

# Chapter 2

## Theoretical Approaches: Operationalizing Action Competence as a Learning Outcome of Education for Sustainable Development Using International Large-Scale Assessments



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### 2.1 Introduction

Since the publication of the first reports of the Intergovernmental Panel on Climate Change (IPCC) in the 1990s, consensus has been growing about the human-induced nature of climate change (Myers et al., 2021). The latest IPCC synthesis report again confirmed the urgency of increased climate action for human living conditions and ecosystems alike (IPCC, 2023). Based on findings regarding the inadequacy of efforts made so far, there is a growing call for increased action (United Nations Environment Programme, 2022). Meanwhile, sustainable development and how to empower future citizens to mitigate and adapt to sustainability challenges through education for sustainable development (ESD) have become prominent

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issues on the agendas of citizens (Pizmony-Levy et al., 2023), policymakers (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017), practitioners, and scholars (Leicht et al., 2018).

As a transformative educational approach, ESD poses challenges for monitoring processes and measuring learning outcomes. Yet this is crucial if countries are to contribute to students' empowerment through education, and educational policy-makers need tools to do so (Leicht et al., 2018).

Educational effectiveness research typically focuses on cognitive outcomes in traditional school subjects such as mathematics, sciences, and native languages. However, there has been a growing and increasingly vocal movement calling for the inclusion of less traditional subjects and affective and social educational learning outcomes (Muijs, 2006; Muijs et al., 2014; Reynolds et al., 2016; Townsend et al., 2016; Verhelst et al., 2022). In line with this and the calls for preparing future generations for the sustainability challenges that lie ahead, it has also been recommended that educational effectiveness research should take a specific focus on sustainability issues (Kelly & Clarke, 2016).

Conceptual frameworks have been suggested to guide teaching-learning processes in order to better prepare future generations for sustainability challenges. Among these, action competence in sustainable development (ACiSD) (Mogensen & Schnack, 2010; Sass et al., 2020) emerges as a notable framework that may not only be able to guide teaching-learning processes but also allow for conceptualizing the learning outcomes of action-oriented ESD (Mogensen & Schnack, 2010; Olsson et al., 2022; Sass et al., 2020; UNESCO, 2017). Recent evidence has supported policy claims regarding the effectiveness of ESD for fostering ACiSD (Boeve-de Pauw et al., 2015; Olsson et al., 2022; Saleem & Dare, 2023; Sass et al., 2023; UNESCO, 2017; Verhelst et al., 2022).

The current chapter introduces the main components of the ACiSD-ESD conceptual framework that focus on the development of the relevant knowledge and skills, willingness, and self-efficacy of (groups of) people to contribute to sustainability. As this conceptual framework focuses on more than cognitive outcomes, the risk of ILSAs inducing a push toward accountability is reduced when utilizing ACiSD and related educational approaches. Additionally, it also answers the calls for including more affective and social educational goals to complement the predominantly cognitive orientation of effectiveness research (Reynolds et al., 2016; Townsend et al., 2016) and ILSAs (Sinnes & Eriksen, 2016).

In the following chapters of this book, we initiate an operationalization of the ACiSD-ESD conceptual framework with a focus on environmental knowledge, using TIMSS 2019 data, and willingness to act pro-environmentally, using ICCS 2016 data. Additionally, there is a focus on aspects of ESD as opportunities to learn for both the knowledge and willingness components of ACiSD. In what follows here, we will first discuss action competence. Then, we zoom in on ESD and its facilitation of action competence development. We end this chapter with the role ILSAs can play in advancing ESD implementation internationally.

## 2.2 Conceptual Framework: Action Competence as a Learning Outcome of Education for Sustainable Development

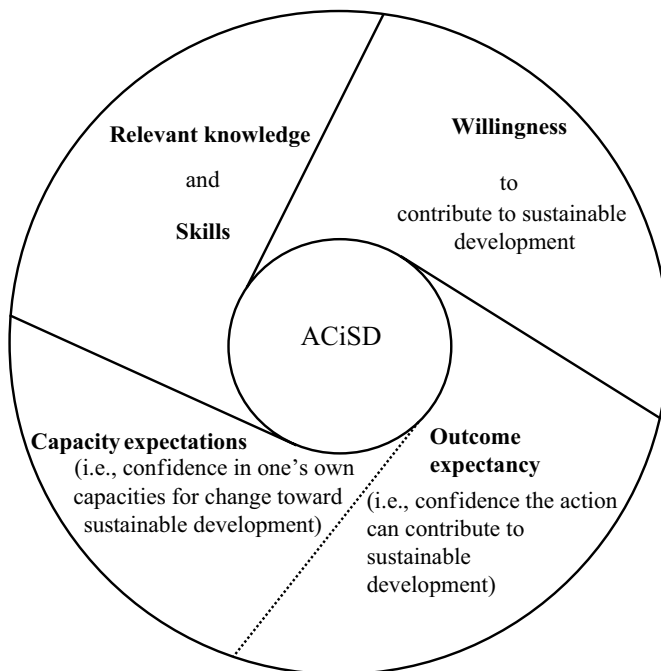
The concept of action competence was first developed by scholars at the Danish School of Education in the 1980s. They developed it as an educational ideal and underscored an orientation toward action as one of the central notions in an effective teaching approach (Mogensen & Schnack, 2010). Given the need for monitoring efforts to implement ESD in schools (UNESCO, 2017), Sass et al. (2020) redefined action competence as a generic competence of individuals or groups, introducing the concept of ACiSD. This redefined action competence conceptual framework facilitated the development of measurement instruments focusing on students in primary and secondary education (aged between 10 and 19), such as the Self-Perceived Action Competence for Sustainability Questionnaire (SPACS-Q) by Olsson et al. (2020).

In the following section, we further elaborate on the notions of *action* and *action competence*. Additionally, we introduce the SPACS-Q as a suitable generic ACiSD measurement instrument. Its items may inspire variables to be added to ILSA (e.g., TIMSS and ICCS) student questionnaires in order to include measurements of their self-perceived ACiSD.

### 2.2.1 Action Competence

*Action* is a voluntary behavior, meaning it is a choice decided on by the person taking the action. Furthermore, it is a voluntary behavior that aims to solve complex issues defined by controversy about how to solve them (Hungerford & Volk, 1990; Jensen & Schnack, 2006; Mogensen & Schnack, 2010; Sass et al., 2020). Sustainable development refers to mutually interacting environmental, social, and economic aspects that involve past, present, and future generations in their local, regional, and global contexts (United Nations, 2015). As sustainable development issues are often characterized by conflicting interests, i.e., environmental, social, and economic viewpoints from several generations across the globe (United Nations, 2015), different solutions may be preferable to different stakeholders involved. Therefore, sustainability problems qualify as complex and controversial issues that call for action in view of their urgent nature (Sass et al., 2020).

*Action competence* is defined by the acquisition of relevant knowledge and skills, willingness to contribute to finding a solution, and self-efficacy regarding a controversial problem. When the action taker's goal is to solve a sustainability problem, this implies relevant knowledge about sustainability and sustainability action possibilities. Skills then include, for example, critical, systems, and future thinking, as well as problem-solving and communication skills. Willingness refers to a strong motivation, or passion, and commitment to contribute to sustainability (Jensen & Schnack, 2006; Mogensen & Schnack, 2010; Sass et al., 2020). It allows



**Fig. 2.1** Core components of action competence in sustainable development (ACiSD). (Source Adapted from Sass et al. 2020)

the action taker to persevere in the face of difficulties (Moeller, 2013). Self-efficacy consists of confidence in one's own capacities, i.e., capacity expectations, and confidence in a positive impact of the action, i.e., outcome expectancy (Sass et al., 2020). For a graphic representation of ACiSD, see Fig. 2.1.

Answering UNESCO's (2017) call for monitoring and informing ESD implementation efforts, instruments were developed to measure the learning outcomes of ESD. Examples of such instruments include the, already mentioned, SPACS-Q (Olsson et al., 2020) and ACiSD-Q (Sass et al., 2021), as well as the Sustainability Consciousness Questionnaire (SCQ) (Gericke et al., 2019). Whereas the SCQ and ACiSD-Q are based on specific sustainability actions such as *avoiding buying goods from companies with a bad reputation for looking after their employees and the environment* (SCQ) or *saving electricity and water at home* (ACiSD-Q), the SPACS-Q is a more generically conceived instrument. This quality makes it suitable for use with a broad international population. It consists of 12 items that tap into the core components of ACiSD, with four items on respondents' knowledge of action possibilities, four items on willingness to act sustainably, and four items on confidence in the impact of one's own behavior or actions. Therefore, the operationalization that can be made with TIMSS and ICCS may be similar to the knowledge, confidence, and willingness components included in the SPACS-Q.

## 2.2.2 Education for Sustainable Development

Recent empirical evidence has underscored the value of action-oriented ESD for students' ACiSD development (Boeve-de Pauw et al., 2015; Olsson et al., 2022; Sass et al., 2023), as is also suggested in policy documents (UNESCO, 2017). ESD is characterized by holism (Varela-Losada et al., 2016; Wiek et al., 2015), pluralism and participation (Berglund & Gericke, 2022; Mogensen & Schnack, 2010; Öhman & Östman, 2019; Rudsberg & Öhman, 2010), and an orientation toward action (Sass et al., 2023; Sinakou et al., 2019; Varela-Losada et al., 2016).

*Holism* relates to an integrated approach to the different aspects of sustainability (i.e., environmental, social, economic, generational, and spatial). This involves an interdisciplinary view on sustainability (Boström et al., 2018; Ke et al., 2020; Sass et al., 2023). Consequently, teachers of different disciplines need to cooperate if students are to achieve a holistic perspective (Gericke et al., 2020; Ke et al., 2020; Mogensen & Schnack, 2010).

*Pluralism* involves an openness to contrasting perspectives, views, and opinions (Öhman & Östman, 2019), whereas *participation* refers to a shared responsibility between teachers and students regarding decision-making and the teaching-learning process (Öhman & Östman, 2019; Sass et al., 2023). A pluralistic and participative approach to teaching requires a democratic style of education. Students are invited to engage with different values, insights, opinions, and perspectives, while taking responsibility for the teaching-learning process in cooperation with the teachers (Mogensen & Schnack, 2010; Öhman & Östman, 2019; Rudsberg & Öhman, 2010). Even though pluralism and a participative approach seem to be two different aspects of a democratic approach to teaching and learning, they have often been considered together under the single term of "pluralism." However, recent research seems to indicate it may be prudent to describe (and measure) these two aspects separately (Sass et al., 2023).

Finally, an *orientation toward action* means that students, teachers, and partners in the local community learn together by engaging with authentic sustainability problems in the real global and local society (Sinakou et al., 2019; Varela-Losada et al., 2016).

In the past decade, few empirical studies have looked into the effectiveness of ESD regarding students' ACiSD development. Still, their findings point toward the relevance of action-oriented, holistic, participative, and pluralistic educational approaches, such as ESD. Next to the value of a holistic, pluralistic and participatory approach to teaching (Boeve-de Pauw et al., 2015; Olsson et al., 2022), a recent study in Flanders (Belgium) found that an action-oriented ESD approach in particular supports students' action competence development (Sass et al., 2023). This finding was confirmed in a Malaysian study (Saleem & Dare, 2023). Further international research is required to verify these findings. ILSA data are well-suited to inform such a verification and cross-cultural comparison.

## 2.3 Operationalizing the Conceptual Framework

Educational policymakers need instruments for monitoring ESD teaching-learning processes and measuring ACiSD as desired learning outcomes. This is an essential first step if countries are to contribute to students' empowerment through education (UNESCO, 2017). Due to the possibility of offering rankings of countries' achievements, international large-scale assessments (ILSAs) appear to have a larger impact on curriculum and educational policy decisions than international agreements (Sinnes & Eriksen, 2016). However, they tend to steer countries toward a more cognitive focus, measuring students' knowledge through multiple choice tests that presuppose there is certainty about wrong and correct answers (Sinnes & Eriksen, 2016). Contrary to this, ESD acknowledges that sustainability issues are characterized by uncertainty, the search for knowledge that is not (yet) available, and the value of different perspectives (Öhman & Östman, 2019). Still, ILSAs such as the International Civic and Citizenship Education Study (ICCS) and Trends in International Mathematics and Science Study (TIMSS) from the International Association for the Evaluation of Educational Achievement (IEA), and the Programme for International Student Assessment (PISA) from the Organization for Economic Cooperation and Development (OECD) have taken the lead in tackling the challenge of providing nations with such tools by beginning to establish an important space for incorporating and addressing ESD topics and learning outcomes in their frameworks and assessments (Stepanek Lockhart, 2018; UNESCO, 2017). These initiatives are applauded, although they go hand in hand with the responsibility for a continued search into ways to embrace the transformative nature of ESD, as it is "vital to remember that only what is measured gets counted" (Stepanek Lockhart, 2018, p. 228). ILSAs may provide a promising tool for monitoring the development of ESD learning outcomes and processes, offering a comparison between and within countries (Rieckmann, 2018; Sandoval-Hernández & Miranda, 2018; UNESCO, 2017). Such comparisons have proven to be influential regarding countries' educational policy settings (Sinnes & Eriksen, 2016). Furthermore, as sustainability issues typically involve populations and ecosystems worldwide, we posit that ILSAs may provide interesting insights across national educational settings. They may facilitate exchanges of insights and knowledge acquired by educational systems across the globe, supporting an acceleration in ESD implementation efforts. Conversely, they may also go against the ESD rationale, which emphasizes its transformational and democratic character, by generating too much emphasis on accountability within participating national settings (Pizmony-Levy & Gan, 2021). Due to their focus on measuring students' knowledge *about* rather than their preparedness *for* sustainability, alignment between ILSA student achievement measures and ESD practices has been found to be insufficient to capture students' opportunities to develop ACiSD (Sinnes & Eriksen, 2016). Consequently, Sinnes and Eriksen (2016) call on international initiatives to develop measures that can inform countries regarding their educational system's ability to foster ACiSD. Regarding this endeavor, we recommend caution when attempting to measure multifaceted concepts such as ACiSD and ESD through ILSAs. However, the

various context questionnaires that complement achievement measures in ILSAs may show promise for looking into the crucial alignment between the transformative nature of ESD and ACiSD as its desired learning outcome. Moreover, these questionnaires should be further developed with attention to non-cognitive attributes, contextual differences, and cultural variations in the expression of sustainability actions, which are difficult to quantify. We therefore call for such adaptations, as they will both contribute to valid and reliable information that can feed a learning culture regarding ESD within and across educational systems, while also addressing the critique that ILSAs are ignoring the complex nature of this field.

Following this introduction to the ACiSD–ESD conceptual framework and looking into the role ILSAs may play in encouraging countries to foster ACiSD through ESD implementation, the remaining chapters in this book proceed with an operationalization of two ACiSD components, i.e., knowledge and willingness, using ILSAs. Specifically, the subsequent chapters provide an operationalization of environmental knowledge through secondary analyses of TIMSS 2019 data (Chaps. 3, 4, 5, and 6), followed by an operationalization of willingness to act pro-environmentally through secondary analyses of ICCS 2016 data (Chap. 7, 8, 9, and 10). Additionally, we include different ESD components in the variables, selected from both the TIMSS and ICCS measurements.

For an operationalization of environmental knowledge, the environmental awareness scale that was (re)introduced in the TIMSS performance tests of the 2019 assessment (see Chap. 4 for details) was used. Teacher practices that may promote students' environmental knowledge were based on *teachers' emphasis on science investigation* as a proxy for an action-oriented approach (see Chap. 6).

Willingness to act pro-environmentally, as operationalized in Chap. 7, made use of an ICCS 2016 question regarding young people's future intentions to act pro-environmentally. The ICCS 2016 measure of *open classroom discussion* (Knowles et al., 2018), was used as an indicator of pluralistic ESD teaching practices. This measure looks into the extent to which controversial issues are discussed in the classroom, guided by the teachers, promoting facts and controversies to be understood and remembered by the students (Carrasco & Pavón Mediano, 2021), as is further explained in Chap 10.

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