for internal consistency in the research process. Moreover, the section provides critical reflections on the consequences of my epistemological and methodological choices, as expressed in the methods, in terms of enabling and constricting the study of the scaling of ESD-activities.

As the participatory research workshops were a crucial part of the Re-Solve research process, the limitations to this method are discussed separately along with critical reflections on my dual roles as researcher and facilitator in the workshop series.

The chapter concludes with a section on ethical considerations with emphasis on the participatory research approach of my research project.

### 6.1 Epistemology

In the introductory chapter, ‘scaling’ was argued to be complex and multidimensional. Given that the research project included participants with varied epistemological positions, this complexity necessitated that I assume a pluralistic approach to knowledge and knowledge creation when generating empirical data on scaling. This pluralistic approach meant that I initially did not restrict the research project to any single epistemology (understood as the notion of what constitutes knowledge and the process for creating knowledge). Meanwhile, when analysing the generated empirical data, a particular epistemological position was assumed to support precision in the analysis, enabling the study of certain aspects of the empirical data.

Consequently, there was throughout the research project a temporal movement from a pluralistic epistemological approach during the generating of empirical data to choosing a particular epistemology as part of conducting the data analysis.

As such, the epistemological positioning for data analysis involved knowledge creation through inquiry processes. This choice is in line with the

Dewey argues that we experience phenomena as parts of an environment, as multiple relations to an on-going world (R. A. Putnam & Cochran, 2010). While emphasising experience, these relations take the form of reflective inquiry, initiated to respond to indeterminate situations such as problems (Dewey, 1929, 1938/1997).

In addition, focusing on action and experience and taking our experiences as the basis for knowledge, the chosen epistemological position for data analysis focuses on how, through inquiry, we can move forward in the world, including in education.

Consequently, knowers are involved and part of a non-static world in which knowledge is about on-going phenomena. Knowing is bound up with the problems faced by people in particular contexts, as an activity of inquiry in which knowers, through reflection, develop claims to knowledge (Dewey & Bentley, 1949/1991; Putnam & Cochran, 2010). Because of this, the outcomes of inquiry are provisional, possible to adapt based on further inquiries and thus, knowledge and practice emerge together in that knowledge is only possible concerning some form of practice. As we create knowledge through practices in the world, in this research project, I have explored the scaling of ESD-activities, as experienced by participants involved in the research process. This inquiry-focused epistemology has implications for methodology as strategies of inquiry and justification for methods as well as methods as knowledge generating inquiries (Dewey, 1938/1997).

6.2 Methodology

In the research project, methodology is understood as having two functions: as strategies of inquiry and as justification for methods. In order to create consistency with the approach to epistemology, I have chosen methodologies that support explorative research practices that can adapt in order to consider the unexpected in the research process (Chilisa & Kawulich, 2012; Ritchie, Lewis, & Elam, 2003). As such, the chosen methodologies are strategies of inquiry (Cresswell, 2008; Creswell & Poth, 2017; Schwandt, 2015) to generate empirical data and conceptually develop ‘scaling of ESD-activities’. To this end, presented below is the chosen methodology of the participatory research approach.

6.2.1 Participatory research approach

The choice of the participatory research approach builds on the assumptions drawn from the chosen epistemological position, that knowing is created in
practice and that we are all experts on the subject of our own experiences. The approach enabled the generation of empirical data to support the development of a conceptual framework on scaling. As such, the justification for choosing the participatory research approach is epistemic: it creates knowledge that can be considered valid in light of the chosen epistemological position.

Consequently, in the chosen approach, researchers engage as partners together with the participants in research practices creating opportunities for joint learning. These learning processes involved the creation of knowledge through collaborative and critical reflection, drawing on participants’ experiences and understandings of the scaling of ESD-activities (Reason & Rowan, 1981). This joint process of collaborative knowledge-construction and learning enables participants and researchers to engage critically with their experiences and knowledge as part of the learning process. The process was thus ultimately expected to expand scaling knowledge and contribute to theory development regarding the scaling of ESD-activities.

Furthermore, in combining participants’ experiences and knowledge with relevant research introduced by the researchers (Bergold & Thomas, 2012), participatory research differs from action research in its focus on knowledge creation. The approach aims to enable the co-creation between participants and researchers of context-relevant knowledge about shared topics, which may or may not be immediately actionable (Whyte, 1989). While the knowledge created should be relevant for engendering social change, the key interest of the approach is to enable a process of knowing among those involved (Bergold & Thomas, 2012). As such, the participatory research approach aligns with the chosen epistemology in this research project.

To summarise, the chosen methodology justify methods generating knowledge that is relevant to participants' experiences and practices, and that may imply ESD scaling action on policy and research level aimed at social change.

### 6.3 Data generating methods

As argued by Ritchie et al. (2003) as well as other researchers (Chilisa & Kawulich, 2012; Schwandt, 2015), methods should be closely connected to the research aim, which in this research project is generating and analysing empirical data on scaling. Participatory research workshops as well as case study and writing to learn methods were used to generate empirical data on the scaling of ESD-activities, as presented below.
6.3.1 Workshops as a participatory research method

Workshops as a participatory research method in this research project had dual-purposes: (1) to enable participants to develop knowledge and capacity related to their interests and (2) to enable researchers to generate empirical data about scaling (Darsø & Høyrup, 2012; Darsø, 2001; Rossi, & Sein, 2003; Ørngreen & Levinsen, 2017).

Consequently, workshops can be an activity where the unexpected is considered (Öberg & Hernvall, 2016) and while there is a wide range of approaches to workshops as a method, participatory aspects are often emphasised (Cornwall & Jewkes, 1995; Northway et al., 2014; Pain, 2004; Robertson & Wagner, 2012; Shallwani & Mohammed, 2007; Spinuzzi, 2005).

Furthermore, workshops are in this research project understood as arranged events of a limited duration targeted to participants working in the same field, e.g. ESD (Jaipal - Jamani & Candace, 2015; Koehler, Mishra, & Yahya, 2007; R. T. Putnam & Borko, 2000).

As such, participatory research workshops have potential to enable the identifying, articulating, and exploring ill-defined research concepts and topics such as ‘scaling’ (L. Darsø & Høyrup, 2012; Lotte Darsø, 2001; Ørngreen & Levinsen, 2017). As participants engage in a shared practice, and participants, together with the facilitators, can pause the activity, the workshops enable the building of common vocabularies. Participatory research workshops offer spaces for such explorative learning processes in which participants draw on their experience in addressing the issues at hand and exploring relevant concepts. This reasoning is in line with Bergold and Thomas (2012) who argue for the importance of, when using participatory research approaches as methodology, choosing methods that build on participants’ knowledge and experience.

As a result, workshops enable participants to inquire collaboratively, explore, analyse, synthesise and co-construct knowledge (Laurillard, 2008; Mor, Warburton, & Winters, 2012; Winters & Mor, 2009). Following this line of reasoning, designing workshops based on participatory research methodology involves going a step beyond solving participants ‘problems’ , to generating empirical data by facilitating theory-practice co-creation (Goodyear, de Laat, & Lally, 2006).

Moreover, drawing on the literature review by Ørngreen and Levinsen (2017) participatory workshops as a research method constitutes a distinct perspective of knowledge that is in line with the chosen epistemological position and methodological approach. As such, participatory research workshops were suitable as a data generation method in this research project. As noted by Unger (Unger, 2012) capacity building using workshops has a clear role in participatory research as a way of creating enabling conditions for
knowledge development that is both relevant to participants practices and acceptable in the light of values in different contexts.

An example of how the participatory research workshop method was used in the research project to generate empirical data is presented in the study of the South African workshop series detailed in Paper IV. In the workshop series, the participants brought experiences of regional ESD-activities, within academia as well as in policy and education system development. The workshop series included, but was not exclusive to, small group sessions of 5-7 participants in which they addressed questions regarding the scaling of ESD-activities. During the studied workshop sessions, participants reflected on the tentative concepts of scaling introduced by facilitators. These reflections involved relating the tentative concepts to their experiences of ESD-activities, among which the Change Project Approach and Fundisa for Change were prominent. From the audio material recorded during these workshop sessions, empirical data was generated of the encounters between tentative scaling concepts and the participants’ experiences of ESD-activities, as part of their discussions.

Further examples of how the participatory research workshop method was utilised throughout the research project are detailed in 6.7, outlining the three Re-Solve workshop series.

While considering the benefits of participatory research workshops as data generating methods, the dual purposes of the workshops result in contradictions, especially regarding the involvement of the researchers (Ørngreen & Leivinsen, 2017). As such, throughout the Re-Solve workshop series, I occupied two positions when engaging in the workshops, first as facilitator (alone or together with co-facilitators) focusing on capacity building and knowledge co-creation for and with the participants. Second, I occupied the position of research practitioner with data generation at the centre, in which participants became part of the research practice. To outline how my positions as researcher articulated throughout the research project, the presentation of the three workshop series (6.7) includes a series of examples. Furthermore, the potential contradictions between these two positions as facilitator and researcher are discussed in 6.12.

6.3.2 Case study method

As noted by Yin (2009), ‘case study research comprises an all-encompassing method—covering the logic of research practice, data generation techniques, and specific approaches to data analysis’ (Yin, 2009, p. 121). The case study method constituted a part of the method for data generation as well as data analysis. As such, both aspects of the case study method are presented together.

Following from the epistemological position outlined above, the case study method was chosen as it supports the generation of context-relevant
knowledge. As noted by Yin (2009), a case study method is well suited when studying phenomena, such as scaling, where the boundaries between practice and 'contexts' are difficult to draw. Acknowledging and exploring this interwoven character of phenomena enables the development of enhanced understandings of why certain processes develop as they do and what aspects of a phenomenon could be the focus for future research (Bowen, 2009; Flyvbjerg, 2006; Owen, 2014; Thomas & Magilvy, 2011).

Furthermore, using cross-case studies (Yin, 2009) as a research method facilitates the studying of possible and unforeseen elements and aspects of the phenomenon of analysis, e.g. scaling. Contrasting one case with other cases enables the identification of elements and aspects relevant to phenomena.

In addition, there are significant analytical benefits of case studies as these explorations result in understandings characterised by conceptual depth and theoretical nuance (Yin, 2009). Research practices facilitated by a case study method can thus provide insights into the enabling and constricting conditions of certain outcomes related to a phenomenon and inform future research as well as policy and practice about what is important to consider more extensively in addressing phenomena.

Consequently, when conducting a cross-case study analysis, Yin (2009) argues the benefits of developing theoretical propositions relevant to cross-case analysis and conclusions. Developing theoretical propositions can both guide the data generation and, more crucially, provide a structure, and strategic approach for the data analysis (Yin, 2009). Simons (2009) argues that such theoretical support to the generation of empirical data as well as identifying themes for data analysis, enables progressive theory development.

An example of how the case study method was used for both data generation and data analysis is presented in Paper III, studying the Change Project Approach (CPA) course in Southern Africa. In generating the empirical data for the case study, four cases were selected out of the documentation produced by 27 CPA-course participants, using two selection criteria. The first criteria included cases involving encounters between the educational content, those involved in the scaling and environments that were as part of teacher education programs. The second criteria included cases details of how participants demonstrated the ‘implementation’ of the change project in their educational practice.

The analysis of the cases of the CPA course documentation included a combination of cross-case study method and abductive analysis method. In analysing the CPA course cases, the initial step involved reading and re-reading the documentation produced by the participants and, supported by the tentative SEAL conceptual framework, identifying the sustainability challenge, scaling objects, the scaling subjects and scaling sites in each case. Second, the chosen cases were examined, first apart and then together, to establish how these ‘scaling’ aspects related to each other in the material,
understood as encounters, unfolding over time. In the final step, similarities and differences in the course participants' descriptions over time facilitated the identification of shifts in their understandings of the scaling object, scaling subjects and scaling site.

The third analytical step included re-reading the course-participants' documentation, identifying aspects that were significant in each case and noting recurring themes. These themes were compared with the tentative conceptual framework, assessing the degree to which the framing accounted for the themes and to what degree the conceptual framework was challenged. As noted by Simons (2015), this form of exploration provides a level of abstraction to the case material that supports theory development.

Theory was developed based on analysis of the cases individually and together providing insights into the phenomena of scaling as expressed in the cases (Simons 2015). As such, the use of cross-case studies as data generation and data analysis methods led to the identification of recurring and divergent themes and how these themes could inform the development of the SEAL conceptual framework.

6.3.3 Writing to learn method
Writing to learn (Dysthe, Hertzberg, Hoel, & Andersson, 2011) was employed as the data generating method in the Ecuadorean Re-Solve workshop series (further detailed in 6.7). The method centres on recurring writing exercises providing participants opportunities to reflect and relate to thoughts and experiences in a retrospective structure. Dysthe et al. (2000) view writing as having the potential of becoming a crucial learning strategy, as it enables learners to make thoughts explicit. Through use of the method, learners reflections and thought development becomes possible to track and document.

Furthermore, writing can enable learners to contextualise their thoughts as well as helping them identify gaps in lines of reasoning, thus encouraging engagement with new knowledge, making it their own. Foundational for the writing to learn process is the assumption that writing enables us to reach, develop and structure our thoughts. It can be a way for participants to test their thoughts through writing. The writing becomes an opportunity of calcifying to oneself what is understood and not understood about a subject.

Accordingly, Dysthe et al. (2011) describes writing as having the potential to become a crucial learning strategy as the method enables participants to reflect on how educational content and methods can be adapted to context, while generating written empirical data.

Moreover, the writing to learn method has several components that are relevant for this research project. Recurring writing exercises gather thoughts and experiences, especially when involving more abstract or intricate ideas or theories, enabling us to perform retrospective structuring by
going back, reflect and see new aspects, using the writing as a basis for developing new thoughts and ideas. By formulating and reformulating ideas and knowledge through writing, new knowledge becomes intermingled with our life experiences, making the knowledge our own and thus engendering enhanced understandings of the subject by internalising the knowledge. Writing on or about subjects and experiences creates possibilities for reflective practices, looking back at concrete situations using our current thoughts. Writing can enable us to ask questions such as, what happened?, how did it happen?, why did it happen?, why is it relevant?, how do I interpret it? Are there alternative actions or interpretations?

An example of how this method was used in the research project is the Ecuadorean Re-Solve workshop series, which included four reflective exercises and one visioning exercise. The reflective exercises followed the structure of having the participants individually reflecting in writing for three minutes, then sharing their written reflections for five minutes, followed by another reflective writing exercise. The reflections focused on the possibilities and obstacles for participants adapting the content of the Alforja Educativa ESD-activity to their everyday practice. This repeated movement between reflective text and presentational text (Dysthe et al. 2011) enabled the participants to reflect, share and develop their thoughts on the topic of the workshop series. As these texts were documented, empirical data was generated regarding the reflections and learning among the workshop participants. In the visioning exercise, learning to write was utilised by having participants first re-reading their reflective texts on the conditions for using the educational content of the workshop in their practices. Drawing on these reflections, the participants, in groups, outlined a number of shared visions of ‘scaling’ the Alforja Educativa. The participants then articulated in text individual visions of how they would, through their practices, contribute to the shared visions. Finally, these individual visions were brought back to the groups as presentational texts and compiled to substantiate the visions with concrete actions and contributions from the participants.

The generated empirical data using the writing to learn method provided insights into how the participants envisioned the scaling of the ESD-activity, individually and as groups, where the activity would be introduced, who would be included and in what capacity.

6.4 Introduction to empirical data

In the following three sections, I first present the Re-Solve research process, its origins and purpose as well as giving a generic description of the Re-Solve workshop series. Second, the three Re-Solve workshop series is detailed, focusing on the settings of each workshop series, who was involved and how the workshop series differed. Third, the empirical data generated as
part of the research project is summarised in a series of tables. These tables present the empirical data for each of the four studies that form the basis of this thesis; both material generated in the Re-Solve workshop series as well as other written and documentary material generated using case study and writing to learn methods.

6.5 Re-Solve

Re-Solve is in this research project used as a research process involving a series of participatory research workshops. These workshops facilitate a critical and iterative collaborative process aiming at (a) generating empirical data on the scaling of ESD-activities, and (b) enabling capacity building among participants in the form of enhanced conceptualisations and practices regarding the scaling of ESD-activities grounded in research and experience. Consequently, Re-Solve provides a framing for data generation methods as well as the data analysis methods, centred on an on-going iteration between theory and experiential data generated as part of the workshop series.

A team at Uppsala University initially developed Re-Solve, including participants from the Department of Education (David O. Kronlid), Uppsala Centre for Sustainable Development (Sara Andersson and Misol Kim), and the Entrepreneurship Lab at the Department of Business Studies (Mikael Scherdin). Initially, the design of Re-Solve was as a circular process tool for multi-stakeholder sustainability challenges projects aiming at helping practitioners to think and analyse challenges systematically and to create and implement innovative and resilient resolutions collaboratively.

Initiated in its current form by the Swedish Centre of Education for Sustainable Development (SWEDESD), Re-Solve includes both generic elements that recur in each workshop series and elements that are adaptive in relation to context. The adaptive elements are developed together with workshop participants to assure that the workshop content and process is relevant for them.

Moreover, the generic steps to build capacity among workshop participants include performing a pre-analysis, designing the workshop process and positioning the workshop concerning relevant policy and research. The pre-analysis usually involves selecting several ESD-activities. The choice of ESD-activities is based on material submitted by the participants to the facilitators. Drawing on the selected ESD-activities, the workshop process is designed in dialogue with the participants, adapting the process to their context.

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7 See http://www.resolveprocess.se/ for more information on this phase of Re-Solve.
As such, participants, together with facilitators, decide on specific themes and structures for the workshops, set within the frame of Re-Solve research process.

In addition to the collaborative process used in designing the workshop series, facilitators and participants also address questions of the desirable or prioritised outcomes of the workshops. This design process means that each workshop will deliver outcomes related to the jointly set workshop themes and outcomes as well as the purpose of participants’ capacity building.

On that account, approaching the outcomes of the workshops as not completely pre-defined strengthens the participatory research character of the Re-Solve relative to the purpose of generating empirical data.

6.5.1 The purposes of Re-Solve

The Re-Solve aims to facilitate the development of reflective scaling practices among those involved in the scaling of ESD-activities. As a research process, this means that Re-Solve has components of both empirical data generation and capacity building. In terms of capacity building, the purpose is to enable the development of nuanced and contextually relevant conceptualisations of scaling. Through a collaborative learning process, Re-Solve offers participants opportunities to reflect on current practices as well as re-actualise experiences in addressing sustainability challenges. Conceptualising scaling and reflecting on current practices enable participants to assess the scalability of ESD-activities and how these activities can be adapted to engender reflective scaling practices capable of addressing the sustainability challenges at hand. In terms of generating empirical data, the purpose is to facilitate research on the aspects of learning, sustainability, and ethics in the scaling of ESD-activities. The use of a participatory research approach means that participants are engaged as co-creators of knowledge on scaling. Each Re-Solve workshop series generates empirical data contributing with theoretical and practical insights regarding scaling processes.

In developing participants’ reflective scaling practices, Re-Solve offers an approach for systematic and reflective self-evaluation of current practices and on-going ESD-activities. As a crucial piece of this reflective practice, the development of a shared scaling vocabulary enables participants to engage with scaling on both practical and conceptual levels. Moreover, Re-Solve supports participants connecting these reflections to practical insights enabling them to move forward in their scaling efforts.

The following sections outline the main workshops, along with key considerations involved in the Re-Solve research process. As noted above, in addition to generating empirical data, Re-Solve aims to support participants developing their understanding of scaling, assessing current or past scaling efforts, formulating visions and making decisions on how to enact an action plan on scaling moving forward.
6.6 The Re-Solve process

The Re-Solve research process is transactional in that it informs and directs the specifics of the workshop series while at the same time, these specifics come to affect how the process become operationalised. While this transactional character indicates a degree of contingency in the workshop series, there is significant continuity in terms of the structure and steps among the iterations of the workshop series. Each series comprise of pre-workshop preparations and five main workshops (the number can adapt to circumstances) offering participants opportunities to explore the scaling of ESD-activities. The components of the workshop series are outlined in Figure 1 below:

![Figure 1. An Overview of the Re-Solve Scaling Process, adapted from Kronlid, Mickelsson and Do (2019)](image)

Pre-Workshop preparations

The purpose of the pre-workshop preparations is for the facilitators, together with the participants to adapt the workshop series. These adaptations involve identifying specific needs to enable capacity building among the participants as well as selecting examples from the ESD-activities provided by the participants. Introduced into the workshop series, these ESD-activities, considered successful by the participants, form the empirical basis for the subsequent workshops. Participants are encouraged to jointly reflect on the choice of ESD-activity, why it is considered successful, and how the scaling of the activity could be conducted.

Initiating the Re-Solve process, engaging participants in reflections on relevant ESD-activities strengthens the contextual relevance of the workshop
series. The subsequent conceptualisations of scaling are, thus, anchored in reflective practices familiar to the participants.

Resulting from these pre-workshop preparations are factsheets detailing significant information regarding the ESD-activities and the participants’ reflections and rationale for choosing the activities.

Workshop 1: Conceptualisation of scaling

The purpose of workshop one is to enable participants to conceptualise scaling in ways that enables them to develop their scaling practices. Through collaborative and critical reflections, in which they adapt scaling concepts introduced by the facilitators, participants develop deep and nuanced understandings of scaling. In the workshop exercises, these understandings draw on the participants' intuitive notions of scaling and their experiences of engaging in ESD-activities. The conceptualisations of different aspects of scaling thus form a vocabulary with implications for participants’ scaling practices.

Ahead of the workshop, the facilitators provide the participants with documentation of the ESD-activities chosen during the pre-workshop preparations along with relevant policy, including UNESCO policy on ESD and the SDG (Sustainability Development Goals).

The workshop includes an introduction, two main reflective sessions, and a closing session. During the introduction, in conjunction with presenting relevant scaling research, the facilitators relate the workshop series to the UNESCO's Global Action Program on ESD (GAP) and how the Re-Solve process contributes to the participants work within the GAP.

Utilising an abductive process structure, the two main sessions of the workshop involve the facilitators offering participants opportunities to develop a shared conceptualisation of scaling. In this process, participants' intuitive and experientially based notions of scaling become, through facilitated exercises, juxtaposed with examples from scaling research. By moving between intuitive understandings, experiential examples and research, the participants critically reflect on scaling as concept and practice.

In the first reflective session, participants zoom out by doing a writing to learn exercise in which they individually during a few minutes write what scaling means in their ESD-practices. These intuitive understandings of scaling are then shared and discussed among the participants resulting in an overview of the groups, often varied, notions of scaling.

Following the first session, the facilitators introduce questions regarding scaling based on educational research including:

- What should we scale?
- Why should we scale?
- Who should be involved in the scaling process?
- How should we scale?
• Where, to and through which levels and areas, should we scale?
• When should we scale?

These questions form the basis for the second reflective session that zooms into the ESD-activities chosen during the pre-workshop preparations. Participants are asked by the facilitators to pose the questions above to the ESD-activities, using them as empirical examples for the session. By identifying, reflecting, and discussing aspects of the activities, the participants explore scaling as a learning process anchoring intuitive and theoretical understandings of scaling to concrete examples.

In the closing session, the facilitators and the participants summarise and discuss the conceptualisations of scaling resulting from workshop exercises. These discussions highlight how the participants, through reflection, appropriated and adapted the concepts of scaling. As such, there are two major outcomes of the workshop, (1) conceptualisations of scaling that bring together intuitive understandings, experiential examples, and theoretical understandings on scaling, and (2) new collaborative descriptions of the chosen ESD-activities based on the participants reflections and educational research.

Workshop 2: Indicative Descriptions and Scalability Indicators

The purpose of workshop two is to enable participants to explore their notions of scaling, while relating the notions to research and empirical examples in order to further delve into the question of what makes an ESD-activity scalable. In order to develop a contextually relevant understanding of scalability, the workshop takes its starting point in participants' understandings, with them outlining indicative descriptions of what characterises a scalable ESD-activity.

By starting in the participants’ experiential understandings, the facilitators position these understandings as a crucial part of the indicative descriptions, strengthening the participants’ ownership and accountability of the process and workshop outcomes.

The workshop includes an introduction, two main reflective sessions, and a closing session. Following the introduction, in which the facilitators, together with the participants reflect on the outcomes of workshop one, the first reflective session focuses on creating and sharing stories of ESD-activities that the participants are well acquainted with.

The choice of storytelling using the writing to learn method (Dysthe et al., 2011) is grounded in the method as a way to make concepts more tangible through connections with people's experiences (UNESCO, 2012).

Sharing and reflecting on these stories, the participants work together with the facilitators to identify descriptions indicative of scalability. Through this exercise, participants explore the notion of scalability along with how this notion offers new perspectives to the scaling stories. As such, the ses-
sion involves an iterative process developing the notion of scalability and the scaling stories together.

In the second reflective session, facilitators, together with the participants, engage in clustering the indicative descriptions generated during the first session. Along with a degree of rephrasing, the purpose is to consolidate the indicative descriptions into a more manageable number while attempting to retain meaning and nuance. Following this consolidation, participants individually grade the relative significance of these indicative descriptions. Together they then reflect on points of agreement and disagreement regarding the grading: which indicators are consistently getting a high score and what indicators are points of diverse grading. Together with the facilitators, the participants identify a list of the ten highest-scoring indicators along with notes on indicators that are especially divisive.

The workshop concludes with a discussion on how the scalability indicators resulted from the participants scaling stories and possible perspectives lost along the way of compiling these stories into indicators. As such, resulting from the workshop is a set of indicators of scalability, further substantiated with a series of indicative descriptions based on the participants' experiences.

Workshop 3: Self-Evaluation of ESD-activities

The purpose of workshop three is to enable participants to engage in self-evaluation of the ESD-activities selected for the workshop series, developing their understanding of scaling processes. By operationalising the scalability indicators from the previous workshop, criteria are developed against which the ESD-activities can be evaluated. Involving participants in articulating and operationalising evaluation criteria offer opportunities to critically reflect the strengths and weaknesses of the criteria, enabling them to develop ownership of the process.

The workshop, involving four sessions, starts with the facilitators, together with the participants, discussing the outcomes of the previous workshop. These discussions emphasise both points of agreement and disagreement among the participants regarding the scalability indicators.

Through a reflective exercise in groups, the participants translate the indicators into criteria to be operationalised in evaluating ESD-activities. By applying the scalability indicators as criteria, the self-evaluation enables the participants to make an appreciation of the scalability of the ESD-activities along with ways to systematically anticipate challenges for scaling and identify ways to improve the scalability of the activities moving forward.

Based on the outcome of the self-evaluation, the participants reflect on the relative strengths and weaknesses, along with principal opportunities and challenges, of scaling the ESD-activities in question. The aim of this reflective evaluation is to enable participants to develop a nuanced understanding
of scalability in practice rather than a strict evaluation of whether the ESD-activities should be scaled or not.

Throughout the self-evaluation, participants combine educational questions of scaling presented in workshop one with the scalability criteria, identifying scaling pathways. These pathways addresses, what is to be scaled, why should it be scaled, who is to be involved, how, where, and when is the scaling occurring.

Following the identification of these scaling pathways, participants reflect on the results of the evaluation, adapting and improving the scalability criteria to better account for the diversity and specifics of the concrete examples of ESD-activities. As such, the discussion provides participants with opportunities to gain further insight into why a specific ESD-activity was scaled in certain ways and how the scalability criteria could be improved.

The workshop results in (i) the participants creating a tentative set of scalability criteria for evaluating ESD-activities that is open to further adaptation, and (ii) the participants learning to conduct an experientially grounded self-evaluation of ESD-activities.

Workshop 4: Vision and Resources

The purpose of workshop four is to enable participants to formulate a vision for the scaling of selected ESD-activities along with an outline of the resources needed to attain this vision. With workshop three focusing on a self-evaluation of the ESD-activities and their scalability, the present workshop facilitates the participants to look forward to the future of the ESD-activities.

Learning processes related to sustainability questions should move beyond re-production of solutions to re-imagining the challenges, creating shared goals, hope, and encouragement as well as offering possibilities for fundamental change (Taylor, 2014; UN, 2015b). Such learning processes generate both creative thinking and passion. A vision is something positive to move toward. By creating a shared vision, participants arrive at a joint starting point for further reflection on the why, what, how, when, and where of scaling. Where would the participants like ESD-activity to be scaled and how does this objective align with attainable resources.

In the workshop, the facilitators utilise the scaling pathways identified in workshop three as the starting point for participants to envision possible futures of the selected ESD-activities. A four-step visioning exercise is used in which facilitators guide the participants in addressing the question, what would an ideal situation look like for your ESD-activity in 5 years?

In an initial individual brainstorming, participants are encouraged to be specific and formulate one declarative sentence outlining the envisioned state of the ESD-activities they would like to see achieved. The aim is for the sentence to highlight a critical aspect of the vision rather than be fully encompassing. The participants then share their tentative visions while consid-
ering differences in onto-epistemological backgrounds and perspectives. These considerations include emphasising that the objective for the exercise is for the participants to collaboratively reflect on the declarative vision statements and critically discuss their potential strengths and weaknesses, arriving at a joint vision statement that also reflects the, perhaps divergent, thinking of the group.

Supported by the facilitators, the participants cluster the proposed declarative sentences based on shared and divergent themes, collaboratively drafting a vision statement. This drafting consists of drawing on the declarative sentences in setting focus areas for the envisioned scaling futures of the ESD-activities. The resulting vision statements can include, in addition to written text, drawings, maps, and photos. Crucial in this exercise of articulating participants’ visions is the support of facilitators in re-connecting the discussions with the educational questions that have been present throughout the workshop series. Participants then jointly discuss the vision statements guided by these educational questions to further challenge and develop their concept of scaling in relation to the concrete examples of ESD-activities.

In the second part of the workshop, facilitators introduce categories of key scaling resources based on scaling research, outlined in Figure 2 below:

![Figure 2. Key resources for scaling, adapted from Kronlid, Mickelsson and Do (2019)](image)

Using these resource categories as a starting point, the participants reflect on how the resources are relevant to attaining the scaling visions they formulated. This reflection involves participants, with the support of the facilitators, motivating how they have formulated their visions and identify necessary resources, making their scaling visions more tangible.
The workshop results in (1) several scaling vision statements relating to the selected ESD-activities and (2) the mapping of necessary resources for the attainment of these visions.

**Workshop 5: Action Plan**

The purpose of workshop five is to enable participants to build on their scaling visions, developing action plans. These plans include addressing questions of at what time resources need to be attained and mobilised to achieve the visions. Along with formulating these action plans, the workshop enables the participants to operationalise the results of the whole workshop series for continual evaluation and adaptation of the ESD-activities in light of changing circumstances.

The vision statements resulting from workshop four constitute an initial step in the participants formulating action plans for scaling, shifting from the general notion of a vision to the concreteness of specific actions. Developing an action plan provides the participants with a structure for describing and reflecting on how to scale the ESD-activities in question.

The first step of the workshop involves the participants engaging with several reflective questions to outline the action plan.

- What action will occur?
- When will it take place and for how long?
- Who will carry it out?
- What resources are needed?

As part of the participants addressing these questions, the facilitators introduce a perspective that structures the answers in time slots. Emphasising the time-aspect contributes to developing concrete action plans, along with making them easier to compare and discuss among the participants.

After sharing the tentative action plans, the participants critically reflect on each action plan utilising the previously developed scalability criteria. Discussing the action plans using the criteria connects the workshop to the first part of the workshop series, along with assuring that the action plans are criticised based on common grounds. The aim is for the critical reflection of scaling action plans is to generate new ideas for adapting and improving the action plans.

The outcome of this workshop is several scaling action plans for the selected ESD-activities along with the identification of avenues for the potential improvement and adaption of the activities.
6.7 The Re-Solve workshop series

This thesis draws its principal empirical data from three Re-Solve workshop series in which I participated as a facilitator. The workshop series was held at different points during the research project, as detailed below:

- Swedish Re-Solve workshop series, Autumn 2015
- South African Re-Solve workshop series, March 2016
- Ecuadorean Re-Solve workshop series, July 2016

Throughout the descriptions of the workshop series, ‘facilitators’ designates me as researcher together with one or two co-facilitators in the workshop, while ‘facilitator’ designates me as the researcher in the workshop.

6.7.1 The Swedish Re-Solve workshop series

The Swedish Re-Solve workshop series was held in the autumn of 2015. The series aimed, through the adaptation of the pre-existing Re-Solve process, to develop the Re-Solve research process to address the challenge of up-scaling articulated in research and UN policy (Coburn, 2003; Harwell, 2012; UNESCO, 2014d). By identifying scaling challenges, defining strategies to address these challenges and ways of assessing these strategies, an initial blueprint was developed for the Re-Solve as part of the workshop series.

The workshop series included 11 participants from the Swedish ESD research and practice community with participation in each workshop session ranging from five to 11 participants. In the workshops I participated as one of the facilitators (the facilitation group included three people among whom two were the main facilitator during each workshop session), presenting policy and research materials and facilitating the exercises in each workshop.

This workshop series included six workshops, each three hours long and with different points of focus as listed in Table 2 as well as further detailed below.

<table>
<thead>
<tr>
<th>Workshop 1</th>
<th>Workshop 2</th>
<th>Workshop 3</th>
<th>Workshop 4</th>
<th>Workshop 5</th>
<th>Workshop 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 September</td>
<td>29 October</td>
<td>12 November</td>
<td>25 November</td>
<td>10 December</td>
<td>17 December</td>
</tr>
<tr>
<td>To construct indicators of scalability in general</td>
<td>To develop internal &amp; criteria for scaling</td>
<td>To apply scaling criteria to the ESSA ESD-activity</td>
<td>To apply and further develop the tentative concept of scaling in relation to the IBA ESD-activity</td>
<td>To identify scaling resources relevant to the IBA and construct a vision of scaling the IBA</td>
<td>To construct an action plan to scale the IBA and to evaluate the Re-Solve process</td>
</tr>
</tbody>
</table>
In the first workshop, the facilitators related the workshop series to the UNESCO GAP giving an overview of the scaling research literature and presenting the tentative scaling conceptual framework at the time of the workshop series.

Throughout the initial two workshops, an iterative process enabled participants to reflect on what they understood as indicators for scalability. As the participants outlined their intuitive scalability indicators, the facilitators compiled these indicators and shared them with the participants, documenting both the indicators and the participants' discussion. The facilitators, together with the participants identified, through reflective exercises, ten indicators that were deemed, by the participants, as the most important. The participants then discussed how they could consolidate these indicators into several key scalability indicators.

Consequently, the initial two workshops resulted in the facilitators compiling graphs illustrating the participants' average grading of each scalability indicator and the convergence or divergence in participants' estimates regarding the relative importance of the indicators, as well as illustrating key scalability indicators as identified in the participants' discussions.

In the third workshop, facilitators lead reflective exercises in which participants formulated scalability criteria based on the key indicators from the previous workshops. The participants then used these scalability criteria in an exercise to assess the ESSA program (Education for Strong Sustainability and Agency)8. Based on the participants' interests and experiences, the ESSA program and the IBA (Inquiry-Based Approach) were chosen as examples in the third and fourth workshop, respectively. The assessment exercise engendered critical discussions of the ESSA program, the applicability of the scalability criteria, and how they could be developed further. While facilitating these discussions, the facilitators documented the participants' reflections and conclusions. Throughout the discussion, participants emphasised context-sensitivity in the scaling of the ESSA-project and the scaling of ESD-activities in general. Context sensitivity was argued to be essential in enabling adaptation of ESD-activities to new contexts and thus for scaling. A further outcome of the workshop was the assertion that scaling objects are qualities that address the sustainability challenges at hand in different contexts. This contextual character indicated that the scaling object of an ESD-activity could vary between contexts. In addressing questions regarding the complete contingency of the scaling object, the participants ventured the possibility of viewing scaling objects as a stable project frame where the specific contents can change.

The fourth, fifth and sixth workshops continued the overall iterative conceptual development process by relating the results of the first three work-

8 ESSA explores ways for teacher educators and their institutions to initiate a systematic approach to strong sustainability and agency in their syllabi and working practices.
shops to the scaling research literature by reflecting on the example of the Inquiry-Based Approach (IBA). These reflections took the form of exercises where the facilitators, together with the participants, discussed the tentative scaling concepts of scaling object, scaling subjects, scaling sites and scaling resources in relation to the IBA.

Following the exercises, the participants, lead by the facilitators, reflected on the application of the tentative scaling concepts to the IBA, provided new perspectives on both the ESD-activity and the concepts. A crucial outcome of the participants' discussion, documented by the facilitators, was the insight that scaling objects are contingent, how what is to be scaled can, and often will, change over time and with different scaling sites.

Resulting from this workshop series was a shared vocabulary among the participants regarding scaling objects, scaling subject, scaling targets and scaling resources that could form the basis for further research on the scaling of ESD-activities. A crucial outcome was that when discussing criteria for the scalability of ESD-activities, participants engaged with questions of the quality of ESD-activities. These discussions involved the assertion that the scaling object of an ESD-activity could vary between contexts. In addressing questions of the contingency of the scaling object, the participants ventured the possibility of viewing it as a (semi) stable frame where the specific contents can diverge. This point to the insight that the scaling objects, the content that is scaled could, and often will, change during the lifetime of an ESD-activity.

6.7.2 The South African Re-Solve workshop series

The South African Re-Solve workshop series were held 14-18 March 2016, at the Environmental Learning and Research Centre (ELRC). Consisting of five workshops, the series included efforts to strengthen participants' ownership of the scaling process further.

With the launch of the UNESCO GAP, many stakeholders, educators, and practitioners faced the problem of making sense of scaling-up, scaling and to develop a critically informed stance concerning the directives of the GAP.

Drawing on the results of the Swedish Re-Solve workshop series, the facilitators developed a tentative conceptual framework of scaling of ESD-activities. This framework informed the South African workshop series, and joint reflections between facilitators and participants lead to revisions of the conceptual framework with both greater depth and nuance.

The facilitators conducted the workshop series in collaboration with a team from the Environmental Education Association of Southern Africa (EEASA). In the workshops, there were nineteen participants from the Southern African region (South Africa, Zimbabwe, Namibia and Swaziland) along with two co-facilitators, among which I was one. The participants all had experiences as ESD researchers and practitioners in the Southern Afri-
can region and beyond. Table 3 below summarises the distribution of the participants and facilitators according to country and occupation:

Table 3. Participants (including facilitators) of Re-Solve workshop 14-18 March 2016

<table>
<thead>
<tr>
<th>Countries and occupation</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 from South Africa</td>
</tr>
<tr>
<td>2 from Zimbabwe</td>
</tr>
<tr>
<td>1 from Swaziland</td>
</tr>
<tr>
<td>2 from Sweden</td>
</tr>
<tr>
<td>8 university researchers</td>
</tr>
<tr>
<td>10 PhD-candidates and ESD-practitioners</td>
</tr>
<tr>
<td>1 Government official</td>
</tr>
</tbody>
</table>

In preparation for the workshop series, facilitators and participants at the ELRC held a pre-workshop discussion, resulting in changes to the order and structure of the workshops. This discussion explored the concept of scaling, focusing on experiences of ESD-activities from the Southern African Development Community Regional Environmental Education Programme (SADC-REEP) network.

During the workshop series, the facilitators returned to this preparatory work to draw on examples and conceptual ideas to contextualise and substantiate participants’ reflections and discussions.

The preparatory work resulted in participants sharing the ownership of the workshop from the outset, understanding their work in the SADC°-region as part of a shared effort to scale ESD-activities.

Facilitating the Re-Solve workshop involved stepping into a strong and mutually shared history among the workshop participants of collective ESD work. As such, the participants brought experiences of national and international ESD-activities, stretching back over 25 years. Many of the participants had been involved outside of academia, working with policy and as consultants engaging with questions of education systems development, social learning and social, as well as ecological, justice.

Table 4 summarises the South African workshop series.

Table 4. The South African Re-Solve workshop series, 2016

<table>
<thead>
<tr>
<th>Workshop 1</th>
<th>Workshop 2</th>
<th>Workshop 3</th>
<th>Workshop 4</th>
<th>Workshop 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim</td>
<td>To conceptualise scaling of ESD-activities</td>
<td>To develop indicative descriptions of scaling</td>
<td>To self-assess selected ESD-activities</td>
<td>To construct scaling visions and identify scaling resources</td>
</tr>
</tbody>
</table>

9 Southern African Development Community
In the first two workshops, the facilitators focused on enabling participants to explore and reflect on their understandings regarding the scaling of ESD-activities in SADC region based on their experiences. These reflections resulted in participants outlining several descriptions of what made the ESD-activities in the SADC region scalable. Jointly reflecting on the descriptions, the facilitators and the participants re-formulated and consolidated them into a list of short indicative descriptions.

Introduced, by the facilitators, to the tentative conceptual framework as it had developed at this time, the participants engaged in further discussions regarding how to relate scaling research with their experiences of ESD-activities in the SADC region. In these facilitated reflections, participants emphasised two ESD-activities: the Change Project Approach (CPA) \(^\text{10}\) and the Fundisa for Change\(^\text{11}\).

With the previously developed indicative descriptions of scalability as a starting point, the participants, in exercises led by the facilitators, critically used, challenged, and adapted the tentative conceptual framework of scaling.

The exercises resulted in participants questioning the distinction of scaling subject and scaling beneficiary, highlighting the role of scaling partners.

The participants outlined a shared vocabulary, enabling them to share and discuss their experiences of ESD-activities. This adaptation of the tentative conceptual framework involved making scaling less of a novel occurrence. Instead, participants outlined scaling as a persistent part of their experiences and practice that could be made explicit and developed by conceptualising scaling.

Throughout the exercises, facilitators documented the conceptualisations of scaling developed by the participants. These conceptualisations highlighted scaling as characterised by a multi-dimensional learning process.

As part of the third workshop, my co-facilitator and I sought to enable participants’ re-evaluation of past and current experiences of ESD-activities in the SADC region. This workshop involved exercises mobilising the participants’ indicative descriptions and scaling conceptualisations to appreciate and highlight the work done in the ESD-activities of the CPA, the Fundisa for Change and the Amanzi for Food\(^\text{12}\). Facilitators documented these reflec-

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10 The Change Project Approach focuses on capability building and mediation to address sustainability challenges in context. Enabling participants to develop and reflect on their educational change projects, the approach aims to enact change through the collaborations of colleagues in context.

11 Fundisa for Change strives to enhance transformative environmental learning through teacher education. Meanwhile, the ESD-activity reaches beyond the educational institutions to engage environmental organisations, NGOs as well as business and state actors sharing an interest in strengthening teacher education in terms of sustainability.

12 Amanzi for Food facilitates co-engaged learning about different ways of harvesting, storing and using rainwater, while working to accommodate a range of stakeholder needs, and to ultimately improve sustainable and water conscious food production. (https://www.ru.ac.za/elrc/projects/amanziforfood/)
tive discussions and in a subsequent exercise discussed them with the participants.

In the workshop, participants closed the gap they had experienced between the ESD-activities they had experiences of and the priority action areas of the GAP. The participants made it clear that the issues highlighted by the GAP regarding scaling are not novel and that on-going ESD-activities in the region have, and continue to engage with the issues.

The final two workshops involved facilitators supporting participants in envisioning scaling futures for the ESD-activities discussed during the workshop series. Furthermore, participants articulated preliminary action plans to achieve these futures. This envisioning and development of action plans included considering the needs of the regional networks, while explicitly addressing the objectives of the GAP.

In the exercises, the participants utilised the scaling conceptualisation they adapted and developed throughout the workshop series. Participants specified what aspect of the ESD-activity they would scale, as scaling objects, and who would be involved and in what capacity, as scaling partners and beneficiaries. To these reflections, the facilitators added the concept of scaling resources as a way to enable participants to identify what would be needed to achieve the visions and action plans, and at what times.

Several scaling visions and action plans of selected ESD-activities resulted from the exercises, documented by the facilitators in audio-recordings, written texts and in the form of participants' illustrations.

At the request of the participants, the final workshop also involved outlining action plans for scaling in the SADC-REEP network, building on its connections and history as a framework for ESD-activities. These last two workshops were reconnected, through discussions, with the pre-workshop preparations, approaching the future of scaling of ESD-activities in the SADC-region as crucially linked to the history of scaling endeavours.

As part of the workshop series, the adaptation of the conceptual framework involved making scaling less of a novel occurrence by discussing it as a persistent part of participants’ practices. Throughout the workshop series, participants expressed an experience of a mismatch between the ESD-activities they were involved with and the priority action areas of the GAP. As the participants articulated conceptualised scaling and developed their shared vocabulary, they were able to connect their ESD-practices in the SADC region with the priority action areas of the GAP.

In conclusion, throughout the workshop series, participants, along with the facilitators, worked on multiple levels, from conceptualising scaling to evaluating specific ESD-activities as well as identifying a scaling pathway for the future within the SADC-REEP network. Workshop participants brought diverse experiences of ESD-activities, and a further outcome of the
workshop series was of the productive potential of friction in the workshop process. This friction was evident in the challenging by the participants of the scaling concepts introduced by the facilitators. By revising, adapting and adding to these concepts, participants contributed to the development of the workshop process and the concepts used therein. As such, the participants contributed to revising the tentative scaling conceptual framework, as well as the Re-Solve workshop series.

6.7.3 The Ecuadorean Re-Solve workshop series

The final series of Re-Solve workshops was held in collaboration with Re-Act Latin America in Ecuador in 2016, 19-22 July (see Table 5). In contrast to the previous two workshop series, the Re-Solve workshops were held as an integrated part of the Antibiotic resistance (ABR) workshop Taller Salud Escolar Mundo Microbiano: Estrategia Niño a Niño en el Mundo de Los pequeños on the Alforja Educativa as an educational approach to ABR.

Developed for three years (2012–2015) the Alforja Educativa aims to scale community-based health education to involve children as well as parents and the local community. The Alforja Educativa is moving beyond a strictly medical conceptualisation of ABR, including the use of war metaphors when discussing bacteria. The ESD-activity is grounded in the worldviews of Sumak Kawsay (Life in Plenitude or Good Living), which understands humans as both belonging to nature and society. Educational practitioners, as well as schoolchildren, are involved, with children developing knowledge of ABR as well as themselves, promoting awareness in families and local communities.

Health education was the central theme of the ABR workshop, focusing on what research has described as the sustainability challenge of ABR (Cars et al., 2008; Jasovský, Littmann, Zorzet, & Cars, 2016; Laxminarayan & Chaudhury, 2016; Laxminarayan et al., 2013; Nathan & Cars, 2014).

The ABR workshop aimed to enable participants (including teachers, health practitioners, and community workers involved in health educations) to engage with questions regarding ontology, health, and participation in ABR education. Designed to provide a space for collective reflections, the ABR workshop focused on the development of participatory practices involving children and local communities.

With 41 participants, the workshop included teachers from 17 schools in the region of one of Ecuador's largest cities, along with artists and health practitioners from the region and other parts of Latin America. Teachers attending the workshop were from urban and rural, private and public as well as both hispanic and intercultural schools.

The integrated Re-Solve workshops were designed in collaboration with the ABR workshop leader to have the character of capacity building workshops aimed at scaling the Alforja Educativa. In addition to enabling partici-
pants to develop their understandings of educational practices related to ABR, the Re-Solve workshops also had the purpose of collecting empirical research data.

In fulfilling both purposes, a pedagogical method, writing to learn (Dysthe et al., 2011), was employed. The method consisted of repeated writing exercises enabling participants, in a retrospective structure, to reflect on how they could adapt the educational content and methods discussed during the ABR workshop to their practices.

The Re-Solve workshop series was named ‘Re-Solve and writing in ABR education: A tool for sharing of ideas, cooperation, and critical thinking.’.

As illustrated in Figure 3, the Re-Solve workshops were integrated with the overall workshop series as reflective writing exercises to enable participants’ engagement with questions of scaling the educational content of the workshop and the Alforja Educativa. These reflective spaces were:

• Day one, initial reflections on participants’ current ABR practices.
• Day one, two, and three, reflections on possibilities and challenges of the Alforja Educativa.
• Day four, exercise outlining visions for scaling the Alforja Educativa.

Figure 3. Structure of the scaling visioning pathway during the Ecuadorean workshop series 19-22 July, 2016.
Table 5 below summarises the Ecuadorean workshop series.

Table 5. Re-Solve workshop series in Ecuador, July 2016

<table>
<thead>
<tr>
<th>Focus of participants’ reflections</th>
<th>Workshop 1</th>
<th>Workshop 2</th>
<th>Workshop 3</th>
<th>Workshop 4</th>
<th>Workshop 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>How participants were currently addressing ABR in their educational practices.</td>
<td>How the Child-to-Child methodology, as a whole or as selected parts, could be integrated into participants’ practices.</td>
<td>The articulation of a shared vision regarding the scaling of the Alforja Educativa.</td>
<td>The formulation of individual visions of how they each could contribute to the scaling of the ESD-activity through participants’ practices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The potentials and limitations of integrating the Sumak Kawsay ontoepistemology as part of participants’ practices using the Child-to-Child methodology.</td>
<td>The potentials and limitations of integrating the Sumak Kawsay ontoepistemology as part of participants’ practices using the Child-to-Child methodology.</td>
<td>What impact these choices would have for their potential ABR practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workshop 1</td>
<td>Workshop 2</td>
<td>Workshop 3</td>
<td>Workshop 4</td>
<td>Workshop 5</td>
<td></td>
</tr>
</tbody>
</table>

During the first two workshops, the facilitator lead exercises designed to enable participants' reflections on ABR educational practices. In the first workshop, this involved participants reflecting on their current ABR practices while in the second workshop participants related these practices to the Alforja Educativa ESD-activity presented previous during the day. The writing to learn exercise enabled the participants to share their experiences and hear about other participants' ABR practices. Participants could change or add to their original written reflections in light of the joint group discussions. Reflect on their practices through the lens of the Alforja Educativa allowed the participants to move outside their immediate perspectives as well as seeing a progression in their reflective thinking from the same morning. Throughout these workshops, I, as the facilitator, collected and documented the participants' written reflections.

During the third and fourth days, the participants delved deeper into the traditional knowledge system of Sumak Kawsay that underpinned the Alforja Educativa. This involved challenging the war metaphor in ABR and instead focusing on co-existence between humans and bacteria and discussing the Child-to-Child methodology as an educational methodology to promote these ideas. In relation to these workshops, participants from Argentina and Ecuador shared their experiences, thus providing concrete examples of ABR education that the participants could draw on in their reflections.

In workshops three and four, participants reflected, based in the topics discussed during the two days, on the potentials and limitations of the Sumak
Kawsay and the steps of the Child-to-Child methodology. Participants' had the opportunity, as part of the exercise, to relate their reflections to their time with the local school children and the experiences shared by the Argentinian participants.

In the fifth and final workshop, the facilitator focused on enabling the participants to reflect on how they could take the Alforja Educativa forward. During the previous workshops, participants had developed their understanding of the Alforja Educativa through reflective writing exercises. The facilitator presented the scaling resource framework to support the participants in developing their visions. Along with these visions, participants also outlined action plans of what steps to take and when integrating the Alforja Educativa as part of their educational practice. To develop these visions and action plans, participants engaged in a multi-step visioning exercise in groups, led by the facilitator.

Participants reflected previous days' writing, what had changed, and what has stayed the same. These formed the basis for outlining their visions. Participants were encouraged to be specific and formulate concrete visions based on what they perceive as the purpose and content of the Alforja Educativa. These visions were shared as written with the group, and the participants made changes and additions to their visions based on the group discussions.

Participants then worked in groups to articulate a joint vision. The participants made graphical illustrations of these joint visions in which they articulated what action they would take to contribute to the joint visions. Finally, all the groups shared their visions and collectively reflected on the potentials and limitations of scaling the Alforja Educativa through these visions and action plans.

In addition to developing a shared vocabulary of scaling, the workshop series resulted in discussions among the participants regarding terms of involvement. The participants highlighted questions of how children, as well as families and educators that are part of the Alforja Educativa, are expected to behave.

Even though the documented written reflections highlighted the participants' confidence in the capability of children to understand, develop and educate others about ABR, the participants also identified challenges. These challenges included how to support children in their subject position as ABR educators as part of their families and their local community. These reflections illustrated the participants’ perspective, that to realise the potential of the Child-to-Child methodology and the Alforja Educativa necessitates support and a willingness from parents and the local community to develop altered relationships with their children.
6.8 Generated empirical data

This section summarises the empirical data of the research project. The empirical data, presented in a separate table for each of the four papers, was primarily generated as part of the Re-Solve workshop series, detailed above. Meanwhile, the material also includes written materials and documentation, as outlined in the respective tables.
### Table 6. Empirical data Paper I

<table>
<thead>
<tr>
<th>Paper I</th>
<th>Workshop length</th>
<th>Participants</th>
<th>Facilitators notes on the workshops</th>
<th>Written materials produced by participants</th>
<th>Assessments/evaluation of the workshops</th>
<th>Case video interviews with participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Swedish workshop series</td>
<td>3 hours per workshop session</td>
<td>5-8 participants depending on the workshop session.</td>
<td>22 pages of notes</td>
<td>34 Indicators of scalability identified by the participants. Participants grading of scalability indicators Notes of relations between scalability criteria.</td>
<td>3 group visions and action plans for scaling.</td>
<td>8 pages of written evaluations.</td>
</tr>
<tr>
<td>South African workshop series</td>
<td>8 hours per workshop session</td>
<td>19 participants</td>
<td>29 pages of notes</td>
<td>26 pages of participants’ reflective notes on the workshop sessions. 30 pages of daily reflections by participants</td>
<td>4 group drawings of visions and action plans for scaling.</td>
<td>6 pages of written assessments 8 interviews, ranging from 2-7 minutes. Total of 34 minutes</td>
</tr>
<tr>
<td>Ecuadorean workshop series</td>
<td>8 hours per workshop session</td>
<td>41 participants</td>
<td>41 written reflections regarding the scaling of the Alforja Educativa.</td>
<td>7 group drawings of visions and action plans for scaling.</td>
<td>35 pages of written assessments.</td>
<td></td>
</tr>
<tr>
<td>Paper II</td>
<td>Project reports</td>
<td>Educational documents</td>
<td>Participants Reflections workshop series in Ecuador.</td>
<td>Reflective writings workshop day 1</td>
<td>Reflective writings workshop day 2</td>
<td>Reflective writings workshop day 3</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
<td>-----------------------------------</td>
</tr>
</tbody>
</table>
Table 8. *Empirical data Paper III*

<table>
<thead>
<tr>
<th>Paper III</th>
<th>Written assignments produced by participants of the Change Project Approach(^{13}) course 2009/2010 iteration of the CPA</th>
<th>Written assignments chosen for analysis</th>
<th>Number of written assignments per case</th>
<th>Size of each written assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27 case participants’ written assignments</td>
<td>4 cases of participants’ written assignments</td>
<td>5 written assignments</td>
<td>pre-course assignment ranging from 5 to 15 pages remaining four assignments written throughout the course (10-15 pages each) corresponding to the three educational units of the course and a final report.</td>
</tr>
</tbody>
</table>

Table 9. *Empirical data Paper IV*

<table>
<thead>
<tr>
<th>Paper IV</th>
<th>Participants Re-Solve workshop series in South Africa, 14-18 March 2016</th>
<th>Audio material</th>
<th>Transcripts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19 participants from the Southern African region</td>
<td>5 hours of audio recordings from day 1 and 2 of the workshop.</td>
<td>101 pages of transcripts.</td>
</tr>
</tbody>
</table>

\(^{13}\) Change Project Approach
6.9 Data analysis methods

Analysis of the generated empirical data detailed above was conducted in two phases, representing qualitatively different forms of analysis.

In the first phase, conducted during the workshops, the analysis took the form of me as researcher and facilitator, informed by epistemological positioning and chosen theories, continually asking questions and reflecting on the workshops together with my participants and co-facilitators. The purpose of these reflective practices was to explore what the topic of scaling could come to mean in relation to diverse practices. Furthermore, this phase of the analysis involved me documenting the participants’ reflections, contributions and ideas regarding scaling and re-framing them using my chosen theoretical approach. As such, the first phase of the analysis came to frame and re-frame the empirical data, facilitating further analysis. In phase two, constituting the principal analysis of the research project a number of methods was utilised. In the next two sections, these methods\textsuperscript{14} are outlined, followed by a presentation of the analytical process in each paper.

6.9.1 Abductive content and thematic analysis method

As part of the data analysis, I used an abductive research method (Corbin & Strauss, 2015; Niiniluoto, 1999; Peirce, 1955). This method includes content and thematic analysis coupled with theory development. The combination of content analysis (Corbin & Strauss, 2015; Strauss & Corbin, 1990) and thematic analysis (Fereday, Jennifer Muir-Cochrane, 2006) enables the identification of recurring themes and patterns. Such an approach is coherent with European curriculum studies in which experiential data and data from research are brought together in order to understand teaching and learning processes (Almqvist, 2005; Hansson, 2014; Kramming, 2017; Lidar, 2010; Lundqvist, Almqvist, & Ostman, 2009; Öhman, 2006; Östman, 2010).

As such, when conducting theory-informed abductive interpretation of data, there is openness to the possibility of encountering a phenomenon for which our theory lacks explanatory power. In that case, an amendment to the theory used in analysis becomes necessary (Peirce, 1955; Reichertz, 2010). Furthermore, Reichertz (2010) notes that bringing together different conceptualisations and theories to address new phenomena forms a basis for further operationalisation of the amended theory in order to account for generated empirical data.

Consequently, the data analysis included theory development based on the empirical data, providing new insights into the phenomena of scaling (Simons, 2015). As part of the theory development, the conceptual framework on scaling was challenged and later amended based on its ability to

\textsuperscript{14} Case study method was outlined in 6.3.2.

An example of how the abductive analysis method was used in the research project is presented in section 6.9.5 as part of a cross-case analysis. Meanwhile, as this method was utilised in multiple studies throughout the research project, an additional example taken from Paper I is therefore outlined, illustrating the abductive process across the three Re-Solve workshop series.

In the participatory research workshops in Sweden (autumn 2015), South Africa (spring 2016) and Ecuador (summer 2016), there was no fully developed SEAL conceptual framework. Instead, I together with colleagues had identified and outlined several tentative concepts prior to the workshop series based on existing educational scaling research (Clarke & Dede, 2009; Coburn, 2003; Dede et al., 2005; Harwell, 2012) and transactional learning theory (Dewey, 1938/1997; Dewey & Bentley, 1949/1991). An example was the concept of scaling object that posed the question, what is scaled? Throughout the three workshop series, the facilitators introduced this tentative concept to the workshop participants. The participants’ ways of addressing this question of ‘what is being scaled?’ was documented, and through an abductive analysis aspects of similarity and divergence between the documented answers and the tentative concept of ‘scaling object’ were identified. Based on the analysis, facilitators, together with the participants, identified limits to tentative concept resulting in the successive development of the concept ‘scaling object’ throughout the workshop series, as detailed further below.

During workshop four in the Swedish workshop series, it was suggested in a dialogue regarding the Inquiry-Based Approach (IBA) that those involved in the scaling of ESD-activities may not share the same view on what is the scaling object. Moreover, the scaling object may include various educational content. Regarding the scaling of IBA in the Swedish workshop series, the participants' discussions highlighted notions of IBA as a method for inquiry, a model for facilitating stakeholder dialogue and a set of values.

In the South African workshop series, participants discussing the ESD-activities of the Change Project Approach and Fundisa for Change argued that different scaling objects could come to the fore in different contexts and at different times. In the example of the Fundisa for Change, workshop participants suggested that the scaling object could be the educational methods at one point in time and the fundamental principals of the ESD-activity at another point in time.

Furthermore, the reflective writing of participants in the Ecuadorian workshop series illustrated that the ‘scalable’ educational content of the ESD-activity could take a range of forms. On the one hand, educational content can be pinpointed as educational methods that follow a clear structure in which specific educational content is selected based on contextual relevance.
On the other hand, the content can take the form of onto-epistemological worldviews, as illustrated in the Ecuadorian workshop series.

In addition, the experiential data of the Ecuadorian workshop series illustrated that ESD-activities seldom involve just one type of scaling object. Throughout the analysis of the scaling data, a tension was identified between multiple scaling objects. On the one hand, a scaling object focused on metaphors of co-existence with bacteria and the traditional values of Sumak Kawsay. On the other hand, a scaling object centred on the Child-to-Child methodology that emphasises greater agency for children, families and communities to define the challenges of antibiotic resistance.

Consequently, assuming an abductive research approach enabled the generated empirical data to inform further theoretical choices, resulting in theoretical development as part of the research project. Furthermore, this theory development came to inform the subsequent analysis and interpretation of the data in an iterative process. Throughout the research project, this reciprocity of theory and empirical data constituted a way of developing and fine-tuning the conceptual framework of SEAL.

6.9.2 PEA analysis method

In Paper IV, the practical epistemological analysis (PEA) method (Wickman, 2004; Wickman & Östman, 2002) was used to enable the detailed analysis of learning processes centred on transactional learning encounters (Hofverberg & Maivorsdotter, 2017; Maivorsdotter, Quennerstedt, Universitet, & Medicin, 2012; Maivorsdotter, Wickman 2011; Wickman & Östman, 2002). An important aspect of the analysis was to inquire how past experiences enabled the workshop participants to proceed with the activity in which they were involved (Wickman, 2004; Wickman and Östman, 2002). Hence, PEA was chosen since it facilitated the analysis of how the re-actualisation of workshop participants' past experiences enabled conceptualisations of the scaling of ESD-activities.

To this end, the study, presented in Paper IV, utilises four analytical concepts of PEA in the analysis: (1) gaps, (2) relations, (3) encounters and (4) purposes and ends-in-view (Maivorsdotter & Quennerstedt, 2012; Wickman & Östman, 2002).

A gap (1) is understood to emerge when participants express hesitation or uncertainty of how to proceed with the activity they are involved in. When participants formulate suggestions of how to proceed with the activity, these suggestions are understood as attempts to fill the gap by creating relations (2). Participants are understood, drawing on the transactional learning perspective, as re-actualising past experiences by relating these experiences with other participants' experiences, educational content, and what constitutes the participants' environing conditions. In describing the relations be-
between re-actualised experiences, educational content, and environing conditions, an encounter (3) is analytically constructed.

The three previous steps can be understood as processes in which the participants become stuck and possibly also unstuck, and thus can proceed with the workshop activity. Through this analysis, it is possible to identify whether the participants, through steps 1-3, formulated ends-in-view (4) to achieve the activity purpose (4) of conceptualising scaling. The analysis was conducted with the help of excel, which I used to structure the analysis, cross-reference gaps and document recurring relations between transcripts.

In my analysis of the audio transcripts, the first step involved identifying instances when workshop participants expressed hesitation or uncertainty of how to proceed with the workshop activity at hand. The expressed hesitation and the fact that other participants engaged with the hesitation through their action were interpreted as the emergence of a gap.

These actions, taken by participants to engage with uncertainties or hesitations, were analytically constructed as creating relations, in which participants re-actualised their experiences. By relating current experiences of the educational content and environing conditions to past experiences that are considered certain, what was uncertain in the current experience became (at least temporarily) certain. The, albeit temporary, certainty enabled the participants to continue the workshop activity.

Consequently, analysing the stops and starts of the workshop participants’ discussions identified both gaps and relations. A gap was understood to emerge when the hesitation or uncertainty of one participant halted the discussion in that other participants, through their actions, acknowledge the need to address said uncertainty. Furthermore, a relation was understood as being created when participants were able to proceed with the workshop activity. Through studying what came to be involved in these relations, created by the participants, transactional ‘encounters’ were analytically constructed.

Throughout these three steps of the PEA analysis, participants’ were analytically understood as striving towards fulfilling one or more purposes, often through recontextualisation of said purposes into ends-in-view. While purposes and ends-in-view are related, Dewey differentiates between them (Dewey, 1934/2009, 1938/1997). Purposes are recontextualised by participants as part of learning processes into the ends-in-view. These ends-in-view enable participants to relate the educational activity to their experiences, thus setting the direction of meaningful action (Maivorsdotter and Wickman 2011; Maivorsdotter and Quennerstedt 2012). In the final analytical step, categories of relations were analytically constructed, informed by the SEAL conceptual framework, to enable further analysis. Utilising the educational research presented in the theory section of the paper further enabled this analysis.
As noted, Paper IV provides an example of how this analysis method was used. The PEA analysis had two phases: I, as the paper's author, performed an initial analysis, while in the second phase, sections of the data found to be interesting in the initial analysis were analysed as part of a research workshop together with senior researchers experienced with PEA analysis. Additionally, the results of the analysis were presented and discussed as part of several research seminars. The analysis resulted in a categorisation of the identified relations with a small number of relations not categorised due to being ambiguous or difficult to identify given the purpose of the study. As such, conducting the PEA analysis both individually and together with senior researchers reduced the risk of limiting the analysis to the authors perspective, thus supporting the credibility of the analysis as noted by Simons (2009, 2015).

6.9.3 Analytical process Paper I

The aim of Paper I was to explore the meaning of scaling in an ESD context. Empirical data for the study was generated during three series of participatory research workshops. During the workshop series, real-world experiences of the scaling of ESD-activities combined with educational scaling literature to represent a diversity of ESD-contexts and meanings of scaling. In the analysis, we utilised content and thematic analysis as part of an abductive method of analysis to enable theory development (Niiniluoto, 1999; Peirce, 1955).

The first step of the analysis involved encounters between the tentative conceptualisations of scaling that facilitators brought to the workshops and participants’ experiences of ESD-activities. These encounters highlighted characteristics of scaling that the tentative conceptualisations could not sufficiently account for. In the second step, theory development involved abductively bridging the gap between the conceptualisation and the experiences of the participants (Reichertz 2010). The adapted conceptualisations were, as a third step in the analysis, re-operationalised with the empirical data. This abductive process, of moving from conceptualisation to empirical data and back again within the frame of the Re-Solve research process enabled the experiences and knowledge of both researchers and participants to contribute to the theory development.

As such, the analysis involved identifying the limits of the tentative conceptual framework and to integrating the experiential material from the Re-Solve workshop series in theory development of the scaling of ESD-activities.
An example of this analytical process is how the tentative concept of scaling subjects developed throughout the two first workshop series. The tentative concept presented by facilitators in these workshops proved insufficient in accounting for the participants’ experiences, instigating further theory development.

In the Swedish workshop series (autumn 2015), participants were presented with two tentative concepts of scaling: ‘scaling subjects’, who performed the scaling, and ‘scaling targets’, to and for whom the scaling would be performed. Workshop four involved the operationalisation of these tentative concepts of scaling in relation to the Inquiry-based approach (IBA), an example ESD-activity that the participants had experiences of. During the workshop discussions, the tentative concepts were challenged by the participants on the basis of separating those involved in scaling processes into two separate groups. The argument put forward by the participants was that all involved should rather be understood as scaling subjects but that some of the scaling subjects could be beneficiaries of the scaling process.

As such, the concept of scaling targets was removed, and the idea of scaling beneficiaries was included in the tentative concept of scaling subjects. Meanwhile, in a session during the second day of the South African workshop series (spring 2016), the following conversation was recorded.

C: Can I ask something? If I’m a scaling beneficiary and then, am I allowed?. Like, once I’ve benefitted from your project, or program am I allowed to do the scaling as a beneficiary?

R: To do the scaling?

C: Yeah

R: That's the problem of the term beneficiary, because what are the terms of engagement? Because if we are a partnership, we are university, we got a colleague; we got extension services, we got farmers. Nobody can then say "You can’t do this" because it's generative and the example you give you do something, and then you realise that "ah, I can actually scale this" maybe we are in a garden as a group, a cooperative but I can scale this to my other plot which is a family plot, nobody can say anything about that.

[sounds of agreement]

C: But then could you adapt it to your own context and situation or do I need to follow the rules and regulation of the [inaudible]

R: If you are looking at an activity system the rules should change according to how you want to follow your object [scaling object?], to where you are

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15 The example is not an exhaustive description of how the concept developed throughout the research project.
taking it, to a different site. So, there is no being locked up in somebody’s rules.

This transcript highlighted how the notion of scaling beneficiary, as part of the tentative concept of scaling subjects, became insufficient to account for the workshop participants’ experiences. The participants, drawing on their experiences, posed questions regarding the ‘terms of engagement’, i.e. what the beneficiaries were allowed to do. Their discussion went on, challenging the idea that beneficiaries could not also be those that do the scaling and adapt the scaling to their context and situation. As a result, the tentative concept of scaling subjects came to include both beneficiaries and partners of the scaling process. Furthermore, as highlighted in the transcript, those involved in scaling (scaling subjects) were understood as being able to shift between beneficiaries and partners in scaling processes depending on the circumstances.

6.9.4 Analytical process Paper II

The aim of Paper II was to investigate how subjectification of those involved in the scaling of ESD-activities both enables and constrains scaling as a learning process.

The empirical data was generated using two selection criteria. The first criteria included on-going scaling processes in which an ESD-activity had been developed and piloted, but were further steps to scale the activity had not yet been taken. The second criteria included ESD-activities emphasising the contributions of those involved in the scaling of ESD-activities.

Engaging a three-part empirical data, the analysis moved between the workshop participants’ written reflections, educational material of the ESD-activity and annual reports of the ESD-activity, using an abductive text analysis method (for further detail see Mickelsson & Danielsson, 2018). In a first analytical step, we identified two recurring themes in the educational material and the reports of the ESD-activity (Corbin & Strauss, 2015; Fereday, Jennifer Muir-Cochrane, 2006). As a second analytical step, participants' written reflections were read and re-read, focusing on how the reflections articulated expectations regarding the scaling of the ESD-activity, and to whom of those involved in the scaling process these expectations were directed. In a third step, we utilised the two themes from the educational material to support the categorisation of participants’ reflections, supported by the analytical concept of subjectification (Butler, 1997; Davies, 2006).

An example from the analytical process highlighting the subjectification processes was the written reflections of two participants during the second day of the Ecuadorian workshop series.
Preschool children can grasp complex ideas or concepts such as microbes and express them in easy-to-understand words that you remember, and concepts that can spread to other larger groups including children and parents (Reflections, Day 2, Participant 2, Entreococos Group).

Preschool children who understand the concepts of microbes and bacteria make them clear and talk about them with their parents (Reflections, Day 2, Participant 4, Alegremia Group).

These reflections expressed an assumption about children's ability, which was interpreted, informed by the theoretical perspectives of the paper, as expectations. Children were expected not only to be able, but also willing, to submit to the scaling of the complex ideas and concepts of the Alforja Educativa, both at school and at home. As such, the participants' reflection expressed as an expectation that children assume the subject positions of learners, in understanding these ideas, and of teachers, in scaling these ideas in relation to their families.

The interpretation that these reflections express expectations were supported in another written reflection from the same workshop exercise:

challenges to use the workshop in my practice would be that preschool children who understand the concepts of microbes and bacteria are able to clearly talk about it them with their parents, [and] parents taking the time to listen and learn from children (Reflections, Day 2, Participant 3, Prevencion y Salud Group).

When discussing the children’s ability of ‘clearly’ talking about the concepts, and parents taking the time to listen and learn, as a challenge, the participants highlighted the subject positions children were expected to submit to.

6.9.5 Analytical process Paper III

The paper aimed to explore enabling and constricting conditions for the scaling of ESD-activities by conducting a case study of shifts in course participants' understanding of transactional encounters involving three components: ESD-activities, those involved in scaling, as well as ‘environing conditions’, the aspects of the participants’ environment that become relevant in the scaling process.

The case study involved selecting four cases from the documentation of 27 CPA\textsuperscript{16} -course participants, using two selection criteria. The first criterion involved selecting cases highlighting encounters between those involved in the scaling of ESD-activities and the environments in which these activities were introduced. The second criterion was selecting cases that illustrated

\textsuperscript{16} Change project approach
shifts in participants' understandings. These shifts in understanding included the educational content of ESD-activities, the terms of participation of those involved in the scaling and environing conditions.

As an initial step in the analysis, we read and re-read the documentation produced by the participants and, supported by the tentative SEAL conceptual framework, identified the sustainability challenge, scaling objects, the scaling subjects and scaling sites in each case, i.e. what is scaled, who is conducting the scaling and where is the scaling occurring.

Second, we examined, first apart and then together, how these aspects of the scaling process related to each other in the empirical data, understood as encounters. In a final step, we identified similarities and differences in the descriptions of the aspects, emphasising possible shifts in participant's understanding of scaling object, scaling subjects and scaling site.

An example highlighting this analytical process can be drawn from one of the cases studied in the paper. In the first written assignment, the course participant outlines the sustainability challenge of land degradation in the scaling site of a farming village:

Thus the physical landscape, together with land pressure and poor farming methods, are envisaged to have led to land degradation in the form of soil erosion, gulley formation and siltation of water bodies. (Assignment 1, page 5).

[name] village, located in the Eastern Highlands of Zimbabwe, is often exposed to extremes that is heavy rains in good seasons and extended periods of droughts [...]. (Assignment 1, page 5).

The second assignment, from the same course participant, exemplifies what was analytically constructed as a scaling object:

In my change project, the communal farmers are supposed to observe how work has been done and how other farmers managed to achieve the results that s/he achieved that was worth observing by others. [Case 1, Assignment 2, p.4].

the agricultural expert demonstrated on best practices on how to effectively apply organic manure (Assignment 2, page 2)

As such, the scaling object was interpreted as consisting of observations by communal farmers of demonstrations by an agricultural expert on worthwhile farming practices. The scaling subjects in this part of the change project included communal farmers and an agricultural expert, while the farming community and vegetable garden constituted the scaling site.

The encounter between the three aspects of the scaling process (scaling object, scaling subjects and scaling site) was exemplified in the following passage:
A week after the demonstration, the community observed that some of the crops were showing signs of fertility deficiency. Even though they had their local knowledge about how to address the situation, they had to wait for the three weeks to elapse before they intervened. That was a limitation that was observed from the use of the demonstration method where participants were supposed to follow the demonstrations to the book' [Case1, Assignment 2, p.2].

From the encounter exemplified above, there were shifts, as part of the third assignment, in the participants understanding of both the scaling object and the scaling subjects involved in the specific scaling effort.

Thus the rural community and its traditional leadership working well with traditional knowledge systems interact with new knowledge from case studies and experiences from other experts in the CoP would reconcile such new experiences with TKS [Case 1, Assignment 3, p.5].

This passage was interpreted as a shift from having the agricultural expert introducing expert knowledge and showing how the community should change their practices to reconciliation between these new agricultural experiences and the traditional knowledge systems of the community.

6.9.6 Analytical process Paper IV

The paper aimed to contribute with knowledge of how scaling is conceptualised in practice through transactional learning encounters. Using a selection criterion that included instances where participants expressed hesitation or uncertainty of how to move forward with the workshop activity, several passages from a transcribed audio material of the South African workshop series were selected for analysis. This analysis was conducted using a Practical Epistemology Analysis method (PEA).

The initial PEA-analysis resulted in the identification of several passages in which the other participants acknowledged and engaged with the expressed uncertainties. These engagements were analytically constructed as relations, between current experiences and past experiences that were considered certain. Through the creation of relations, what is uncertain in the current experience becomes (at least temporarily) certain. As such, participants were understood as drawing on experiences to engage uncertainty in the activities (for further detail, see Mickelsson, 2020).

Furthering the analysis, in a first step I read the relations multiple times, noting similarities and differences and made preliminary groupings of them. These groupings were then shared and discussed with colleagues experienced in PEA-analysis and adjustments were made to the groupings. As a
second step, utilising the tentative\textsuperscript{17} SEAL conceptual framework I set the grouped relations within three categories. Each category of relations was presented in the paper with an example to highlight the analytical process.

An example of this analytical process was a session during the second of the South African workshop series. In the session, participants were addressing questions related to scaling but found it problematic to agree on how to address the questions of, what is to be scaled:

(1) P: So the first thing that we may want to find out here is when we say what is to be scaled are we talking about the object of scaling?

(2) J: The object of scaling?

(3) N: Is that what we are talking about, the question was.

(4) T: What is to be scaled?

(5) P: So what is an object of scaling, how do we understand it? An object of scaling, what is an object of scaling?

(6) J: Ok, so what are we saying to help describe it?

(7) T: I think it works better if we have an example to help us.

(8) T: Example? Object of scaling. You were saying something that I liked that is kind of common in many cases, a change project.

Voices of agreement

(9) M: A change project, we started as a very small thing here, two people probably, four-five people, one institution, thirteen institutions etcetera. So what we are scaling is the, what we mean by scaling a change project, what are we scaling?

(10) T: A program

(11) J: From what you just said, I think we are scaling several things at the same time. […]\textsuperscript{18}

In lines (1-6), a ‘gap’ was understood as emerging when J, T and N acknowledged P's expression of uncertainty and question regarding what is to be scaled. Responding to the question, T (lines 7 and 8) created, what was interpreted as, two ‘relations’. The first relation was between the idea of the

\textsuperscript{17} The SEAL conceptual framework as it stood at the time of the analysis.

\textsuperscript{18} The transcript has been shortened for the purpose of exemplification.
need for an example and the scaling object, and the second relation was between the change project and the scaling object. Meanwhile, a new gap emerged as M (line 9) expressed uncertainty regarding what in the change project was to be scaled, with T and J (lines 10-11) acknowledging this uncertainty by engaging with it. In response to the gap, T (line 10) was understood as creating a relation between what was scaled in the change project and ‘a program’, while J (line 11) created a relation between what is scaled in the change project and several things at the same time.

The relations, interpreted to be created by T, J and M (lines 7-11), illustrated an encounter between the tentative concept of scaling object, i.e. what is to be scaled, and participants' re-actualised experiences of the Change Project Approach. While the ‘purpose’ of the workshop session was to address the scaling questions, as the participants created relations, I argued that this was the formulation of an ‘end-in-view’, the example of the Change Project Approach becomes a way to move forward in addressing the purpose of the workshop session.

6.10 Research quality

According to Smith (Smith, 2014), disagreements regarding research quality can be traced back to differences in epistemological perspectives, i.e. what constitutes knowledge and how knowledge can be created. As such, discussions of research quality can be understood as engaging questions of what research is considered legitimate and worthwhile. In educational research, these differences in epistemological perspectives include questions of what is being learnt, why it is being learnt, who is learning and how processes of learning and knowing are to proceed (Popkewitz, 1997).

Drawing on the purpose of this research project and the chosen pluralistic epistemic approach, when engaging scaling as a phenomenon that is at the same time contested and conceptually under-developed, it is necessary to move beyond the idea that the research process can be predetermined and formalised using standardised methods (Denzin & Giardina, 2015, 2016).

Predetermining the use of methods tends to recreate what is already known, preventing opportunities in the research process to encounter the unexpected. Or as noted by Smith (2014), when deconstructed, predeterminations regarding how to conduct research practice often result in the establishment of ridged limits on knowledge creation.

Accordingly, formalised and prescriptive methods risks become controlling and disciplining, limiting research thinking and practice (Denzin & Giardina, 2015, 2016).

As such, the research practice in this research project is iterative, with methods as steps taken along a path (Åsberg, 2001). Such an approach considers the unexpected, where initial analysis can reveal new insights revamp-
ing methods of data generation and data analysis to better accommodate these insights (Glaser & Strauss, 1967). This ‘emerging’ character of methods can be further expanded upon when considering the point made by Taylor et al. (2015), how methods constitute research practices and as practices are done in situ by researchers rather than having an existence apart from research practices. As such, methods as research practices are understood as producing certain realities rather than objectively describing them.

Consequently, in order to create knowledge of phenomena such as ‘scaling’, it is beneficial to develop methods in the research process, with the methods as expressions of underlying epistemological and methodology choices (Carter & Little, 2007). Such an approach necessitates strategies of inquiry and research practices that are reflective of the researches’ epistemic positioning, and have the ability to be adaptive to the research context and those involved in the research process.

In addition, to account for the complexity and multi-dimensional character of ‘scaling’, this research project has taken a pluralistic approach to not only epistemology at the data generating stage of the research process, but also to methodology and data generating research practice during this stage, which has further implications for my approach to research quality.

If we assume, as has been argued above, that discussions regarding research quality can be derived back to differences in epistemological positions, attempts to identify standardised quality criteria is of limited use if researching a trans-disciplinary topic (Carter & Little, 2007; Denzin & Giardina, 2016) such as the scaling of ESD-activities. Similarly, concerns exist when utilising qualitative 'key markers' of research quality (Tracy 2010). Understanding these markers as based on certain epistemological perspectives, means that they can come to constitute limiting checklists against which research, drawing on other epistemological perspectives, is measured (Gordon & Patterson, 2013).

On this point, my approach to research quality takes an alternative path to arguments for the necessity of quality criteria specifically designed for qualitative research (Gordon & Patterson, 2013; Guba, 1981; Lincoln, 1995; Lincoln & Guba, 1985); Lee, 2014; Brinkmann, 2015). Instead of relying on predetermined criteria of research quality, I attempt to derive research quality considerations from the purpose, objectives and choices of the research project. This reasoning draws on the idea that quality research pertains to how epistemology, methodology and methods are consistent with the formulation of research objectives, the selection of research subjects and how data is analysed and presented (Boaz & Ashby, 2003; Lohr, 2004; Shavelson & Towne, 2002).

Meanwhile, choosing not to assume pre-defined criteria for research quality does still, as noted by Carter and Little (2007), mean that reflections on research quality are crucial. This choice of basing my discussion of research quality on the purpose and choices of the research project can be argued to
be a strong point as it enables me to contribute to a pluralistic knowledge creation, which is in line with the reasoning presented regarding epistemology.

Consequently, I argue that the explorative aim articulated in this research project necessitates non-standardised research quality considerations (Spencer, Ritchie, Lewis, & Dillon, 2003). In focusing on the research aims and the choices of epistemology and methodology, made to support developing methods during the research process, my approach to research quality starts in, but is not limited to, internal consistency as consideration for research quality.

To fulfil this research quality consideration I have in the sections above highlighted the consistency between my epistemology (justification of knowledge), methodology (strategies of inquiry and justification of methods), and methods (research practice) along with detailing the process of conducting the data generation and data analysis in the research project. I argue that starting in the use of internal consistency as a research quality consideration offers a systematic way for detailing the justification of qualitative research and accounting for modification and innovation in the research process. As part of this effort, I outline the connections between my choices, while acknowledging challenges in the research process. Such justifications enable critical reflections regarding the choices taken in this research project while highlighting the limits of the chosen research approach.

This approach to research quality does not necessarily mean that my discussion results in research quality considerations that are markedly different than if I, for example, used 'key markers' of quality research (Tracy, 2010). Rather, there is a difference in the process by which I come by these results, through a discussion based on the research aim, objectives and choices of epistemology, methodology and methods in the research project. The goal of this chapter is to discuss several research quality considerations that result from my research aim and choices while making references to the data generating and data analysing processes. As noted, these considerations may come to overlap with, for example, 'key markers' of quality research (Tracy, 2010).

In the following section, I outline how my choices of epistemology and methodology as expressed in research practice, i.e. in the use of methods, indicate the need for further research quality considerations in addition to those pertaining to internal consistency.
Critical reflections on research quality considerations

Following Carter and Little (2007), by exploring the choices of epistemology, methodology and methods along with their internal consistency, additional considerations for research quality can be formulated. The sections below highlight these considerations in terms of consequences of my epistemological and methodological choices.

My epistemological position of knowledge creation through inquiry necessitates that I consider the positions of researchers and participants in the research project (Mantzoukas, 2004). The chosen research practices should expand knowledge relevant to scaling practices, develop capabilities, and empower participants. To this end, the research project has utilised participatory research workshops to develop knowledge coupled with developing the capabilities of workshop participants.

As such, participatory research workshops support processes of validating research results in relation to the experiences and practices of workshop participants and making said results reliable among the different contexts in which the workshops were held. This contextual reliability was achieved by subsequent participatory meaning making in the different workshop series as exemplified in the sections above outlining the three workshop series. Firstly, this means that results drew on the workshop participants’ knowledge and experience. Secondly, the preliminary analysis conducted during the workshops, and that came to frame further analysis, was challenged by workshop participants’ knowledge and experience. As such, the research results were presented, adapted and re-contextualised by the workshop participants through participatory meaning making in each workshop series.

When addressing complex research topics such as scaling, my choice of an inquiry-based epistemology implies that methodology and methods should be able to appreciate the nuance and complexity of the topic. In the research project, theory development has been conducted through an abductive process, moving between research and empirical data, as a way of accounting for the complexity and nuance of scaling.

Throughout the research project, to allow for considerations of the unexpected, the Re-Solve research process has been adapted together with the development of, and research outcome of, the SEAL conceptual framework. I have thus reduced the risk of providing simplified approaches in engaging and understanding the topic of scaling.

Meanwhile, due to my epistemological positioning, there is a risk that I assume a somewhat naïve approach to the social interaction in the scaling of ESD-activities where, in particular, power relations between the various groups involved do not necessarily come into focus. It is thus more difficult in the study to talk about social, political and economic structures that are often the framework factors for our actions. Chapter 9, to account for this
potential blind spot, includes a critical discussion in which the research project is contrasted with PhD studies that have explored these structural aspects further.

In addition, the choice of a participatory research approach implies that the topic of research should be relevant, timely, significant or interesting for those I engage with as part of the research project, similar to the quality ‘key markers’ outlined by Tracy (2010). Such relevance can take several forms, from shared disciplinary priorities to timely social, institutional or policy events. The topic for this research project draws on educational research and especially ESE, in which questions of 'spreading' of policy and educational content are prevalent. In addition, 'scaling-up' has been, and continues to be, a recurring theme in the UNESCO GAP and the Sustainable Development Goals (SDGs).

Furthermore, in terms of presenting the research, a consequence of my methodological choices is that I should make fair and credible representations of participants’ contributions and report on the results in a way that is trustworthy and plausible, what Lincoln and Guba (1985) calls credibility. Research should be detailed and comprehensible to further this representation of credibility, enabling readers to relate the research and the representation of participants' contributions to their experiences, what Lincoln and Guba (1985) calls transferability and Simons (2009, 2015) call generalisability. To these ends, in this chapter, I have attempted to present the generated empirical data along with the analytical processes in each paper. Following Smith (2014), these research quality considerations are illustrated through my ability as a researcher to explore, as shown in the chapter, choices of epistemology and methodology, including the creation of more contextually responsive research processes. Furthermore, these descriptions have emphasised participants' contributions to the generation of empirical data. These contributions are illustrated in the parts of the chapter detailing the participatory research workshops, how the results of the research project grew from an abductive process of theory development and the data analysis process.

Concerning the presentation of participants’ experiences, Paper II involves an analysis of cross-language data, as there was a language barrier between researchers and the participants in the data generation (Squires, 2008, 2009). When conducting such analysis, conceptual equivalence, i.e. that the meaning of data generated together with participants is not significantly altered emerges as a relevant research quality consideration (Simon, 1996; Squires, 2009).

As noted by Temple et al. (2006), contextual reflexivity and being part of the data generation process can compensate for the researcher not being fluent in the language of the participants, necessitating translations of the generated data.

Consequently, in conducting an analysis of cross-language data as part of Paper II, the analysis included not only the data but also an analysis of the
workshop context in which the empirical data was generated. The results of this contextual analysis were presented in this chapter, detailing the Ecuadorian workshop series.

Finally, in addition to providing empirical examples, I have detailed the three Re-Solve workshop series, which were the research contexts in which the majority of the empirical data was generated. I analysed the empirical data alone as well as in collaboration with my co-authors of paper I-III. To clarify the results and make them easier to understand, Paper I and II provide figures, while Paper III and IV provide tables of the analytical results. In the papers, these figures and tables also assist in addressing the occasionally conflicting purposes of providing detailed empirical examples and descriptions while considering the restrictions in terms of word count for academic journals.

6.12 The positioning of research participants and the researcher

Based on the emphasis of participants’ contributions in the research quality discussion above, the choice of methodological approach and participatory research workshops necessitate that I address questions of my position in the workshop as a researcher as well as the positions of workshop participants. As noted previously, the emphasis on participation in the research process runs through my choices of epistemology, methodology and methods. By making these epistemological choices and their consequences for research practice explicit, the quality of the research process can be highlighted (Smith 2014).

While the participatory research workshops offered spaces for knowledge co-creation, they came with a set of challenges. In the research project, the participatory research workshops had dual purposes, containing inherent tensions regarding the roles, expectations, and interests that emerged as researchers and participants became involved in the workshops. At the core of these tensions was my role as a researcher. I was engaging in the workshops as (1) the facilitator, prioritising the needs of the participants, and as (2) the researcher prioritising data generation, where participants become part of the research practice. Ørngreen & Levinsen (2017) referencing Cornwall, and Jewkes (1995) differentiate between participatory research workshops where the research stays in the control of the process and workshops where researchers and participants mutually contribute to the process.

There is a risk that I as researcher forget the purpose of attending to participant needs, focusing on the purpose of generating research data and not perceiving participants as subjects and co-creators of knowledge in the workshop series. Meanwhile, the opposite risk is that the participants' needs,
in terms of capacity development, come to overshadow the purpose of generating research data. In that case, the workshop has lost its purpose as a research method, undermining the potential of the workshop to contribute with empirical data for research regarding scaling processes (Chambers, 2002; Cornwall & Jewkes, 1995; L. Darsø & Høyrup, 2012; Lotte Darsø, 2001).

These tensions make it is necessary for me as a researcher to balance the dual purposes of the method to avoid risks of undermining research quality, participant agency and desired outcomes (Durance & Godet, 2010; Ørngreen & Levinsen, 2017)

A way of managing this balance of purposes in conducting the workshop series was to approach them as complementary. By emphasising the agency and contributions of participants, a nuanced insight into the understandings and practices regarding scaling might be achieved, enhancing the quality of the research data (Darsø, 2001; Ørngreen & Levinsen, 2017). Thus, it was important that I, as a researcher, was accountable for, and constantly aware of, my dual roles in the workshop series and how these roles enabled the dual purposes of the workshops.

Darsø (Darsø, 2001) and Ørngreen & Levinsen (2017) highlight limits to the documentation of data as a challenge to participatory workshops, differentiating between data generated in real-time and data as retrospective representations of phenomena. As the immediate data could not always be preserved, ways to address this in my research process has been to make audio recordings and reflective notes as well as collect documentary materials produced during the workshop (Cresswell, 2008; Creswell & Poth, 2017; Newby, 2010). In terms of the analysis, Cresswell (2008) emphasises the significance of my position as the facilitator performing the analysis as I were part of the workshop, thus supporting the dual role and purpose of workshops as a research method.

While utilising participatory research workshops can generate new ways of understanding the issue of the scaling of ESD-activities, it is worthwhile to consider that under some conditions, this openness can become counter-productive. These limitations of the research method relate to the immersive and collaborative environment that I, as the facilitator, together with the participants, was 'thrown' into. There is a risk that this environment put some participants in a passive position. When I noticed this happening, I, together with my co-facilitator, attempted to activate the participants, supporting them in sharing their opinions and experiences. The results of the workshop series came to partly depend on my ability as the facilitator, to create conditions under which participants could support each other’s knowledge creation. These were situations, in which I, as facilitator, needed act in a way that was sensitive to the specifics of participants' experiences, creating enabling conditions for them to re-actualise and share these experiences in the workshop sessions.
It has been crucial for me, in addressing the dual purposes of the workshops, to highlight marginalised voices and perspectives, along with acknowledging the experiences of the participants. Coupled with presenting relevant research, I have worked with participants to re-actualise existing knowledge and experiences to jointly explore the research topic of scaling. Through these efforts, I was able to contribute to workshops spaces in which the participants, together with me as a facilitator, adapted and appropriated scaling as something discussed, learned and ultimately performed. This process highlights how through participatory research workshops it is possible for research on scaling to approach scaling practice while benefitting from the workshops being structured spaces for reflection (Cresswell, 2008; Creswell & Poth, 2017; Johnson, Onwuegbuzie, & Turner, 2007; Newby, 2010).

6.13 Research ethics

Throughout, the research process has been guided by the ethical principles of Good research practice by the Swedish Research Council (2017). For the generation of the empirical data in the workshop series, I have adhered to the principles of informed consent and voluntary participation. In these workshops, the focus was on working empirically with participant’s reflections on scaling based on their experiences of ESD-activities. The workshop participants were provided with an information sheet, informed by the guidelines developed by the Regional Ethics Vetting Board in Uppsala (2017), outlining the aim of the study, how the study was to be conducted as well as potential benefits of the study. Participants were also provided written information about their voluntary participation and their right, at any point, to withdraw from the study without further explanation. Finally, it was made clear that the researcher and his supervisors would only use the collaboratively generated data for research purposes and that the data would be subject to standard guidelines of data use at Uppsala University (2019) as well as following the Swedish Research Councils guidelines (2017).

The research project does not deal with sensitive personal data but focuses on participants' experiences of the scaling of ESD-activities. Thus, the research project is not interested in what according to research ethical guidelines (Regional Ethics Vetting Board in Uppsala, 2017) are considered sensitive personal data: racial or ethnic origin, political opinions, religious or philosophical beliefs, membership of a trade union, data related to health or a person's sex life or sexual orientation. Given that no sensitive personal data was expected to emerge in the process, or as indicated by the study's aim and methodological ambitions, the research project was not subject to ethical review.
All participants in the Re-Solve workshop series were adults, and while the more extensive workshop in Ecuador, within which the Re-Solve workshop series were held, involved school visits, no data generation was done, and no recordings or notes were taken during these visits. In the workshops where participants generated written reflections, which were documented, the participant groups named themselves and assigned each member a number that they used throughout the workshop, thus limiting the risk of reverse identification.

In terms of the workshop participants’ informed consent, as noted by Malone (2003) and Crow et al. (2006), it is not always clear for research participants to know what they are consenting to and thus the degree to which their consent is ‘informed’. In the Re-Solve workshop series, the participants were highly educated and experienced practitioners and researchers who were accustomed to research and could thus be expected to know what informed consent entails in research. The participatory research workshops that form the basis for much of this research project focus on the co-generation of knowledge. As noted above, the studies presented in this thesis are not an evaluation of the Re-Solve workshop series or the participants’ knowledge or expertise but centres on the joint generation of research data on scaling and the theory development of SEAL. In addition, the participants were not required to consent in order to participate in the workshop.

When reporting and using the empirical data, fictional names are used to assure confidentiality as far as possible. In addition, the research material is stored on a locked hard drive to which only my co-authors and I have access.
7 Summary of the studies in the Papers

7.1 The relationships between the four Papers

The four papers are studies of ‘scaling’ as a subject of inquiry, framed by the myths of scaling (Looi & Teh, 2015) as presented in the introductory chapter (Chapter 1). The papers jointly explore the knowledge gaps indicated by the myths of scaling, engaging with empirical data from diverse geographical locations and ESD-activities.

As such, the myths of scaling provide a framing for the four papers regarding the conditions for the scaling of ESD-activities. Paper I develops a tentative conceptual framework, while Papers II and III delve into more detailed empirical data and subsequent studies of the conditions of scaling. Paper IV contributes with a study of how reflective scaling practices can be developed through the re-actualisation of participants’ experiences of ESD-activities.

As detailed in the methodology chapter (Chapter 6), the empirical data analysed in the studies present diversity in terms of geographical reach, involving an exploration of how questions of scaling can be addressed, relating to different sustainability challenges. The choice of empirical data from ESD-activities that have a significant history (South African and Swedish workshop series) as well as more recently developed ESD-activities (Ecuadorian workshop series) enabled the development of the SEAL conceptual framework.

7.2 The study in Paper I

The paper outlines a conceptual framework of Scaling-ESD-Activities-as-Learning (SEAL). This framework is the result of the Re-Solve research process at the point of writing the paper in 2017. In the study, we discuss the concept of ‘scaling’ of ESD-activities based on how ‘up-scaling’ ESD is highlighted in the UNESCO Global Action Programme (GAP) on ESD. The study draws on a Deweyan theory of learning as processes of transactional encounters when presenting the conceptual framework of SEAL. The theoretical specifications and practical implications presented are results of data generated using a participatory research workshops and an abductive re-
search approach in the analysis of this data. In this study, we argue that viewing scaling as a learning process enables a nuanced and multidimensional notion of the scaling of ESD-activities. This notion should be seen in relation to (a) complex sustainability challenges, (b) ethical aspects, (c) a more attentive and strict approach to scaling in ESD policy and (d) addressing questions of significant importance to scaling research. The study contributes with developing a conceptual framework of SEAL that is, on the one hand, a theoretical refining of the scaling concept and the other hand, offers practical implications for ESD practice and policy as well as ESE research.

7.3 The study in Paper II

The paper aims to investigate how the subjectification of those involved in ESD-activities (scaling subjects) both enables and constrains the scaling of ESD-activities. The study focuses on the Alforja Educativa, an ESD-activity in Ecuador on antibiotic resistance (ABR). ABR has been described by research as a sustainability challenge comparable to climate change. The analysis of how the subjectification of school children and educators enables and constrains scaling as a learning process is conducted by drawing on documentary material and written reflections from workshop participants. The Paper illustrates how the emergence of subject positions of those involved in scaling impacts the conditions for scaling of ESD-activities. The study makes a theoretical contribution to scaling research in the form of presenting a way of understanding the role and importance of subjectification in scaling processes. It outlines empirical results on the dynamics of the outlining of scaling visions and action plans for ABR and the Alforja Educativa, conceptualised as a learning process.

7.4 The study in Paper III

The paper aims to contribute to knowledge about how transactional educational encounters involved in the introduction of ESD-activities can both enable and limit scaling efforts. This study centres on four cases of the Change Project Approach (CPA) course in Southern Africa. The paper is a response to the assertion in ESD policy that the UN decade of education for sustainable development (DESD) have failed in up-scaling ESD-activities and that, according to educational scaling research, there is a lack of empirically grounded research on scaling. From a SEAL perspective, this paper studies the shifts in participants' understandings of transactional encounters involving three components: ESD-activities, those involved in scaling as well as environing conditions. Through this approach, the paper addresses
perennial concerns with stakeholder participation (agency) and participatory processes that are at the heart of the ethos of ESD. In the paper, a recurring theme is how SEAL can contribute to the theorisation of change in educational work in order to create conditions for more reflective practice amongst those involved in the scaling of ESD-activities. Resulting from this study is insights into the dynamics involved in the scaling of ESD-activities. As part of these results is the outline of a concept of scaling sites as non-static places centred on what comes to play in the practice of scaling of ESD-activities.

7.5 The study in Paper IV

This paper aims to contribute with knowledge of how scaling is conceptualised in practice through transactional learning encounters. As such, the paper reports on a study of the collaborative conceptualisation process of the scaling of ESD-activities. Focusing on the workshop series held in South Africa in 2016, involving researchers and practitioners who have worked with ESD in the region, the study explores the conceptualisation of scaling through the re-actualisation of participants' past experiences of ESD-activities. Through the use of practical epistemology analysis (PEA), these re-actualisations of participants' experiences are identified and analysed. Further analysis and discussion of the results of the PEA are carried out from the perspective of the conceptual framework of SEAL. The study illustrates how participants when encountering situations where they are uncertain of how to conceptualise scaling draw on their experiences of ESD-activities. The re-actualisation of these experiences in the workshop offers a concrete and tangible joint reference, both when engaging with questions of scaling and when envisioning future scaling of ESD-activities. In the latter case, participants also assume a certain degree of ownership in directing the educational activity.
8 Results: Theoretical and practical insights of the empirical studies

8.1 Introduction

This chapter presents the results of the research project as theoretical and practical insights grounded in the empirical studies conducted in the papers. In the subsequent chapter (Chapter 9), these insights will be critically discussed in dialogue with four PhD studies engaging with the subject of inquiry of this thesis.

Guided by the thesis research objectives, the chapter provides insights into the scaling of ESD-activities as a way to deepen the conceptual framework of Scaling-ESD-Activities-as-Learning (SEAL). This conceptual framework is the result of an abductive research approach involving both empirical studies and theoretical inquiries that have supported and informed each other throughout the research project. Central to the development of this conceptual framework is the notion of approaching the scaling of ESD-activities as a learning process. The framework involves understanding scaling processes as an educational subject of inquiry, drawing on educational and ESE-research to explore the complexities of the scaling of ESD-activities.

When presented in Paper I, the SEAL represented the conceptual framework as it stood at the point of writing the paper in 2017. After the publishing of Paper I, the conceptual framework has been expanded upon, and further nuanced through the research reported on in Papers II-IV as outlined below:

• Paper II contributes with the notion of subjectification in scaling processes. The question is not only who is involved in scaling, and what agency and ownership they have in the scaling process, but also the expectations placed upon them, what subject positions they are expected to submit to or assume, when involved in the scaling process.

19 This conceptual framework is the theoretical result of the whole thesis, including Paper I-IV. This framework thus represents a further development of the conceptual framework presented in Paper I, which was the theoretical result of the Re-Solve research process at that point.
• Paper III contributes with knowledge regarding shifts in participants’ understandings in the scaling process and the dynamics involved in agency formation as part of scaling processes.

• Paper IV contributes with knowledge that the learning can occur both in the actual scaling activity but also in the conceptualisation of scaling. As such, the paper illustrates how scaling can be deliberated as a learning process together with other people.

• Paper IV furthermore contributes with the notion of re-actualisation of experiences as a critical aspect of scaling-as-learning, in which participants’ experiences encounter the educational content of ESD-activities.

The conceptual framework of SEAL is the result of empirical studies, described in the chapter outlining the papers of the thesis (Chapter 7). In addition, the methodology chapter (Chapter 6) have detailed the chosen methodological approach and empirical data of the studies. While the research project utilises empirical data from studies of both informal and formal education, the results of these empirical studies indicate the ‘educational’ character of scaling, involving the selection of educational content and the importance of participants’ experiences in scaling. These results show that an understanding of scaling processes as a multi-dimensional processes offers an avenue of exploring and addressing the complexity involved in introducing ESD-activities into new contexts and increasing its impact.

The theoretical insights of the research project are presented in terms of the SEAL conceptual framework with the chapter going into detail regarding several interrelated scaling concepts, a scaling vocabulary, that resulted from the empirical studies reported on in the papers. That section is followed by the practical insights of the research project, which provide more depth to the SEAL conceptual framework, outlining a number of interrelated aspects of approaching scaling as learning.

8.2 Theoretical insights

Considering that scaling has emerged as a central topic in ESD policy and practice of the post-DESD agenda (UNESCO, 2014c, 2014d, 2014a), conceptualising the scaling of ESD-activities as an educational phenomenon has significant benefits. Approaching scaling as a learning process enables me to draw on theories that are apt at accounting for the particular complexity of the scaling of ESD-activities, thus enabling the development of knowledge about scaling that is relevant to educational research, policy and practice.

The inquiries that formed the basis for the development of the conceptual framework have two principal theoretical sources: transactional learning theory, and theorising about qualitative educational scaling. These theories enable a conceptualisation of scaling as a transactional learning process.
characterised by contingency and continuity. The transactional learning theory, as outlined in the theory chapter (Chapter 5), is based in Deweys (1938/1997), thoughts on the experience and environing conditions in learning processes. The theories of qualitative educational scaling (presented as part of Chapter 4, previous research) principally draws on Coburn's (2003; Coburn & Stein, 2010) and Clarke and Dede's (2009) emphasis on qualitative scaling characterised of depth, sustainability, the shift in ownership and evolution.

Drawing on transactional learning theory, SEAL highlights that the wicked, complex and evolving, nature (Kronlid, 2014; Rittel & Webber, 1973) of sustainability challenges necessitates a continually evolving scaling process to retain relevance and ability to address the sustainability challenges in question. In the conceptual framework of SEAL, scaling does not strive for a predefined optimal state, but is instead a dynamic adaptation to contingent social complexities, and aims to address sustainability challenges faced by people in context.

Assuming a transactional learning approach involves viewing the scaling of ESD-activities as encounters between the educational content of ESD-activities, those involved in the scaling effort and their on-going practices relating to the sustainability challenges at hand. Accordingly, the notion of scaling-as-learning builds on the continuity of the experience of those involved in scaling. In Dewey's terms, this continuity of experience means that one of the challenges of scaling is to make relevant experiences part of learning how to scale ESD-activities into an contingent and unknown future. Scaling thus becomes a dynamic adaptation aimed at enabling those involved in the scaling process to address sustainability challenges both in the present and in the future.

8.3 Scaling vocabulary

Based on the results of the empirical studies and theoretical inquiries conducted in the research project, there was a need for a degree of analytical separation within the conceptual framework forming a vocabulary of scaling concepts. Garrison (2001) points out that it can be essential to analytically distinguish, subject from environment or situation when studying learning. Such analytical separations of ontologically interwoven phenomena enable inquiries. The following sections present these analytical separations as scaling concepts.

8.3.1 Scaling objects

In the conceptual framework, ‘scaling object’ is utilised to identify and analyse the educational content of ESD-activities that is to be introduced into
new situations through the scaling process. These scaling objects are concept-
ualised, drawing on the Deweyan learning theory, as objects of inquiry, not
something static or pre-defined. Scaling objects are the educational content
named as objectives of inquiry, i.e. the scaling object is as argued in Paper I,
objectives of the inquiry of the scaling of ESD-activities (Dewey,
1938/1997). This reasoning follows Garrison et al. (2015) and Glassman
(2001), that it is possible to view objects in educational settings as educative
objectives. Even objects that seem enduring or stable are still events, point-
ing to an understanding of the scaling object as an educational event, that is
performed in one situation and then again in a different one. These different
iterations of an ESD-activity are thus to be considered as part of the same
scaling event. The scaling object becomes a durational-extensional event
implying that the scaling object has a tentative meaning that can transform
over time (Garrison et al., 2015; Glassman, 2001).

Consequently, scaling objects are not static but acquire meaning in the
scaling process. Arguably, the scaling object transforms over time as it is
scaled both in the temporal and spatial dimensions resulting in different iter-
ations. As such, scaling objects are contingent and constructive while retain-
ing a degree of continuity.

The critical point to be taken from an understanding of scaling objects as
transactional events is that they are re-determined, re-named and that we can,
as pointed out in Paper I, learn more of what they can become through the
scaling process. Thus, the scaling object is understood as not adequately
named or known prior to the transactional learning process but rather that
through scaling it becomes discernable what the scaling object could be, and
has become, as an ‘durational-extensional’ event.

With SEAL presented as a dynamic multi-dimensional process, the identi-
fication of scaling objects emerges as a significant question. As workshop
participants in Sweden and South Africa articulated the scaling object of
specific ESD-activities, these articulations included multiple, often compet-
ing, suggestions (for further details see Paper I and Paper IV). Assuming the
durational-extensional perspective, scaling objects, as argued in Paper I, can
be different things at different times at different locations, meaning that the
scaling object can be principles, methods, educational content, and educa-
tional approaches. The scaling of ESD-activities is seldom limited to the
generation of a single scaling object, mirroring this dynamic diversity. Those
involved in the scaling process may generate different scaling objects that
can, to a certain degree, be at conflict with each other.

Examples of scaling objects identified in the Re-Solve workshop series
were presented in the papers. When participants, as part of the Swedish
workshop series, discussed the Inquiry-Based Approach (IBA), they pro-
posed multiple scaling objects for the IBA. These scaling objects ranged
method for inquiry, via a model for facilitating stakeholder dialogue to a set
of values and after no initial agreement, the participants suggested that the
scaling object of the IBA could differ based on both time and space of the scaling effort. Furthermore, the Ecuadorian workshop series provides examples of how the scaling of the Alforja Educativa ESD-activity could be said, based on the empirical data, to involve multiple scaling objects that may or may not conflict.

8.3.2 Scaling subjects

The concept of ‘scaling subject’ enables the identification and analysis of those who take part in the scaling of ESD-activities. Central to the concept is the dual, and related, processes of subjectification and agency formation. While I will discuss each process in turn, subjectification can be understood as informing the agency formation process as a whole.

Subjectification is in this thesis conceptualised as conditioning the agency of scaling subjects (Butler, 1997; Davies, 2006; Heller, 1996; Michel & Foucault, 2002, pp. 326–348). As argued in Paper II, while there are expectations put upon those involved in scaling to submit to certain subject positions, this does not mean that they are passive. Instead, scaling subjects are assuming positions as part of activities with other people in which there are expectations regarding how they should act that also entail mastery and thus agency (Davies, 2006) in processes of scaling. The notion of scaling subjects becoming related to an agency formation process is the result of, as argued in Paper I, that scaling subjects can assume a degree of ownership of the scaling process. This agency formation process forms an important aspect of the scaling process as it is the practices of the scaling subjects that the scaling of ESD-activities in no small degree hinge on (Clarke & Dede, 2009; Coburn, 2003; Dede et al., 2005). As argued in Paper I following Coburn (2003) and Clarke and Dede (2009), shifts in ownership of the scaling process to scaling subjects is often an enabling condition for the qualitative characteristics of depth, sustainability, and evolution. It is in the practices of these scaling subjects that the ESD-activities need to become integrated and aligned with valued beings and doings for scaling to achieve depth. These scaling subjects are furthermore, those who over time will continue the ESD-activities. They will not only be involved in scaling the activities initially, but also sustain the scaling effort. Finally, these scaling subjects are able to continuously adapt and keep the ESD-activity relevant, ensuring its ability to evolve with changing circumstances.

As such, the scaling subjects are at the centre of balancing adaptivity and fidelity in the scaling of ESD-activities (McMaster & Fuchs, 2011). While ESD-activities will need to be adapted to remain relevant over time, there need to be a degree of continuity in terms of ideas (Harwell, 2012) or purposes (Dewa et al., 2002) to be able to talk about scaling rather than the development of new ESD-activities. Therefore, the balancing of adaptivity, in response to changing circumstances, and fidelity, to central ideas and pur-
poses, focuses on the scaling subjects ability to share the principles of the ESD-activity, reinforcing the importance that the scaling object can not stand in conflict with the valued beings and doings of scaling subjects, as discussed in Paper I. Whether or not recognised in the scaling effort, these valued beings and doings will form enabling or constricting conditions for scaling depending on their relation to the scaling object.

Examples of scaling subjects are presented in the Swedish workshop series. University and college lecturers along with municipality employees and community representatives were identified as scaling subjects as the workshop participants argued that these subjects often are crucial in on-going learning processes. Participants in the South African workshop series highlighted educational practitioners and trainers in both formal and informal education as important scaling subjects on similar grounds of facilitating learning processes. Finally, in the Ecuadorian workshop series, participants highlighted children as important scaling subjects in introducing the educational content of the Alforja Educativa to their families and local community.

8.3.3 Scaling sites

The concept of ‘scaling site’ enables the identification and discussion of the ‘where’ of scaling, the environment of scaling subjects and environing conditions relevant to the practice of the scaling of ESD-activities. As noted in the theory chapter (Chapter 5), environment is not a separate or inert ‘surrounding’ but forms a continuously becoming part of our experiences (Dewey, 1938/1997; Dewey & Bentley, 1949/1991; Rosenblatt, 1985) These ‘environing conditions’ form a unified whole of objects and events that come to be involved in our experiences. In the scaling of ESD-activities, the environment includes both the human and natural objects and events that come to be involved in the particular scaling of ESD-activities (Lotz-Sisitka et al., 2015). Analytically differentiating the identification of the environment and the environing conditions for the scaling of ESD-activities is crucial in enabling discussion about what forms of the environment that could potentially be actualised in scaling and what is actualised in specific ESD-activities (Dewey, 1938/1997; Hansson, 2014; Kronlid, 2014).

As noted in Paper I, scaling sites can be analytically divided into source sites and target sites, connected through scaling objects and scaling subjects, each with a specific environment. Such environments can be quite diverse, including formal educational institutions to small scale farming communities. Meanwhile, similarities in environing conditions between scaling sites can be an enabling condition for scaling. Such similarities may limit the degree to which the scaling object needs to be adapted, thus enabling the scaling object to retain certain aspects, balancing adaptivity and fidelity. Furthermore, similarities in valued being and doings between those involved in the scaling source sites and scaling target sites will make the scaling ob-
ject more likely to be ethically acceptable for the scaling subjects in the target scaling site, further supporting the balancing of adaptivity and fidelity. Consequently, the selection of scaling objects comes to the fore, as this choice becomes important in what target scaling sites become eligible while retaining fidelity to the educational content of the ESD-activity.

Examples of scaling sites are presented in the South African workshop series where workshop participants identified the access and ability to utilise water as a point of contact between diverse locations in Southern Africa. Participants were thus able to jointly connect their experiences within the frame of a larger ESD-activity, the Amazi for Food. As such, scaling sites include locations within national educational institutions such as schools, universities, agricultural colleges, as well as in the surrounding society, including small scale farming communities and government institutions. In terms of scaling sites on a global level, the proliferation of the Change Project Approach course highlights the potential of connecting multiple countries in a region as part of a larger scaling process.

8.3.4 Scaling pathways

The concept of ‘scaling pathway’ brings together the three previous concepts within the framing of a transactional learning process. Through the identification and discussion of this pathway, the process of the scaling of ESD-activities can be both tracked, looking back, and envisioned, looking into the future. The complexity of the ‘scaling pathway’ can be understood as the ESD-activity moving along multiple dimensions: vertical, horizontal and functional and across areas and levels: spatial, temporal, jurisdictional, institutional, management, network, and knowledge (Cash et al., 2006). The scaling of ESD-activities is not (only) a matter of linear, teleological governed transportation from geographical (or institutional) location A to a location B. Rather, based on SEAL, the scaling object will undertake a transactional journey along a multi-dimensional ‘scaling pathway’.

Based on the discussion on transactional learning, scaling objects, scaling subjects, and scaling sites are understood as reciprocally transforming as part of the scaling process. Scaling objects are selected and adapted to scaling subjects and sites in order to become ethically acceptable to those involved in the scaling. Developing a concept to identify the scaling process as a whole furthermore accommodates the idea that the process may change direction and form over time in response to changing circumstances, thus becoming characterised by sustainability and evolution as noted by Coburn (Coburn, 2003; Coburn & Stein, 2010) and Clarke and Dede (2009; Dede et al., 2005).

An example of a scaling pathway is presented in the study on the Change Project Approach in Southern Africa (detailed in Paper III). In this study, scaling pathways could be identified as shifts in the course participants’ un-
8.3.5 Scaling resources

The concept of ‘scaling resources’ assists in identifying resources that could be utilised by scaling subjects to enable the introduction of scaling objects in designated scaling sites. These resources can be of various kinds such as institutional frameworks, organisational capacity, partnerships, policy, and financial resources. Crucially, what resources enable scaling of any particular ESD-activity is not predetermined or static, necessary and beneficial resources may differ significantly between designated scaling sites as well as over time. Depending on what aspects of the environment are actualised as envoirning conditions in the scaling activity, available resources may have to be adapted accordingly. As mentioned, scaling resources needed to enable scaling will often change over time as scaling objects, scaling subjects (including their subject positions) and designated scaling sites transform through the scaling process. As such, there is a need for continued strategic analysis to determine what scaling resources are needed to enable scaling.

Examples of possible scaling resources were presented in the South African workshop series. Workshop participants, based on on-going ESD-activities, identified several scaling resources such as financial resources, human capacity, incentives, coordination, training, and communities of practice. Moreover, the participants in the Swedish workshop series drew on their experiences of ESD-activities to identify policy support, strong existing partnerships, collaboration and capacity for the facilitation of participatory processes as significant scaling resources.

8.3.6 Scaling drivers

The concept of ‘scaling drivers’ enables the identification of functions, events, actions, or circumstances that can boost the scaling process and push the process forward, thus providing direction of the scaling pathway. Examples from the literature (Looi & Teh, 2015; Slavin & Madden, 2013) of scaling drivers include visioning and leadership, incentives and accountability, external catalysts, and communication.

Examples of scaling drivers can also be drawn from the Swedish workshop series in which participants highlighted context-sensitivity as well as timing and local relevance along with scientific accuracy. This last driver was also emphasised in the other two Re-Solve workshop series, that having the scaling object grounded in relevant research is important for making the
scaling process more compelling and trustworthy for those involved in scaling efforts.

Furthermore, in the South African workshop series, in addition to trust among partners and leadership, long-term engagement and experience of both the ESD-activity and the designated scaling site were identified as potentially crucial scaling drivers. These drivers were also supplemented by what the workshop participants identified as critical story sharing, for scaling subjects to be able to bring their experiences of the scaling of ESD-activities into the current scaling effort and to critically engage with these experiences in collaboration with other scaling subjects.

Consequently, scaling efforts, looking to mobilise scaling drivers, need to consider their relevance to the designated scaling sites. These considerations can be articulated in terms of timing and local relevance to the economic, socio-cultural and ecological historical trajectories of the designated scaling site (Lotz-Sisitka et al., 2015). The importance of identifying a favourable moment to scale, and thus to mobilise scaling drivers, was emphasised throughout the workshop series in Sweden and South Africa. This point indicates that the scalability of an ESD-activity can, and often will, change over time. As such, crucial in mobilising scaling drivers to facilitate scaling is the ability to 'read' the relationship between an ESD-activity and a designated scaling site. A related consideration is to see these 'readings' as contingent, not just between scaling sites but to a certain degree between different points in time. Employing such attentiveness to the conditions of the scaling process supports decisions on which scaling drivers to mobilise and how to mobilise them.

8.3.7 Scaling vision

The concept of ‘scaling vision’ assists in identifying an especially significant driver at the outset of a scaling process, the establishing of a shared vision for scaling to extend the impacts of an ESD-activity. In order to retain relevance throughout the scaling process, the vision should become embedded in an organisation's missions and goals, values and beliefs. Such missions and goals help define the desired scale, whether it is a geographical location (locally, nationally, regionally, internationally), an issue (e.g. gender equality, poverty alleviation, antibiotic resistance) or a discipline or a field of practice (e.g. community development). In addition, values and beliefs support finding the appropriate pathways and approaches to achieve a ‘scaling vision’.

Furthermore, such relations between values and vision must be continuously re-established in order to adapt to changing conditions, thus retaining the relevance of the scaling process. ESD-activities are often designed as one-off interventions with an emphasis on immediate results and lack a vision for scaling in the first place. Thus, a scaling vision is preferably devel-
oped early, at the beginning of an ESD activity and becomes an integral part of the planning process in order to create enabling conditions for scaling.

In the case of the South African workshop series, scaling visions were formulated as an embodiment of the organisation's values. What such embodiment of organisational values meant came to be renegotiated among the workshop participants in the South African workshop series, leading to a refinement of the vision.

8.3.8 Summary

Summarising the scaling vocabulary, Figure 4 illustrates two layers of the SEAL conceptual framework. The first, inner, layer is the multi-loop process of transactional encounters between scaling objects, scaling subjects and scaling sites constituting the scaling pathway. Meanwhile, the second, outer, layer consists of the interconnected frame for the scaling pathway, including scaling resources, scaling drivers and scaling visions.

![Figure 4. The scaling conceptual framework, adapted from Kronlid, Mickelsson and Do (2019)](image)

8.4 Practical insights grounded in the empirical studies

The theoretical insights resulting from the empirical studies presented in the previous section constituted a further development of the SEAL conceptual framework presented in Paper I. These theoretical insights will, in the present section, support the presentation of practical insights resulting from the
empirical studies. These insights are 'practical' in terms of being relevant for practitioners looking to (1) evaluate past scaling efforts, (2) scale ESD-activities and (3) design ESD-activities for scalability. As such, the section centres on how the results of the studies presented in the papers can provide more depth to the SEAL conceptual framework by outlining several interrelated aspects. These aspects are an analytical separation and should be read as cumulative, together contributing to a larger picture of practical insights. These aspects are, scaling as:

- an understandable learning process
- a selection of educational content
- a process of subjectification
- an agency formation process
- a consideration for valued beings and doings
- a re-actualisation of experiences
- a potential for developing scalability of ESD-activities

8.4.1 Scaling as an understandable learning process

The first practical insight contributing to the substantiation of SEAL is the scaling of ESD-activities as an understandable but not predeterminable learning process. The studies presented in the papers illustrate how it is possible to identify conditions for the scaling of ESD-activities as well as how these conditions could affect the outcomes of a scaling effort. Meanwhile, Paper I indicates, based on transactional learning theories and examples from the Swedish and South African workshop series, that the results of a scaling process, like other learning processes, can only be determined in hindsight. The proposition is that the specific outcome of the scaling of ESD-activities is seldom linear but a winding pathway where it is necessary to consider the unexpected. As such, it is possible to conceptualise and understand the enabling and constricting conditions for the scaling of ESD-activities, but not to predetermine the outcomes of scaling processes.

This open-ended character of scaling processes is further exemplified in Paper II, where the relations among those involved in scaling the Alforja Educativa and their impact on scaling were possible to understand by studying subjectification processes. As the methodology of Child-to-Child and Sumak Kawsay emphasised the equal relations and co-creation of knowledge among children and adults as well as among medical knowledge systems and traditional knowledge systems, they present ways of understanding the subjectification involved in the scaling process. Meanwhile, as exemplified in the Ecuadorean workshop series attempts of establishing such equal relations can very well encounter resistance. By identifying the scaling subjects that are part of a specific scaling process, and considering the involvement of other scaling subjects as part of the social practices in the scaling site, it is possible to understand the process. However, identifying these subject posi-
tions does not imply that it is possible to predetermine the results scaling processes. When engaging in the scaling of ESD-activities, questions can be posed regarding what the potential clashes are, how they play out, and what forms of resistance they engender to the scaling process, which reaffirms the dynamic character of SEAL. As such, the outcomes of such scaling processes are not given.

Paper III illustrates the practical insight of how learning in and through the scaling of ESD-activities is emergent in relation to the environing conditions of designated scaling sites. What aspects of an environment (resources, drivers, social structures or institutional conditions) become actualised in a scaling process is possible identify through a sufficient understanding of the designated scaling sites, but not predetermine. In the change project course, reported on in Paper III, existing traditional knowledge systems regarding small-scale farming became an potentially enabling or constricting condition for the scaling process. The participant farmers were relating their practices to Traditional Knowledge Systems (TKS), and when the scaling process came into conflict with this knowledge, in terms of not acknowledging its relevance to the farming practice at hand, the scaling subjects expressed resistance to the effort to put the Change Project Approach to scale. It was when the scaling process considered and included the TKS that the scaling process could proceed. Considerations regarding TKS can furthermore be construed as an example of how it is crucial to consider the existing valued beings and doings amongst the scaling subjects involved in the scaling process and how, as noted by Nussbaum (Nussbaum, 2003), knowledge creation constitutes an important capability and functioning.

8.4.2 Scaling as a selection of educational content

The second practical insight involves scaling as a selection of educational content, e.g. seldom the whole ESD-activity is scaled, but rather select parts relative to the scaling subjects and the designated scaling site.

(i) Scaling objects, presented as educational content in the SEAL-framework, is shown in the papers to be quite diverse. Paper I exemplify this diversity through dialogue in the Swedish workshop series where the participants describe the scaling object of the IBA as a set of values, a method for inquiry or a model for facilitating stakeholder dialogue. The Ecuadorean and South African workshop series, presented in Paper I, II and IV, illustrate a similar point when the participants proposed specific educational methods, agricultural techniques as well as onto-epistemological approaches drawn from indigenous knowledge systems, as potential scaling objects.

(ii) Coupled with this range in scaling objects, often more than a single aspect of an ESD-activity is selected as the educational content to be scaled. The scaling of the Alforja Educativa ESD-activity (Paper II) included both an educational methodology (Child-to-Child methodology) and an onto-
epistemology (Sumak Kawsay). In scaling the Alforja Educativa both scaling objects, while on different conceptual levels and with different focus, were presented in the empirical data as crucial for the ESD-activity. An example from the South African workshop series (Paper IV) included participants engaging in discussions regarding the scaling object of the Change Project Approach. The discussion encompassed as scaling objects, principles, educational methods as well as fact-based content\(^{20}\), with the participants questioning if these scaling objects were just different aspect of the same object or if it was a case of multiple scaling objects.

(iii) A further idea, related to the point about multiple scaling objects, consists in that the selection of scaling objects as educational content is not always obvious, but a topic for discussion and sometimes disagreement among those involved in the scaling of ESD-activities. In both the Swedish workshop series and the South African workshop series, participants often expressed differing understandings on what should be scaled in the ESD-activity. In Paper IV, when discussing the Fundisa for Change, the participants agreed that the project involved both educational approaches and certain fact-based content. What they found difficult to agree upon was whether the scaling process should be about scaling the approaches, leaving the choice of more specific fact-based content open, or if certain fact-based content was what should be scaled. In Paper I, a similar discussion emerged regarding the Inquiry-Based Approach (IBA) during the fourth workshop. The workshop participants acknowledged that the IBA included both principles and methods, but there was initially no agreement on their relative importance in terms of scaling objects.

(iv) Assuming the possibility of multiple, related, scaling objects indicates that during scaling processes, different scaling objects come into focus at different times. This introduces temporal considerations into the understanding of scaling. Similarly, Paper I, emphasise the temporal dimension when evaluating the success of scaling processes on the ability of ESD-activities to remain relevant to scaling subjects and designated scaling sites over time as circumstances change. Scaling is thus as much about temporal sustainability as a spatial spread; indicating that what becomes scaled in an ESD-activity is often neither static nor stable. Rather, the scaling object can undergo adaptation and transformation throughout the scaling process. Paper I and IV illustrates, from different perspectives, the importance of considering what to bring from the scaling source site, that which becomes the scaling object. In the Swedish workshop series (Paper I), as participants discussed the identity of scaling objects they concluded, what is often scaled can be conceptualised as a set of values. In the Swedish context, such proce-

\(^{20}\) When using 'fact-based' content I am not suggesting that other forms of content are not based on facts but rather as to indicate a content that aligns a selective tradition were facts become divorced from values (Poeck, Östman, & Öhman, 2019; Öhman, 2004).
dural and substantive values relate to deliberative processes and democratic values of equity, respect, and tolerance. Resulting from these considerations is the idea that if the ambition is to scale either specific values or values as 'companions' to some other scaling object, it behoves those involved to critically examine, in context, how the scaling of these values (and the values themselves) can be introduced in new designated scaling sites. Such critical reflections of scaling values would furthermore need to take into account the valued beings and doings of the scaling subjects involved, ensuring ethical acceptability.

(v) Since the scaling of ESD-activities can involve multiple scaling objects, tensions might arise between them. Scaling objects are not always striving for the same aims or have the same purposes. The study of the Alforja Educativa (Paper II) shows how an ESD-activity can encompass scaling objects that are in tension with each other, invoking, for example, specific metaphors and epistemological positions or methodological approaches. In Paper II, tensions emerged as the ESD-activity promoted specific metaphors and onto-epistemologies relevant to human-bacteria relationships, while simultaneously promoting an open-ended methodology. In this methodology, children were expected to formulate their positions and set the agenda for the ESD-activity. As such, children were expected to freely express their interests and engage in open-ended inquiry while simultaneously subscribing to the onto-epistemology of Sumak Kawsay and an understanding of ABR focusing on the co-existence with bacteria.

(vi) The selection of educational content when performing scaling is dependent on educational purposes, i.e., making scaling as a selection of content a purpose-oriented process. As a purpose-oriented process, decisions on how to balance addressing specific challenges, or broader and more general challenges, become crucial. Paper I and IV, exemplify how the workshop participants' understanding of scaling was affected by how they viewed the purpose of scaling specific ESD-activities. When considering the purpose of the Fundisa for Change during the South African workshop series, participants discussed whether the purpose was to mainstream educational content in higher education or build capacity among teachers in their work outside as well as within higher educational institutions, resulting in differences in how they envisioned the scaling process to proceed.

(vii) When the selection of educational content engages differing knowledge systems, potentially productive, as well as oppressive encounters occur (Agrawal, 1995). These encounters between knowledge systems can be related to the geopolitics of knowledge (Mignolo, 2002) and the possibilities of third space epistemologies (Bhabha, 1994, 1996; Soja, 2010).

Paper II provides an example of how enabling encounters between medical science and traditional knowledge systems involves identifying how we can move beyond the choice between medical science and traditional knowledge systems in terms of onto-epistemology. In the Alforja Educativa,
such an approach enabled the scaling to involve both onto-epistemologies, drawing on the potential of both onto-epistemologies in addressing the sustainability challenge of ABR. The flattening of onto-epistemological hierarchies meant in the Alforja Educativa openness to traditional knowledge systems, allowing for conceptualisations of health not limited to medical science.

Furthermore, as seen in the case studies of Paper III, there were examples of small-scale farmers engaging traditional knowledge of the communities and farmers to enable the scaling of the ESD-activity in question. In some cases, these enabling conditions resulted from connecting to on-going traditions of farming practices, but in others, it involved rejuvenating dormant practices well adapted to the local conditions of farming.

While it is outside the scope of this research project to further address how the relationship between traditional knowledge systems and other knowledge systems affect scaling, it poses interesting questions for future research. Nevertheless, part of this practical insight is to highlight these, both potentially productive and oppressive, relations as worth consideration when engaging in scaling practices.

8.4.3 Scaling as a process of subjectification

A third practical insight resulting from the empirical studies is to consider scaling as a process of subjectification, in which subject positions are enacted and re-enacted throughout the scaling process.

(i) Subjectification, applied to scaling, involves expectations that scaling subjects submit to certain subject positions, which can be both potentially productive and repressive for the subjects involved. There is a potentially productive power in researchers, professional educators, and municipality employees assuming subject positions of active engagement in the scaling process. These engagements can facilitate collaborations between educational institutions and communities. In the Swedish workshop series (Paper I), participants reflected on how collaborations among scaling subjects created enabling conditions for scaling in which municipality employees and educators contribute to a grounded adaptation of scaling objects. The potential outcomes of these collaborations included both spatial adaptations to designated scaling sites as well as temporal adaptations, timing, in terms of initiating the scaling process at an opportune moment.

The Alforja Educativa and the Ecuadorian workshop series (Paper II) provide a further example of the productive potential of subjectification. School children, who often are assumed passive recipients of educational efforts, were expected to assume subject positions as significant drivers in the scaling of ABR education. Based on a Child-to-Child methodology, this involved the children being active in defining educational themes and subjects of interest, which would be the starting point for the scaling effort.
There were also expectations on the children to submit to subject positions as drivers in the scaling process by shifting positions from learners in school to educators of ABR with their families and the local community. Such a shift in ownership of the scaling process could empower the school children to adapt the scaling objects, making the educational content meaningful to families and the local community.

A similar shift was also on display in the Southern African cases of the Change Project Approach (Paper III), with expectations on teachers-in-training to assume subject positions of bridging the distance between academic institutions and local communities. The teachers-in-training adapted, in collaboration with local practitioners, educational methods and approaches that they had engaged with within the change project course, to the sustainability challenges of their local communities.

(ii) While there are potential in the subjectification process of enabling scaling subjects to engage in scaling, there are also risks that subjectification becomes repressive. One form this can take is that scaling subjects are limited to positions as passive recipients of scaling efforts. An example is the Change Project Approach (Paper III), in which a community of small-scale farmers were expected to be recipients of knowledge and expertise held by an agricultural extension officer. The farmers were expected not to make adaptations to the ESD-activity even though, based on their knowledge and past experience, they have ways of addressing a wilting vegetable garden. Instead, the farmers were expected to submit to awaiting the return of the agricultural extension officer before addressing the challenge at hand. In this way, the subjectification ended up impeding the scaling of the ESD-activity.

Another way subjectification can become repressive is expectations that scaling subjects take broader responsibility for the scaling effort than they are willing or able to do. In the Ecuadorean workshop series (Paper II) educators were concerned that school-children upon assuming the subject position of educators with family and the local community would experience undue stress by taking the lead in addressing a sustainability challenge that was the responsibility of all members of society. This point can be related to the risk of 'outsourcing' the responsibility for addressing sustainability challenges to children and youth when putting ESD to scale.

(iii) A crucial element of both the productive and repressive potential in scaling as a process of subjectification is that scaling subjects can occupy multiple and changing subject positions depending on the designated scaling site. In Paper II, the school children, as part of the Alforja Educativa, move between the school as a scaling site and other scaling sites, such as family homes and local communities. School becomes a temporary source site from which the ESD-activity is scaled, and children are expected to assume different subject positions depending on whether they are in school or with their families and in the local community.
(iv) Subjectification processes in scaling involve transactional relations among those involved in scaling in the designated scaling sites. In Paper II, as children are expected to assume a subject position of being co-creators of knowledge regarding the Alforja Educativa, teachers are also expected to assume certain subject positions. There are expectations that teachers assume the position of co-creators of knowledge together with the children, rather than being authority figures.

This relational subjectification is further illustrated in Paper III, as the subject positions of small-scale farmers and the agricultural extension officer are connected both to the designated scaling site of the community garden and each other. From the expert introducing external knowledge and showing how the community should change its practices, there was a shift towards using the traditional knowledge of the community as the basis for the ESD-activity. The agricultural expert, together with the community, comes to change their subject positions when combining contemporary agricultural knowledge with the community's knowledge.

(v) The relation between the expected subject positions and different knowledge systems can be an additional source for potentially productive and repressive forms of subjectification. As illustrated in both Paper II and III, subjectification can involve an acknowledgement of traditional knowledge systems, including water conservation in Southern Africa and Sumak Kawsay in Ecuador. Engaging these systems as valid in relation to expert-driven onto-epistemologies can empower scaling subjects who subscribe to, and identify with these, traditional knowledge systems. Meanwhile, assumptions made only for, rather than also by, scaling subjects regarding their subject positions in relation to designated scaling sites and onto-epistemologies might turn the subjectification process repressive.

(vi) Which positions scaling subjects assume in the scaling process is to a significant degree conditioned on the interplay between expectations on the subjects and their submission or resistance to these expectations. An example of this is the Change Project Approach case (Paper III) in which the subject positions of local farmers changed due to them resisting the expectation that they should be deferential to the agricultural extension officer.

(vii) As the Alforja Educativa aims to change ingrained perceptions of health and the negative role of bacteria, it is not only adding new knowledge but also challenging educators' understandings, perceptions, and knowledge. This process involves unlearning (Delahaye & Becker, 2006) as well as learning. In Paper II, the Alforja Educativa provides an example that the flattening of social and epistemological hierarchies often involves the challenging of existing subject positions. Such challenges are seldom unproblematic, and individual teachers enacted a resistance towards this process. The source of the resistance, according to the teachers, was perceived conflicts with other objectives and values of the educational system and their teaching practice. In other words, this reflects, throughout the Ecuadorian
workshop series, recurring tensions between on one hand participatory education and non-participatory education, and on the other hand, between a modern medical knowledge system and a traditional knowledge system.

8.4.4 Scaling as an agency formation process

A fourth practical insight resulting from the empirical studies involves scaling as an agency\(^{21}\) formation process, in which scaling subjects develop agency in adapting the scaling objects.

(i) A crucial component of such agency formation was identified in the South African workshop series (Paper I and Paper IV) as terms of participation for scaling subjects. These terms are set out in the ESD-activity and recreated through the scaling process, influencing scaling subjects’ ownership of the scaling process and whether they are ‘allowed’ to set the direction for current and future scaling efforts. In Paper II, Sumak Kawsay and Child-to-Child methodology, as the principal educational content of the Alforja Educativa, created ‘terms of participation’ in which scaling subjects could utilise the educational methods they deemed relevant. By allowing for a diversity of educational methods, the scaling subjects were able to envision the adaptation of the scaling object in relation to a variety of designated scaling sites. Allowing the scaling object to retain a degree of adaptivity constitutes an enabling condition for agency formation among the scaling subjects as they have opportunities to engage in the scaling process as partners. Paper III exemplifies agency formation in terms of scaling subjects’ ability to adapt the scaling objects of the Change Project Approach. In the cases studied, initially, knowledge creators were often university staff and agricultural extension officers to whose expertise scaling subjects were expected to adhere to in their practices. Meanwhile, resistance from scaling subjects and a concern that they might retire from the scaling effort prompted a change in scaling subjects’ terms of participation. As such, the terms shifted from passive recipients to co-creators of knowledge with a significant degree of agency.

The relation between subjectification and agency formation was exemplified in Paper I as participants of the South African workshop series highlighted how the positioning of scaling subjects as beneficiaries reduced their ability to contribute to the scaling process.

(ii) Enabling scaling subjects to exert greater agency will not always result in what is considered as ‘successful’ scaling. If scaling subjects are not sharing at least some crucial principles of the ESD-activity, i.e. enacting fidelity in the scaling process (Dewa et al., 2002; Harwell, 2012; McMaster & Fuchs, 2011), it might rather be the case of developing or scaling a new

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\(^{21}\) The ability of individuals or groups to chose to take some action after reflective through regarding alternative courses of action. As such, agency is understood to involve self-identity, intentional action, purpose and volition.
ESD-activity. Paper II illustrates how an open-ended approach to scaling subjects’ ability to define the challenge of ABR could come in conflict with other scaling objects of the Alforja Educativa.

Following from the result is considering processes of agency formation as part of shifts in ownership, enabling a degree of sustainability and evolution in the scaling effort (Clarke & Dede, 2009; Coburn, 2003).

8.4.5 Scaling as a consideration for valued beings and doings

Considerations for how the scaling of ESD-activities relate to valued beings and doings (Sen, 1999, 2003) of those involved in scaling constitute a fifth practical insight resulting from the empirical studies.

(i) Such ethical considerations are necessary for both practical-executive reasons and moral reasons. As is illustrated in especially Paper I and III, there is a risk that those involved in the scaling of ESD-activities will withdraw their participation if ethical aspects of scaling, understood as valued beings and doings are not considered in the scaling process. The main reason for conceptualising the ethical aspects of scaling by drawing on the capabilities approach (CA) (Alkire, 2002; Kronlid, 2014; Nussbaum, 2006; Robeyns, 2005b; Sen, 2003), is that CA is strongly action-oriented. Rather than focusing on access to freedom, CA highlights that a person is not free until she or he has the actual ability (functioning) to act upon his or her valued beings and doings.

(ii) Moreover, these valued beings and doings are emergent qualities, i.e., they are not static conditions but change, transform, or transgress over time in response to, e.g. social, cultural, and economic conditions. Accordingly, scaling should not create a conflict with the emergence of the valued beings and doings (Sen, 2003) of the scaling subjects in the designated scaling site. It becomes important to consider how the introduction of new activities in a designated scaling site will affect valued beings and doings, i.e., capabilities, as they are dynamic properties (Kronlid, 2014; Nussbaum, 2003; Robeyns, 2006). Accordingly, scaling should acknowledge the importance of being ethically acceptable to scaling subjects in order for scaling to result in meaningful and sustainable change (Clarke & Dede, 2009; Coburn, 2003; Coburn & Stein, 2010; Dede et al., 2005). A similar point regarding the relevance of what is scaled is made by Harwell (2012) and others (Dewa et al., 2002; Harwell, 2012; McLaughlin & Mitra, 2001; McMaster & Fuchs, 2011; Stemberg et al., 2013).

(iv) However, it is of equal importance that scaling also encapsulates a certain level of transgressive learning (Lotz-Sisitka et al., 2015), as the beings and doings that scaling subjects value are not static but emergent experiential properties. These properties unfold themselves in response to shifting conditions over time and space (at different rates), and in relation to the subjects in question; in short, they are more or less adaptive preferences. The
valued beings and doings of those involved in scaling may, at least to a certain degree, harmonise with the unsustainable practices that have created the need for the scaling of an ESD-activity. As such, it is necessary to consider, and allow for, shifts in the frames of preferences and values amongst those involved in the scaling process when necessary.

(v) Consequently, there is always a dynamic element to scaling that amounts to balancing the need to scale ESD-activities to address sustainability challenges and considerations of scaling subjects’ valued beings and doings. There are tensions between not being too radically different from subjects’ valued beings and doings, and not surrendering to the unsustainable practices caught up in peoples’ valued beings and doings. As stated by Sayer (2011), it is not surprising that in times of struggle, ethics come to the fore.

8.4.6 Scaling as a re-actualisation of experiences

A sixth practical insight involves scaling as a process of re-actualising the experiences of scaling subjects.

Scaling involves inserting ESD-activities along scaling subjects’ continuum of experiences, thus making the ESD-activity relevant to past experiences and having an ability to inform current and future experiences and practices. The results of the analysis in Paper IV illustrate how concepts related to scaling are constituted in relation to ESD-activities, with which scaling subjects have experience. As part of this conceptualisation of scaling related to practice, participants assume ownership of existing concepts of scaling, adapting them. By engaging with scaling concepts, participants learn how to utilise these concepts, while at the same time redefining said concepts. The formulation by scaling subjects of ends-in-view, as part of engaging in conceptualisation, is crucial in how concepts related to scaling are constituted since it indicates the moment when there is a shift in ownership (Paper I). In these ends-in-views, participants take the learning process of conceptualisation into new directions that make ‘scaling’ relevant to their experiences and the challenges they face in working with ESD-activities. By considering the experiences of scaling subjects, it is possible to understand the direction of a scaling process. As such, there is value in scaling processes of involving ESD-activities that do not strictly hold on to an ‘externally’ set purpose but instead enable scaling subjects to re-actualise their experiences, creating conditions for depth and shift in ownership in the scaling of ESD-activities.
8.4.7 Scaling as a potential for developing the scalability of ESD-activities

Considered together, the practical insights outlined above indicate a further practical insight, that of scaling as a potential for developing the scalability of ESD-activities.

(i) Assuming a perspective of scaling as a transactional learning process means that scaling efforts involves learning opportunity regarding the scaling of ESD-activities in general and the specific ESD-activity in particular. Scalability is understood as a relational process, involving the 'distance' between scaling object, scaling subjects (including valued beings and doings), and designated scaling sites, both source scaling site and target scaling site.

In the case of the source site, the relation between the scaling object and the environing conditions of the scaling source site is important as it affects to what degree the scaling object is specific to that scaling site or applicable elsewhere. As noted in the theory chapter (Chapter 5), environing conditions are the aspects of an environment that become relevant in an activity. As such, the source site's environing conditions include the specifics of the sustainability challenge and the way the ESD-activity attempted to address that challenge. Scalability is, therefore, determined in terms of how tightly bound the ESD-activity is with the specifics of the scaling source site and to what degree scaling objects can be identified and extracted from the source scaling site.

Furthermore, regarding the designated scaling target site scalability is related to how the scaling object can be introduced under those environing conditions. The ESD-activity needs to be relevant to the specifics of environing conditions in the target site in order to address the sustainability challenge.

(ii) The scalability of an ESD-activity has two principal parts. First, that the ESD-activity is not so specific to a certain scaling site that a scaling object cannot be identified and extracted. Second, to what degree the ESD-activity enable scaling subjects to adapt the scaling object, making it relevant to the environing conditions of the designated scaling target site. Paper III illustrates, in its focus on scaling objects and scaling subjects' agency in adapting and transforming the scaling object, how the rigidity and flexibility of the scaling object affect the degree of scalability of ESD-activities.

8.5 Summary

This chapter has presented theoretical and practical insights resulting from the empirical studies, as a substantiated SEAL conceptual framework, relevant to practitioners looking to evaluate, conduct or design a scaling process.
Exploring the basis for understanding scaling processes as learning, and generating an empirically grounded vocabulary, has highlighted systematic ways of addressing questions regarding the scaling of ESD-activities. Furthermore, this chapter has outlined insights problematising the educational content of scaling processes, the expected subject positions of those involved in scaling, the agency of these scaling subjects, and how their past experiences can be re-actualised in enabling scaling. These considerations provide practical insights into ways to account for and address the complexity, but also enable, the scaling of ESD-activities.

Considering these theoretical and practical insights is argued to enable scaling processes characterised by depth, sustainability, shift in ownership and evolution. (1) Depth, in that the ESD-activity is relevant to the scaling site. (2) Sustainability, the scaling subjects already engaged in the scaling site carry on the ESD-activity through their practices. (3) Shift in ownership, in that scaling subjects assume the responsibility for the scaling process (4) Evolution, in that the scaling subjects adapt the ESD-activity in relation to changing circumstances and contribute to developing the ESD-activity (Clarke & Dede, 2009; Coburn, 2003; Coburn & Stein, 2010; Dede et al., 2005).

These characteristics implies that the selection of educational content to put to scale should be made together with the recipients and partners of the scaling of ESD-activities. As ESD-activities are not deposited through scaling, the question becomes what ESD-activities are suitable for use by specific scaling subjects to address particular sustainability challenges. The conceptual framework and the studies reported on in the papers of this research project illustrates that an ESD-activity considered successful in one context does not guarantee its scalability in other scaling sites. When considering, and enabling, the adaptation of scaling objects through the agency and engagement of scaling subjects, scalability is possible to achieve. Bringing the arguments (Clarke & Dede, 2009; Coburn, 2003; Coburn & Stein, 2010; Dede et al., 2005) into this discussion would indicate that such adaptation of ESD-activities would enable the long-term relevance of these ESD-activities in the face of wicked sustainability challenges. Scaling is thus considered an on-going process that can attain continued relevance in addressing sustainability challenges, rather than a time-limited intervention.

The following chapter (Chapter 9) will discuss the theoretical and practical insights presented in this chapter and the research project as a whole in relation to the four PhD studies presented in Chapter 4.
9 Discussion

9.1 Introduction

The previous chapter (Chapter 8) presented theoretical and practical insights based on the studies of this research project, detailing the SEAL conceptual framework and offering further depth to approaching the scaling of ESD-activities as learning.

These two final chapters, constituting the discussion and conclusion of the thesis, will engage with previous research in different ways. As part of the discussion in Chapter 9, the research project is contrasted with the four PhD studies presented in Chapter 4, enabling a critical discussion. The PhD studies include three Southern African studies, Mandikonza (2016), Agbedahin (2016) and Tshiningayamwe (2016) as well as one study from Colombia, Chaves (2016). These studies exemplify several approaches that contrast with the approach taken in this research project, and which highlight new aspects regarding the conditions for the scaling of ESD-activities.

In the concluding Chapter 10, I present a synthesis of the results of the research project and, engaging the broader range of previous research, detail contributions to research, practice and policy. Supplementing these contributions, a further section presents how these synthesised results and contributions address the five myths of scaling (Looi & Teh, 2015) that frames the thesis. A final section outlines perspectives on the scaling of ESD-activities as a subject of inquiry for future research.

The approach taken in the present discussion chapter is an active and affirmative choice to enable a critical discussion regarding my research project by contrasting it with the four PhD studies, who share similar research contexts to the present research project and that addresses questions of relevance for the scaling of ESD-activities as an educational subject of inquiry.

While not all of the chosen PhD studies address the ‘scaling’ of ESD-activities, their engagement with the subject of inquiry, the conditions for the multi-dimensional spreading e.g. multi-dimensional processes of mainstreaming or implementing of ESD-activities, justifies their inclusion.

Furthermore, selecting three PhD studies from Southern Africa and one from Latin America acknowledges the participatory approach taken in my research project involving international connections to both Southern African and Latin American contexts. The three Southern African studies were
selected as they represent a summary of long term ESD-activities in the Southern African context about multi-dimensional spreading. Together they constitute reports on the work of major educational projects, namely Fundisa for Change (Tshiningayamwe, 2016), Change Project Approach (Mandikonza, 2016) and Mainstreaming Environment and Sustainability in African Universities (MESA) (Agbedahin, 2016). These studies, utilising a diversity of educational and learning theories, explore ESD-activities throughout the Southern African region. The study from Colombia (Chaves, 2016) was selected as it represents research on ESD-activities in a Latin American context, posing questions regarding the impact of ontological positions held by those involved in multi-dimensional spreading. As such, these four PhD studies are comprehensive reports on research relevant to the main research area of this research project.

As the careful reader has noticed, my notion of context includes a temporal dimension. To provide a theoretical framing for the discussion and to highlight this aspect, I draw on the interrelated concepts of contingency and continuity as outlined by Dewey (1934), detailed in Chapter 5.

In conjunction, the different theoretical perspectives and research approaches discussed in this chapter highlight how the multi-dimensional spreading of ESD-activities as interwoven processes of contingency and continuity could be constructed in several ways.

The structure of the chapter centres on engaging with the four PhD studies in pairs, discussing how they contribute with critical perspectives on the approach of scaling-as-learning taken in this research project.

The first pair of studies, Mandikonza (2016) and Agbedahin (2016) contribute with critical perspectives on the structural aspects. These structures are discussed in terms of creating conditions for multi-dimensional spreading, and how these structures, through mediated action, can facilitate institutional change.

The studies by Tshiningayamwe (2016) and Chaves (2016), constituting the second pair, contribute to critical reflections on the processes and encounters involved in the multi-dimensional spreading of ESD-activities. These processes are discussed as reliant on, and interconnected with, people’s freedoms from epistemological hierarchies, decolonisation of knowledge, creating conditions for the kind of futures they have reason to value.

The aim of this chapter is not to ‘evaluate’ the approaches to the multi-dimensional spreading of ESD-activities taken by the PhD studies, but rather, to discuss and highlight the approach taken in my research project by contrasting it with the four PhD studies’ perspectives and knowledge
claims. This contrasting involves outlining what questions and knowledge claims the studies present to the multi-dimensional spreading of ESD-activities, and how these questions illustrate the possibilities and limitations of the approach taken, and results presented, in this thesis. Table 10 summarises the conceptualisations of multi-dimensional spreading, questions and knowledge claims of the four PhD studies as well as my research project.

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22 Throughout the chapter 'PhD studies' and direct references is used to designate the four PhD studies, while 'the research project', 'this research project' and 'my research project' is used to designate the research presented in this thesis.
Table 10. Summary of studies on the multi-dimensional spreading of ESD-activities

<table>
<thead>
<tr>
<th>Author</th>
<th>Mandikonza 2016</th>
<th>Agbedahin 2016</th>
<th>Tshiningayamwe 2016</th>
<th>Chaves 2016</th>
<th>Mickelsson 2020</th>
</tr>
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<tbody>
<tr>
<td>the multi-dimensional</td>
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<tr>
<td>spreading of ESD-activities</td>
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<tr>
<td>Questions</td>
<td>What are the socio-cultural context and institutional structure of the spreading process, and how do they enable and constrict agency in spreading of ESD? How is the individual agency interconnected with the collective agency in spreading? How does the spreading of ESD-activities facilitate the building of capacity for changed institutional practices?</td>
<td>What are the position-practices of those involved in spreading and how do spreading practices intersect with their structural and institutional positions? What is the relationship of spreading position-practices to those of relevant stakeholders within the laminated system? How do position-practices within the laminated system enable and constrain spreading?</td>
<td>To what extent does spreading of ESD-activities take into consideration functionalities and freedom of people? How can spreading be enabled or limited by conversion factors?</td>
<td>What are the encounters between people holding different ontological positions that occur as part of spreading processes? How are the power relations among participants, specifically when these are seen to represent different ontologies? What are ontological inflexibilities and power negotiations among those involved in spreading? How do position-practices within the laminated system enable and constrain spreading?</td>
<td>How do participants’ experiences and agency create conditions for spreading educational content in ESE? How does educational content interplay with environments, such as natural and social environments, when spreading in ESE?</td>
</tr>
<tr>
<td>Knowledge claims</td>
<td>Intersections between individual practices and collective practices as part of institutional, educational structures constitute conditions for the spreading of ESD-activities.</td>
<td>Comprehensive and multi-levelled social and institutional structures frame spreading of ESD-activities, implying possibilities and constraints for individual and collective spreading practices.</td>
<td>People’s freedoms and possibilities to participate in spreading along with the factors that enable or limit these freedoms create conditions for the spreading of ESD-activities.</td>
<td></td>
<td>Experiences and agency of those involved in scaling practices and the encounters with educational content and context constitute conditions for the spreading of ESD-activities and practices.</td>
</tr>
</tbody>
</table>
9.2 Critical discussion

Based on the outline of the four PhD studies in Chapter 4, I interpret the authors as posing several questions of relevance to my research project on the scaling of ESD-activities. Based on these questions, I furthermore, argue that the PhD studies make several knowledge claims regarding processes of multi-dimensional spreading. The concepts of contingency and continuity as well as the critical contributions of these four PhD studies, forms the basis for discussing the research project presented in this thesis.

All four PhD studies create knowledge of relevance for my research project that the Deweyan work (1934) does not provide in-depth lenses to address.

9.2.1 Critical reflections on the structures involved in the multi-dimensional spreading of ESD-activities

In his study, Mandikonza (2016) poses a number of questions to the multi-dimensional spreading of ESD-activities. Firstly, these questions pertain to what are the socio-cultural contexts and institutional structures of multi-dimensional spreading efforts and how can these structures enable or constrain agency capacity building among participants.

Further questions address the individual and institutional practices involved in multi-dimensional spreading efforts, and how individual agency is interconnected with collective agency as part of such efforts. The third set of questions relates to the mediatory roles of ESD-interventions and activities as part of multi-dimensional spreading in facilitating the capacity for changed institutional practices through reflective engagements.

A recurring theme throughout the study and the research questions is the relationship between individual agency and collective agency as part of institutional dimensions. Crucial to this process is how to introduce ESD-activities in social, institutional practices, moving from the individual-social to the institutional-social. Therefore, the study (Mandikonza, 2016) engages issues of multi-dimensional spreading regarding how to enable and facilitate, initiate and sustain institutional change.

As such, Mandikonza (2016) makes knowledge claims regarding the intersection of individual practices with collective practices within institutional, educational structures, and how such structures affect multi-dimensional spreading processes.

Mandikonza (2016) illustrate that socio-cultural realities of people are not acknowledged in the learning system since he presents them as often being

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23 The ability of individuals or groups to chose to take some action after reflective through regarding alternative courses of action. As such, agency is understood to involve self-identity, intentional action, purpose and volition.
reduced to recipients of colonial education in terms of, for example, teaching in colonial languages. To address this situation, the study presents an approach to multi-dimensional spreading as institutional change through mediated action.

In the study, Mandikonza (2016) highlights how the individual agency and the collective agency are qualitatively distinct, but at the same time interrelated in practice. Meanwhile, my transactional learning approach focuses the attention on the individual learning encounters between learners, educational content and environing conditions. As was shown in the result chapter, these individual action-oriented learning processes are often part of joint knowledge creation processes.

- The study presented in Paper II, identifies processes of reciprocal subjectification as framing the individual learning of children, teachers, family and local community related to ABR-education.
- In the study presented in Paper III, the joint adaptation of educational content and agency formation was found to frame the individual learning of members of farming communities working with agricultural extension officers.
- In the study presented in Paper IV, reflective scaling practices focused on shared experiences of ESD-activities found to frame the individual learning of participants in the South African workshop series.

The arguments presented by Mandikonza (2016) highlights institutional dimensions relevant to my research project. First, Mandikonza (2016) illustrates the intersection of the individual practices, that have been the principal focus of my research project, with collective practices. By contrasting my project with that of Mandikonza (2016), I can discern how my research project could delve further into collaborative learning. Second, Mandikonza’s (2016) study highlights how social structures such as educational institutions frame the intersected individual and collective practices, potentially both enabling and constricted these practices. As such, Mandikonza (2016) points to a further range of structural and institutional conditions for multi-dimensional spreading. These arguments poses further questions of relevance to this thesis regarding the possibilities, through meditation and the interconnection of individual and collective agency, of capacity building with the aim of initiating and sustaining scaling processes as part of institutional change.

In her study, Agbedahin (2016) asks questions regarding the structural conditions for the multi-dimensional spreading of ESD-activities. Firstly,
what are the position-practices\textsuperscript{24} of those involved multi-dimensional practices? Secondly, how does these practices intersect with their positions within a laminated system\textsuperscript{25} of social structures and institutions? Thirdly, how do these position-practices create conditions for enabling and constraining the multi-dimensional spreading of ESD-activities? Central to these questions is the ability of those involved to facilitate change, which results in a fourth question, how is this ability determined by their relative position-practices and available continuous institutional support?

As such, Agbedahin (2016) makes knowledge claims regarding the conditions for the multi-dimensional spreading of ESD-activities within interdependent multi-level social and institutional structures.

In joining the concept of position-practices with a laminated systems perspective, Agbedahin (2016) highlights how the individual and collaborative learning processes involved in multi-dimensional spreading is set within multi-levelled social and institutional structures. As such, these processes become conditioned on their position relative to other on-going practices.

Following these questions (Agbedahin, 2016), multi-dimensional spreading becomes contingent on the position-practice system of those involved, highlighting the ‘positioning’ of such spreading practices. Agbedahin (2016) thus emphasises how the impact of ESD-activities are dependent on their positions within a laminated system, providing new perspectives on how the approach of scaling-as-learning, taken in this research project, can be investigated as emergent and contingent positions in individual, collective, institutional, national, regional and global settings (Cash et al., 2006).

9.2.2 Critical reflections on the processes involved in the multi-dimensional spreading of ESD-activities

As part of her PhD study, Tshiningayamwe (2016) poses several questions regarding people's freedom of realising alternative functionings\textsuperscript{26} in educational practices. Among these, the first is: how multi-dimensional spreading processes can be interwoven with processes of realisation of valued futures among those involved in the processes? Secondly, to what extent does are people’s functionings, their feasible realisation, and the freedom of people to engage in educational practices that are in line with their valued beings and doings, considered in the multi-dimensional spreading of ESD-activities? The third question addresses how multi-dimensional spreading can be ena-

\textsuperscript{24} Practices understood as always positioned within multiple institutional and organisational levels, and these structures are only existing through the reproducing efforts of on-going practices. The positioning of practices within this multi-level system of structures and institutions is integral to the practice, and the meaning and impact of practices transform structures and institutions in which they are positioned.

\textsuperscript{25} A system that enables the description of social realities (social structures and institutions) as arranged in patterns of interdependency.

\textsuperscript{26} The realisation of the valued beings and doings of the people involved in educational practices.
bled or limited by conversion factors that affect people’s ability to convert resources in realising their valued beings and doings. Finally, the fourth question addresses the relation between functionings and capabilities among those involved in the multi-dimension spreading of ESD-activities.

All four questions draw on an insight from the study that due to conversion factors, the form substantial freedoms take (capabilities) for those involved in multi-dimensional spreading when realising their valued beings and doings (functionings) might be different for different people. Those involved may thus require different resources to realise their valued beings and doings in the ESD-activity.

Based on these questions, I interpret Tshiningayamwe (2016) as making knowledge claims regarding the possibilities for people to participate in multi-dimensional spreading processes and what the conditions are for them exercising this freedom.

Contingency emerges in the study (Tshiningayamwe, 2016) as the way people have opportunities, and are able, to mobilise their resources into functionings. This line of reasoning focuses the discussion on how multi-dimensional spreading processes can actively engage with, and support, people's freedom to achieve a life they value, rather than merely recognising the existence of such valued beings and doings.

As presented previously, the SEAL conceptual framework includes considerations for scaling subjects' valued beings and doings, these are primarily supporting ideas for the transactional learning approach. Meanwhile, Tshiningayamwe (2016) highlights how ethical considerations could come to be a significant part of the multi-dimensional spreading of ESD-activities. Such ethical considerations would include the analytical use of capabilities, functionings and conversion factors as part of analysing these processes.

Chaves’s study (2016) raises several questions for the multi-dimensional spreading of ESD-activities, the first of which concerns what the encounters are between people with different ontologies, who are involved in the processes. Secondly, what are the power relations among participants, precisely when these view the world with different ontologies? Thirdly, how is power negotiated, regarding ontological positions, among those involved in multi-dimensional spreading? Finally, how can the potential of encounters between people with different ontological positions, involved in multi-dimensional spreading processes, be appreciated while also considering the costs for those involved in the processes?

Based on these questions, I interpret (Chaves, 2016) making knowledge claims regarding the structural conditions for multi-dimensional spreading.

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27. The substantial freedom for individuals to realise alternative combinations of valued beings and doings as lives they have reason to value.

28. Factors that enable individuals to convert resources into functionings (realised valued beings and doings) in the frame of educational practice. This notion of conversion factors is further nuanced with an analytical separation of social, environmental and personal conversion factors.
These conditions focus on power relations among those involved in the processes, based on differences in held ontologies.

As shown in the study (Chaves, 2016), the attempts to ‘introduce’ ESD-activities in communities sometimes results in disintegrating these communities to a smaller or larger degree.

In her study, Chaves (2016) illustrate how multi-dimensional spreading is characterised by contingency and continuity, depending on how the power relations between people involved play out. With those involved holding different ontological positions, an ESD-activity siding with one position and dismissing other ontological positions could result in resistance to it. This theme regarding ontology is touched upon in Paper II regarding how the onto-epistemology of scaling objects and scaling subjects affects scaling processes.

Encounters between people holding different ontological positions, decolonisation of knowledge and the emphasis on ‘buen vivir’, are positioned at the centre of the multi-dimensional spreading process outlined by Chaves (2016).

Meanwhile, my research project has another entry point, exploring scaling as a transactional learning process and how the long-term viability depends on shift in ownership and the consideration of environing conditions. As the specificities of designated scaling sites, these conditions are, in my research project, coupled with the diverse experiences and ontological perspectives of scaling subjects.

Examples of these shared points include how both my research project and Chaves (2016) emphasise the challenge of adults and teachers to ‘yield’ control to others, including children, enabling them to take part in knowledge creation. While this research project has not further explored power relations between those involved in scaling, originating in differences of ontological positions, I am, based on my approach to scaling, sympathetic to such considerations. In the designing, conducting and evaluating scaling processes, there are connections between considerations for ontological positions and the scaling processes being ethically acceptable to those involved.

9.2.3 Contingency and continuity in scaling processes

Based on the discussion in which my research project was contrasted with the PhD studies, contingency and continuity constitute two aspects of a scaling process involving educational content, scaling subjects and environing conditions of designated scaling sites. The discussion illustrates how the scaling of ESD-activities, in order to be sustainable over time (be characterised by continuity) is dependent on a degree of contingency in the form of being adapted by those involved in the scaling (scaling subjects) to accommodate educational content in diverse and changing environing conditions.
Scaling subjects can furthermore be described as sometimes resisting the scaling of educational content. As such, there is not just continuity of the educational content of the ESD-activity but also of peoples' experiences and valued beings and doings. Scaling processes are thus ill served by trying to uproot and ignore the experiences of scaling subjects along with their valued beings and doings.

Following the points illustrated by the discussion, inertia characterises contingency and continuity in scaling. Understanding the relationship between these two aspects in terms of inertia suggests the gradual change and transformation of educational content and environing conditions. Scaling of an ESD-activity cannot involve the immediate and complete transformation of educational content to be considered a scaling process. Instead, to consider an ESD-activity scaled, a degree of progressive change is necessary, otherwise there would be the development of a new ESD-activity. From this follows that the educational content of an ESD-activity should be possible to track backwards in its different iterations throughout the scaling processes. While scaling iterations may on the surface seem quite different, ESD-activities can be identified as part of the same scaling event.

9.2.4 Concluding remarks

The argument of understanding scaling in terms of contingency and continuity draws on the idea that learning transforms what is involved in a trans-actional encounter as well as represents a continuation of participants past experiences and environing conditions (Dewey, 1938/1997).

The theoretical approach of this thesis, using a Deweyan perspective, enables me to study what constitutes conditions for the scaling of ESD-activities and how these conditions can be understood in terms of contingency and continuity. By contrasting the research project with the four PhD studies highlights the structural and institutional framings and conditions for the scaling of ESD-activities, which is also possible to understand from a perspective of contingency and continuity.

While this research project study learning encounters between scaling objects, scaling subjects and designated scaling sites, the four PhD studies draw on social learning theories and approaches, to explore the broader social, cultural and institutional framings, which also are characterised by contingency and continuity. Both the research project and the PhD studies highlight that the conditions for scaling have a robust temporal aspect. These conditions could be argued to affect scaling subjects ability to, as highlighted by Tshiningayamwe (2016), mobilise their resources and functionings in the scaling process, either enabling the scaling subjects to engage in the scaling process with a significant degree of agency or constricting their agency, thus reducing them to spectators or recipients of scaling processes.
When considering the environing conditions and transactional encounters that scaling subjects find themselves in, as part of engaging in the scaling of ESD-activities, the four PhD studies offers further perspectives regarding both the structures and processes involved in scaling. As such, environing conditions and transactional encounters may differ significantly between whether we are in Southern Africa, Latin America or Sweden representing aspects of contingency and continuity.
10 Conclusion: synthesis of results, contributions and future research

In this concluding chapter, I connect the results of the four papers (Chapter 8) and the discussion of these results (Chapter 9) with previous research outlined in Chapter 4. The first section presents a synthesis of the results, addressing the research objectives. Contributions to ESE-research, ESD-practice and policy are then outlined, building on the results detailed in Chapter 8 and the critical discussion in Chapter 9. These contributions are, furthermore, set in relation to the myths of the scaling introduced in Chapter 2 (Looi & Teh, 2015). Finally, avenues for future research regarding the conditions for, and processes involved in, the scaling of ESD-activities are outlined, including suggestions on how to further develop the SEAL conceptual framework.

10.1 Synthesis of the results

The overall aim of this thesis is to contribute to a deepened and nuanced understanding of scaling in environmental and sustainability education (ESE) research, specifically, to develop a conceptual framework for engaging with the scaling of ESD-activities policy and practice. In this section, the synthesised results of the research project are presented, focusing on how these results fulfil the research objectives of the thesis.

10.1.1 Research objective one

Thesis objective one was to develop analytical methods drawing on transactional learning theory for conducting empirical investigations of meaning making concerning educational content in scaling processes. The objective was achieved through analysis of the Re-Solve workshop series. These analyses generated the results presented in Chapter 8, as the SEAL conceptual framework. This framework, in turn, constitutes an analytical method for practitioners in terms of a systematic conceptual approach to (1) evaluating of past scaling of ESD-activities, (2) conducting current scaling of ESD-activities and (3) designing of future ESD-activities for scalability.
The results of the analysis constituting the SEAL conceptual framework can be illustrated as several points:

Firstly, the thesis does not argue that scaling ‘is’ a learning process but that approaching scaling of ESD-activities ‘as’ a learning process enables theoretically nuanced and empirically sensitive scaling research grounded in educational concepts. The analytical approach taken in this thesis has engaged with questions regarding the conditions for the scaling of ESD-activities characterised by a shift in ownership, depth, sustainability and evolution. These aspects are hard to capture if adopting an instrumental approach to scaling.

Secondly, learning in and through the scaling of ESD-activities is an emergent process relating to the actualised environing conditions of specific scaling efforts and designated scaling sites. As such, it is possible to understand, evaluate and to a degree, direct scaling processes.

Thirdly, scaling is seldom about introducing the whole of a particular ESD-activity. Rather scaling involves a selection of educational content. What these scaling objects are is not always obvious, and the selection of educational content often involves discussions and disagreement amongst scaling subjects, raising the need to evaluative criteria for the inclusion and exclusion of certain content. Furthermore, these discussions and disagreements point to the necessity of considering power relations as part of scaling processes.

Fourthly, scaling involves the introduction of educational content under certain environing conditions, responding and relating to the requirements of the scaling subjects involved. The ability of ESD-activities to address these needs is dependent on involving those scaling subjects, in context, that can carry these ESD-activities forward in time. The reason for this is that in order for the ESD-activity to be relevant in a designated scaling site long-term, the scaling object needs to be adapted, and scaling subjects are the ones who most likely will be present to adapt ESD-activities as circumstances and sustainability challenges transform.

Fifthly, the SEAL conceptual framework points to an understanding of how to scale ESD-activities, which is not limited to achieving functional efficiency. Instead, scaling relies on the ESD-activity and the scaling process being ethically acceptable from the perspective of the scaling subjects i.e. the community and the individuals involved in the scaling process. These ethical considerations remain open to change with the scaling process unfolding as a process of learning about ‘that which is not yet there’.

Sixthly, using the SEAL conceptual framework, involving the transacational learning process, highlights learning opportunities regarding ESD-activities as well as scaling objects, scaling subjects and designated scaling sites, when engaging in scaling of ESD-activities.
10.1.2 Research objective two

Thesis objective two was to examine how workshop participants' experiences and agency create conditions for scaling educational content in ESE. This objective was achieved through analyses of subjectification processes involving scaling subjects and the re-actualisation of workshop participants' experiences in the Re-Solve workshop series as well as analysis of agency and the process ownership in assignments of the Change project course (CPA). The results of these analyses illustrate several points:

Firstly, scaling involves adding ESD-activities to a continuum of scaling subjects' experiences. As such, ESD-activities become transactionally related to scaling subjects’ experiences. While the ESD-activities come to inform subjects’ future experiences, the meaning of the activities also changes based on these experiences. When participants draw on experiences to conceptualise scaling, they not only transform the meaning of scaling concepts but can also create a concrete basis for building a shared understanding of scaling with other scaling subjects.

Secondly, as part of the, often joint, conceptualisation of scaling based on their experiences of ESD-activities, scaling subjects can assume ownership of scaling concepts, learning how to utilise and refine these concepts in relation to their experiences of, and practice with, ESD-activities.

Thirdly, the scaling of ESD-activities involves subjectification processes, where expectations on those involved in scaling are to submit to certain subject positions. Scaling subjects may experience conflicts between the objectives of the scaling process and other objectives and values (such as the educational system and their educational practice). Scaling subjects may also doubt their own and other subjects’ abilities to assume the subject positions.

Fourthly, as a possible outcome of processes of subjectification, agency formation among scaling subjects constitutes an enabling condition for scaling characterised by depth, sustainability and evolution. Such processes enable scaling subjects to adapt the scaling objects to designated scaling sites as part of the scaling process. The development of scaling subjects’ agency supports a shift in ownership of the scaling process to those involved long term in the designated scaling sites, enabling a degree of sustainability and evolution in the scaling effort.

10.1.3 Research objective three

Thesis objective three was to investigate how educational content interplay with environments, such as natural and social environments, when scaling educational activities in ESE. This objective was achieved through analysis of the selection of educational content in the Ecuadorean Re-Solve workshop series as well as analysis of the interplay between environments and educational content in the assignments of the CPA course: how different environ-
ments both facilitate and hinder the scaling of educational content. The results of these analyses illustrate several points:

Firstly, the results presented in this thesis emphasise the dynamic character of scaling, implying that scaling processes do not predetermine the meaning and knowledge of the scaling objects. As an on-going emergent process, the scaling process, including the scaling objects, are shaped by factors such as individual agency, social group formation and norms, and ethical values.

Secondly, the scaling pathway that brings together the concepts of ‘scaling object’, ‘scaling subject’, and ‘scaling site’ refers to this dynamic and emergent quality of scaling processes. Scaling processes include successive expansions of the repertoire of educational questions, and how the scaling object is adapted and transformed in the transactional encounter with scaling subjects and designated scaling sites.

As a result, a given scaling process becomes a journey into the unknown. This journey involves knowledge creation in the form of a learning process about encounters between designated scaling sites, scaling subjects and selected scaling objects: encounters characterised by contingency and continuity. The scaling object is adapted to the designated scaling site as a result of the knowledge creation process highlighting its contingency, but is still possible to recognise as an adaptation continuous with its previous iterations. Similarly, this contingency of the scaling object stems from considerations for the continuity in the environing conditions of the designated scaling site and the valued beings and doings of the involved scaling subjects. Meanwhile, neither the designated scaling sites or the scaling subjects emerge from the scaling process unchanged. The purpose of scaling an ESD-activity is to affect some form of change in the designated scaling site, while scaling processes, as shown, include the subjectification of scaling subjects, to which they may more or less submit or resist. As such, processes of scaling-ESD-as-learning can be argued to be processes of contingency and continuity with differing degrees of inertia. These two analytically separate but ontologically intertwined aspects highlight how scaling processes involve change still grounded in past iterations of the ESD-activities and that the pace of change can shift over time.

Thirdly, the results of the studies illustrates that scaling of ESD-activities is not limited to vertical and horizontal transfer of knowledge and models in geographical, social, and cultural spaces. Rather, scaling can be described as a transgressive process in which scaling subjects and scaling objects are transformative and transform each other, and the designated scaling sites.

Fourthly, the results of the thesis indicate the necessity of, for scaling subjects, ethically acceptable scaling objects. When introducing ESD-activities in a designated scaling site, a reasonable ambition is to make the activity sustainable over time, which in turn, according to this thesis, means that the
ethical considerations of the valued beings and doings of those scaling subjects involved in the scaling processes, need to be considered.

Fifthly, scaling objects need to have some connection to the designated scaling sites in order to open up the possibility for depth, sustainability, and evolution in the scaling effort. In terms of being ethically acceptable, this means, as noted above, taking into consideration the emerging valued beings and doings of those scaling subjects involved in the scaling effort, when evaluating whether a scaling process may be, is, or has been successful. If scaling subjects are to be able to adapt the scaling object to the designated scaling sites, the distance cannot be too large between scaling objects and the knowledge systems held by scaling subjects and their valued beings and doings.

10.2 Contribution to previous research

Chapter 4 accounted for previous ESE research that addressed (1) the empirical process of increasing the impact of ESD-activities as a spreading process, and (2) the dissemination and implementation of ESD policy in practice, especially in terms of critical ESD policy mobility studies. The present section outlines how the research project contributes with knowledge on scaling to ESE-research.

In ESE research, there has been significant interest regarding dissemination of ESD policy, and from a critical policy perspective the politics of dissemination. This research centres on the processes by which ideas and concepts are mobilised by ESD policy and how this is framed by political interests. As such, ESE research focuses on how educational policy is developed and disseminated, by whom and why. As part of these research discussions, ‘scales’ seldom becomes a verb, but are conceptualised as levels along which policy is disseminated. Furthermore, when discussed in ESE research, 'scaling' is seldom engaged using the theoretical tools and perspectives of educational research. Rather, ‘scaling’ becomes often an imported concept to utilise without much further theoretical discussion as is the case in Laurie et al. (2016), Nambiar & Sarabhai (2015), Sarabhai et al. (2012), Sterling (2014). Alternatively, ‘scaling’ is approached as a policy concept, criticised for being a neo-liberal vehicular idea29 (McKenzie, 2012; McKenzie et al., 2015; McLennan, 2004).

Positioned in relation to these discussions in ESE research, my research project is an attempt to explore, refine and deepen the concept of scaling as a verb and educational concept. The concept of scaling presented in this research project is one characterised by depth, sustainability, shifts in owner-

\[29\] An idea that is possible to be appropriated for diverse purposes and in various ways, adaptive in accommodating contrasting perspectives and even dissent.
ship, and evolution. By considering these aspects in the scaling of ESD-activities, the research project contributes to ESE research by creating knowledge about conditions for the scaling of ESD-activities and how to proactively enable the adaptation of ESD-activities in and through scaling processes directed towards designated scaling sites.

In addition, the research project offers a research approach to questions regarding the scaling of ESD-activities, the conditions for such scaling and the evaluation of scaling processes in terms of scalability. As such, this research project contributes with knowledge to ESE research by developing the SEAL conceptual framework. This framework includes a scaling vocabulary, enabling the analytical differentiation between different aspects of the scaling process in order to understand the process of scaling and to offer avenues for evaluating scaling processes. For example, the conceptual framework argues, drawing on Prince (Prince, 2012) and Peck and Theodore (2011; 2010), that what is scaled is not necessarily a coherent whole, but rather that ESD-activities put to scale move in parts. In other words, through the process of scaling, all constitutive parts are transformed: the selected scaling objects, the involved scaling subjects and the designated scaling sites.

Furthermore, as seen in ESE research on policy mobility (McKenzie, 2012; McKenzie et al., 2015; Peck, 2011; Peck & Theodore, 2010), ‘learning’ as one potential process in policy dissemination is acknowledged but scantily expanded upon. As current research on dissemination describes 'learning' as a concept with shifting meaning, subject to policy paradigms, a gap emerges in the research. This research project delves into these learning processes and contributes with knowledge on how a transactional learning approach can offer new perspectives on what is analytically understood as the scaling of ESD-activities and the conditions for such scaling processes.

The research project provides theory development on the scaling of ESD-activities grounded in empirical studies, and as such, contributes with an example of how scaling can be conceptualised using learning theory, more specifically transactional learning theory (Dewey, 1938; Dewey & Bentley, 1949). The example that the research project contributes to ESE-research highlights the possibilities of drawing on learning theories, transactional or others, to explore and address research inquiries regarding the scaling.

Additionally, the principal interest of dissemination in ESE research has focused on the horizontal dissemination policy-to-policy and vertical top-down implementation of policy-to-practice (K. Gulson et al., 2017; K. N. Gulson & Symes, 2007; K. Gulson & Symes, 2017; Hursh & Henderson, 2011; Jickling & Wals, 2008; McKenzie, 2012; Poeck & Lysgaard, 2016). The present research project contributes with an emphasis on practice-to-practice, whether in small-scale farms, university institutions or local communities. Consequently, a contribution of the research project involves high-
lighting how scaling subjects, in designated scaling sites, become crucial in enabling scaling processes.

Moreover, the idea of ‘best practice’ has been criticised in ESE research (K. Gulson & Symes, 2017; Mochizuki, 2008; Peck & Theodore, 2010; Pring, 2000; Spector, 2015). The research project not only contributes with knowledge of how a search in research for ‘best practices’ or ‘good examples’ to emulate in large-scale is of limited value if the aim is to enable scaling as a qualitative process, but furthermore, proposes ways of addressing these challenges. The research project suggests that approaches are needed that is characterised by depth (with regards to contextual specificity and ethical considerations) sustainability (in terms of remaining relevant over time) and evolution (with regards to the ability to adapt to changing circumstances).

Thus, the research project shows how research considerations of scaling should involve, in addition to the horizontal spread, multiple vertical and functional dimensions across institutional and organisational levels as well as among and between groups of people. As such, as a topic for research, scaling can productively move beyond the horizontal and vertical transfer of content, whether it is models, values or knowledge, to designated scaling sites. Hence, as part of a transformative process, scaling objects could be argued to move along a multi-dimensional ‘scaling pathway’ in which the scaling object is both transforming and is transformed by those involved in the scaling process and the designated scaling sites. Thus, with this multi-dimensional perspective in mind, it is important to evaluate the scaling process critically. By emphasising meaning making among those involved in scaling of ESD-activities the transactional perspective highlights that while it is not possible to have control and predetermine scaling processes it is possible, through systematic research and evaluation, to study, understand and impact the scaling process.

No less important, the research project contributes with temporal perspectives on the scaling of ESD-activities. These temporal perspectives highlight the need to address what occurs after an activity has been scaled in a designated scaling site. By substantiating what the ideas of ‘sustainability’ and ‘evolution’ can mean in scaling processes, the research project contributes with knowledge regarding how the temporal scaling of ESD-activities, in designated scaling sites, can be equally as significant as scaling spatially between scaling sites. The research project highlights the importance of understanding in research the conditions for maintaining the relevance of ESD-activities over time and through changing circumstances, in addition to grasping the conditions for initially introducing the activities. Another form of the temporal perspectives is how the understanding of scaling objects scaled to and through multiple scaling sites can be considered part of the same durational-extensional scaling event. As such, the research project
contributes to ESE research with a perspective that can analytically tie together multiple, on the face disparate, scaling efforts as part of a larger scaling event.

This analytical approach has further implications for the evaluation of scaling efforts in ESE research as it enables a more attentive approach, where past and current ESD-activities could be reconsidered with regards to the range of permutations these ESD-activities could take as part of their scaling pathways. Also, the approach facilitates a stricter evaluation in terms of being able to widen the horizons of scaling beyond replicating more of the same ESD-activities, thus locking scaling efforts into technical short term goals. With this approach, evaluating the scaling of ESD-activities is centred on how the scaling enables those involved in scaling processes to build capacity in order to adapt scaling objects in relation to scaling subjects’ valued beings and doings and the environing conditions of designated scaling sites.

Furthermore, the research project contributes with knowledge to ESE regarding the research gap identified in educational scaling research (Denton et al., 2003; Dewa et al., 2002; Elmore, 1996; Fischer & Aubrecht, 2015; Harwell, 2012) regarding (1) a lack of empirically grounded studies and (2) conceptualisations that engage with the conditions for the scaling of ESD-activities. To this end, the research project contributes with empirically grounded studies regarding the conditions for the scaling of ESD-activities. As noted in the result chapter, these empirical studies form the basis for the theoretical conceptualisation of scaling in the form of the SEAL conceptual framework.

Finally, while the four PhD studies introduced in Chapter 4 and discussed in Chapter 9 can be said to highlight the relevance of institutional and social structures as conditions for the scaling of ESD-activities, the research project contributes with perspectives on individual learning encounters between learners, educational content and environing conditions. Through this transactional learning approach, individual action-oriented learning is outlined as part of the joint processes of knowledge creation in scaling processes. Understanding individual learning as interrelated with collective learning and agency offers a perspective on the potentially collaborative character of scaling processes and how these can enable the scaling of ESD-activities. The inclusion of the four PhD studies, illustrate the potential and value of further ESE research on the topic of scaling, drawing on a variety of educational research approaches and methodologies as well as learning theories.

10.3 Contributions to ESD practice

In outlining the contributions to ESD practice, the research project is set in contrast with assumptions regarding ‘spreading’ as a linear process focused
on informing the people involved in the spreading about ‘good examples’ or ‘best practices’. In such approaches, potential obstacles to the spreading are often attributed to the people involved in the spreading, they are either resisting the ‘spreading’ or not ‘spreading’ the ESD-activity in an intended way. In contributing to ESD practice, this research project takes a broader perspective and approaches these processes in terms of scaling-as-learning, as encounters between scaling objects, designated scaling sites and the scaling subjects involved in said sites. The specific contributions of the research project to ESD practice are detailed below:

Firstly, the research project contributes with a perspective that challenges the notion of quantitative replication and transfer of ESD-activities. To fully acknowledge the challenge of scaling at hand, scaling practitioners need to go beyond searching for universalising ‘best practices’ and ‘good examples’. Such ideals may prove to be contra-productive for creating scaling processes that are sustainable over time and able to adapt to changing circumstances in designated scaling sites.

Secondly, the context-dependent nature of the scaling process outlined in the research project contributes to scaling practice with the insight that there are seldom clear sequential steps to reach desired goals in scaling processes. Rather, it is crucial that practitioners conduct systematic critical evaluations regarding the scalability of ESD-activities and the conditions for the scaling processes at hand.

Thirdly, the research project highlights that practitioners should aim to enable a shift in ownership and accountability of the scaling process towards those who are estimated to be engaged long term in the ESD-activity. Such actions can support a sustainable scaling of ESD-activities, avoiding the external imposition of activities, and enabling ESD-activities to a larger degree becoming an integral, yet transgressive and transformative, part of existing practices among those who are involved in the designated scaling site.

Fourthly, when engaging in the scaling of ESD-activities, the research project supports the idea that scaling practitioners would benefit from approaching scaling as a process without a predefined optimal state. By engaging scaling as a process of reciprocal adaptation, scaling practitioners will be able to include contextual considerations in the scaling process, allowing for the ESD-activity and the scaling object, to evolve when facing sustainability challenges in the designated scaling site. As such, the research project calls for scaling practitioners to engage in dynamic learning processes, directed towards the critical adaptation of the ESD-activity at hand, to account for the specific characteristics of the designated scaling site.

Fifthly, the ethical component emphasised by the research project contributes to scaling practice with the insight that addressing complex sustainability challenges often requires the facilitation of multi-stakeholder participation. In order for practitioners to support a scaling process that has a large-
scale impact, these processes often need to be matched with equally large-scale participation across institutional and social sectors as well as disciplines. Furthermore, practitioners should endeavour to bring together a diversity of experiences in the form of participants in order to both identify enabling conditions for scaling and address constricting conditions that can hinder scaling processes. In making such considerations, practitioners would benefit from, when contextually relevant and possible, including diversity in onto-epistemological positions when scaling ESD-activities.

Sixthly, the research project contributes with the insight to scaling practice, that when evaluating and deciding on which ESD-activities to scale, with whom and where, i.e. addressing questions of scalability, scaling practitioners should include ethical considerations. Such considerations entail addressing questions of how scalable an ESD-activity is to a particular context with considerations taken to valued beings and doings of the scaling subjects in context. As a whole, practitioners would benefit from asking and addressing the questions posed by, e.g. the SEAL conceptual framework as it offers a method for how to proactively enable the adaptation of ESD-activities, including considerations of ethical values. For practitioners, this method would include making decisions on the selection of educational content for scaling and planning the scaling of ESD-activities, along with monitoring and evaluating, past and present ESD-activities with everyday educational practices in context.

Seventhly, when conceptualising scaling in practice i.e. deciding how to understand the concept and process, the research project indicates that there is significant value to involving scaling subjects in the scaling process as the imposition of externally defined notions of scaling might undermine especially the long-term sustainability of scaling efforts. As part of this involvement of scaling subjects, consideration should be given to their experiences as these experiences can enable the conceptualisations in ways that can support scaling by being contextually relevant in the effort at hand.

10.4 Contribution to ESD policy
The conceptualisation of scaling presented in the thesis enables a systematic problematising of scaling policy, exemplified by the UNESCO GAP's (UNESCO, 2014d, 2014b) focus on scaling-up of ESD-activities, detailed below.

When engaging questions of scaling, ESD policy (UNDP, 2016: UNECE, 2014: UNESCO, 2013, 2014d, 2014c, 2014b) often uses under-theorised concepts, thus risking assuming short-term and instrumental perspectives of scaling which have limited value due to the 'wicked' character of sustainability challenges. Furthermore, significant differences between contexts in
terms of learning experiences and valued beings and doings make replication of ‘best practices’ or ‘good examples’ of limited viability.

In addition, policymakers' evaluation of past and present scaling, as well as the planning of future scaling, could benefit from the conceptual framework of SEAL by providing a more appreciative and strict approach to determine the scalability of ESD-activities. The intentional selection of educational content, educational context and teachers and learners as a starting point for the scaling of ESD-activities would enable policymakers to establish an action plan that can be communicated and evaluated in educational terms.

Furthermore, the conceptual framework presented in this study derives from an understanding of scaling as a dynamic process where the learning outcome of scaling is only known post-fact, which for ESD policy implies the need for a more systematic approach to scaling. The research project illustrates the need for ESD policy to reconsider the ESD-activities that were carried out during the DESD and onward, supported by the SEAL conceptual framework.

Accordingly, ESD-policy and the GAP would benefit from approaching scaling as a multi-dimensional process that includes both directed and spontaneous aspects and the acquisition of central qualities of ESD-activities.

Besides, the research project supports ESD policy in moving beyond short-term technical activities of doing more of the same in different locations, to evaluating the scaling of ESD-activities based on the ability of activities to support the development of capacities among those involved in the scaling effort, to adapt scaling objects in relation to designated scaling sites. This approach would involve ESD policy, encouraging ESD-stakeholders to engage with those involved in the scaling process at the outset of planning new ESD-activities. Such efforts would arguably contribute to an increase in the scalability of ESD-activities as they offer systematic ways of evaluating planned and on-going ESD-activities on their relative merits and flaws.

Moreover, with the end of the GAP (UNESCO, 2014d) in 2019, the UN has been raising questions regarding Education for Sustainable Development (ESD) beyond 2019. The United Nations General Assembly resolution 69/211 set the direction for the post-DESD in the document Follow-up to the United Nations Decade of Education for Sustainable Development (2005-2014): Global Action Programme on Education for Sustainable Development (UN, 2015a). In the 204th session of the executive board (UNESCO, 2018), the UNESCO detailed the continued global ESD efforts within the frame of the Agenda 2030 and the Sustainability Development Goals (UN, 2015b). The 204th session reaffirms that ESD is a crucial instrument for the implementation of all Sustainable Development Goals (SDGs). Drawing on the specific approach to scaling adopted in this research project, ESD may thus contribute to the navigation and managing of the ‘implementation gap’,
i.e. the mismatch between on one hand research and policy knowledge and on the other action on different levels.

Finally, the UN session calls for the strengthening of commitments to the implementation of the Global Action Programme on ESD (UN, 2015a, 2015b). The research project contributes to the Post-Gap by building on the UNESCO decision and talking to its themes. The results of the research project are relevant to goal four ‘Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all’ (UN, 2015b, p. 19) as it contributes with a focus on inclusion as part of the subjectification processes. In emphasising questions of depth and sustainability in scaling processes, the research project also engages and contributes to the parts of goal four that involves educational quality and long-term efforts. The 4.7 sub-goal includes the aim that all learners by 2030 are to acquire knowledge skills relating to sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and culture's contribution to sustainable development (UN, 2015b). More poignant for the contributions of this research project, the specifications in 4.7.1 talks about the mainstreaming of global citizenship education and ESD throughout national education policies, curricula, teacher education, and student assessment. The results of the present thesis contribute to, and re-frames, such ‘mainstreaming’ of education, including the importance of considering the agency formation processes of learners during such processes.

10.5 The five myths of scaling revisited

Chapter 2 presented the five myths of scaling (Looi & Teh, 2015) as a concretisation of two overarching themes emerging in educational research on scaling: the complexity and dynamic character of scaling processes and the lack of empirically and theoretically grounded research on the topic of scaling. The synthesised results and contributions detailed in this chapter have addressed these myths, as outlined below.

Myth one, the assumption that we know what scaling is has been addressed by the research project through developing the SEAL conceptual framework, detailing the analytical aspects of the scaling process, supported by transactional learning theory emphasising the contingency and continuity of scaling processes. The framework also includes a conceptualisation of scaling characterised by the qualities of depth, sustainability, a shift in ownership and evolution. Further perspectives on what scaling can be, was provided through the contrasting of the research project with the four PhD studies as part of the discussion in Chapter 9.
Myth two, the assumption that there is no need to evaluate whether an ESD-activity is worth scaling has been addressed in the research project by emphasising the necessity of considering scalability as a quality of ESD-activities. Such considerations, including the viability of ESD-activities to specific scaling sites, depend partly on such activities being ethically acceptable to those involved in the scaling effort.

Myth three, the assumption that we know how to scale was addressed in the research project by detailing conditions for scaling characterised by depth, sustainability, a shift in ownership and evolution. These conditions include, the selection of educational content, the dual processes of subjectification and agency formation and the re-actualisation of experiences, framing the involvement of scaling subjects as the drivers of scaling processes long-term.

Myth four, the assumption that we should scale what is considered best practices or good examples has been addressed in the research project by outlining scaling as a qualitative process. Replication of 'best practices' and 'good examples' has little viability when including the temporal dimension of scaling. If the scaling of ESD-activities is to remain relevant over time and able to changing circumstance, i.e. characterised by ‘sustainability’ and ‘evolution’, it becomes necessary to consider contextual specificity and ethical acceptability in light of the valued beings and doings of those involved in scaling processes.

Myth five, the assumption that a large-scale spread is imperative has been addressed in the research project through the outlining of a multi-dimensional concept of scaling. This multi-dimensional perspective includes considerations for not only horizontal and vertical scaling, across institutional and organisational scales, but also scaling over time, going beyond the initial introduction of an ESD-activity in a designated scaling site. The perspective also involves considering the temporal dimension in which an ESD-activity can be scaled over time even though it does not reach beyond the initial designated scaling site.

10.6 Future research

The thesis’ studies conditions for the scaling of ESD-activities and illustrates how ESE research, by approaching scaling as a process of learning, can contribute to what educational research has identified as a pressing question (Clarke & Dede, 2009; Coburn, 2003; Coburn & Stein, 2010; Dede et al., 2005; Harwell, 2012; Hatch, 1998; McLaughlin & Mitra, 2001).

As such, building on the research presented in this thesis, ESE-research could provide further perspectives on the scaling of ESD-activities along the lines of individual, social, and institutional learning. This could include ad-
dressing questions regarding the significance to scaling research that falls outside the aim of the research project presented in this thesis. Hence, ESE-research may inform empirical and theoretical scaling studies in general, and interdisciplinary scaling studies in particular. Understanding the scaling of ESD-activities as movements and moments of re-contextualisation, adaptation, and transformation opens new methodological and theoretical pathways of ESE research on the topic of the scaling of ESD-activities.

In the thesis, I have illustrated the potential of approaching scaling as an educational concept using transactional learning theory. Meanwhile, the approach taken in my research project does not exhaust the potential of using other learning theories.

The present thesis has drawn on Deweyan transactional learning theory, contrasted with social learning approaches in the Southern African and Columbian PhD theses in chapter 9, to enable the critical discussion of the SEAL and the approach taken in the research project. These discussions highlight the possibilities of further studies, combining perspectives on individual learning with studies of social learning and the social structures framing the scaling of ESD-activities. As such, the avenues of study opened by these discussions are possible to take further, utilising learning theories to explore the conditions for, and processes involved, in the scaling of ESD-activities.

The thesis argues that the scaling of ESD-activities present opportunities for learning, both regarding designated scaling sites and scaling objects. An example of future research regarding these learning opportunities would be to explore ontological encounters as part of the scaling of ESD-activities, as highlighted by Chaves (2016). Due to the global character of many sustainability challenges, it becomes interesting to study the conditions for learning among scaling subjects holding diverse ontological positions. How could theories of third spaces (Bhabha, 1994, 1996; Mignolo, 2002) contribute to furthering research on scaling along these lines.

As a principal research result developed through an abductive process, the SEAL conceptual framework presented in this thesis does not represent the end of this theory development process. Rather, there are opportunities for furthering the abductive participatory research process through additional empirical studies. As sustainability challenges transform over time, the argument throughout this thesis has been that the approaches used to research, understand and address these challenges also need to develop and adapt. As such, when addressing questions of what to do next when sharing ‘good examples’, there are opportunities for future research on questions regarding the contingency and continuity of the scaling of ESD-activities.
11 A summary in Swedish

11.1 Kort sammanfattning av avhandlingen


Det övergripande syftet med denna avhandling är att bidra till en fördjupad och nyanserad förståelse av skalning i forskning om miljö- och hållbarhetsutbildning. Mer specifikt är syftet att utveckla ett konceptuellt ramverk för att arbeta med frågor om skalning i utbildningspolicy och praktik relatert till utbildning för hållbar utveckling (ESD). Därigenom fokuserar avhandlingen på hur ESD-aktiviteter kan behålla sin relevans över tid och när de introduceras i nya kontexter.

Utifrån det övergripande syftet har tre delsyften formulerats, nämligen att:

- utveckla analysmetoder för att genomföra empiriska studier av meningsskapande om utbildningsinnehåll i skalningsprocesser
- undersöka hur erfarenheter och agens hos workshopdeltagare skapar förutsättningar för att skala utbildningsinnehåll
- undersöka hur utbildningsinnehåll samspelar med naturliga och sociala miljöer i skalning av ESD-aktiviteter

De tidigare nämnda tre delsyftena behandlas i fyra studier som presenteras i fyra artiklar vilka utgör grunden för denna sammanläggningsavhandling. I
tre av dessa studier genereras empirisk data genom deltagande forskningsworkshops genomförda i Sverige, Sydafrika och Ecuador (artikel I, II, IV). Empirisk data i den fjärde studien genereras i en fallstudie av en ESD-kurs i södra Afrika (artikel III).


11.1.1 Studien i artikel 1


30 En gemensam process där förändringar kännetecknas av tröghet, saker varken helt förblir desamma eller omedelbart förändras. Det är möjligt att spåra en förändring där kontinuitet är villkoret för kontingens och kontingens avslöjar kontinuiteten genom den kommande justeringen som rymmer nya omständigheter, vilket gör den kontinuerlig med vad som kom förut.

31 Scaling-ESD-Activities-as-Learning.
11.1.2 Studien i artikel 2

11.1.3 Studien i artikel 3
Studien syftar till att bidra med kunskap om hur transaktionella lärandemötén kan såväl möjliggöra som begränsa skalning när ESD-aktiviteter introduceras i en kontext. En jämförande fallstudie (Flyvbjerg, 2006; Yin, 2009) genomfördes av dokumentationen från fyra deltagare vid en i kurs södra Afrika (Change Project Approach (CPA)). Studien är en reaktion på påståendet i ESD-policy att FN:s dekad om utbildning för hållbar utveckling (DESD) innebar ett misslyckade vad gällde upp-skalning av ESD-aktiviteter. Vidare tar studien sig an den lucka som identifierats i utbildningsvetenskaplig forskning angående bristen på empiriskt grundad forskning om skalning.

Denna studie analyserar hur deltagarnas förståelse av skalning förändras som ett resultat av transaktionella möten mellan ESD-aktiviteter och mellan de personer som är involverade i skalningsprocesserna samt miljön där skalningen sker. Studien behandlar återkommande frågeställningar angående deltagares agens och de deltagandeprocesser som är centrala för ESD.

Genom analys av kursdeltagarnas dokumentation bidrar studien med insikter om hur etiska dimensioner påverkar skalningen av ESD-aktiviteter. Dessa analysresultat visar vidare på hur skalningsplatser som koncept kan förstås som icke-statiska platser där olika delar av en miljö kan komma att påverka utfallet av skalning av ESD-aktiviteter i praktiken.
11.1.4 Studien i artikel 4


11.2 Avhandlingens sammantagna resultat

Resultaten från studierna som redovisats i avhandlingen visar möjligheterna för forskare, policieskapare och praktiker att nära sig skalning av ESD-aktiviteter på ett systematiskt sätt genom att anta ett lärande perspektiv. Detta perspektiv differentierar skalningsprocessen analytiskt i olika aspekter, bl.a. som ett val av utbildningsinnehåll och som en subjektifieringsprocess. I forskningsprojektet identifierar jag dessutom förutsättningar för skalning både i tid och rum. Denna skalning innebär en djup och signifikant förbättring av praxis i kontext.

Utifrån förståelsen av skalning som karakteriseras av "hållbarhet" och "anpassning", bidrar avhandlingen vidare med ett temporalt perspektiv på skalning av ESD-aktiviteter. Skalning handlar lika mycket om att över tid bevara relevansen av ESD-aktiviteter som att introducera dessa aktiviteter i nya kontexter. Genom att betrakta flera, på ytan olika, skalningsinsatser som en del av samma skalningsändelse med ett delat utbildningsinnehåll, belyser avhandlingen villkoren för skalning och hur varje fall av skalning kan vara en möjlighet för de inblandade att lära sig mer om både skalningsprocessen och vad som skalas.
12 References


157


168


A doctoral dissertation from the Faculty of Educational Sciences, Uppsala University, is usually a summary of a number of papers. A few copies of the complete dissertation are kept at major Swedish research libraries, while the summary alone is distributed internationally through the series Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Educational Sciences. (Prior to January, 2005, the series was published under the title “Comprehensive Summaries of Uppsala Dissertations from the Faculty of Educational Sciences”.)