

**Sustainable Schools for Sustainable Education:
characteristics of an ESD-effective school**

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**Duurzame scholen voor duurzame educatie: kenmerken
van een EDO-effectieve schoolorganisatie**

Dries Verhelst

Faculty of Social Sciences
Department of Training and Education Sciences

Sustainable Schools for Sustainable Education: characteristics of an ESD- effective school

*Duurzame scholen voor duurzame educatie: kenmerken van een EDO-
effectieve schoolorganisatie*

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Dries Verhelst
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Supervisors:
Prof. dr. Jan Vanhoof
Prof. dr. Peter Van Petegem

Composition of the doctoral jury

Supervisors

Prof. Dr. Jan Vanhoof, University of Antwerp

Prof. Dr. Peter Van Petegem, University of Antwerp

Doctoral commission

Prof. Dr. Sven De Maeyer (chair), University of Antwerp

Dr. Jelle Boeve-de Pauw, University of Antwerp

Prof. Dr. Franz Rauch, University of Klagenfurt

Jury members

Prof. Em. Dr. Pamela Sammons, University of Oxford

Dr. Anna Mogren, Karlstad University

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Summary

Ensuring a sustainable future for all requires a holistic, pluralistic and action-oriented way of thinking and acting that explores different perspectives, acknowledges different viewpoints and allows us to undertake action towards sustainability. While the transition towards a more sustainable future was set in motion several decades ago, it is clear that shifting towards sustainability requires continuous action, both in education and in society as a whole. As the students of today will be the ones who have to continue and preserve the strive towards sustainability, education has the responsibility to prepare them for this. With education for sustainable development (ESD), schools can offer an integrated holistic, pluralistic and action-orientated approach, and equip students with the competencies needed to act on sustainable development challenges. The role the school organisation has in enabling education for sustainable development (ESD), and by extension the students' action competence in sustainable development (ACiSD), is the focal point of this doctoral dissertation. The four components of ACiSD, knowledge of action possibilities, willingness to act for sustainability and the belief in their own capacities and outcomes of their actions empower students to make informed decisions and take responsible actions for a sustainable future that ensures environmental, economic and societal prosperity for generations to come.

By investigating the school as an organisation, this dissertation offers insight into the key organisational characteristics that facilitate ESD. The first Study (Chapter 2) defines the framework of an ESD-effective school via a literature study. This framework, which is the base for the subsequent studies in this thesis, consists of the eight characteristics of an ESD-effective school organisation: sustainable leadership, school resources, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision. In Study 2 (Chapter 3) the conceptual framework is qualitatively validated in order to evaluate how it stands up to scrutiny in the real world. To do so, 19

teachers and school leaders from schools that are actively engaged with ESD were asked what organisational characteristics they deem essential for an ESD-effective school and how they perceive the theoretical framework for an ESD-effective school. After this qualitative study, a measurement instrument for the different organisational characteristics was developed and validated in Study 3 (Chapter 4). This instrument, the 'Education for Sustainable Development School Organisational Questionnaire' (ESD SOQ), was then used in the last Study of this thesis (Chapter 5). In this effectiveness study, the school organisation and its key characteristics are linked to student outcomes of ESD: the students' action competence in sustainable development. Using a multilevel approach, it was established that the school organisational level does affect the outcomes of ESD. The findings suggest that students in schools where characteristics sustainable leadership, pluralistic communication, supportive relations, adaptability and democratic decision-making are present and effectively applied have a stronger elicitation of action competence in sustainable development.

This dissertation deepens our understanding of the organisational characteristics of a school in relation to ESD. Our findings indicate that the school as an organisation and the characteristics defined in this dissertation are of material importance when it comes to ESD-effectiveness. This offers a number of perspectives for follow-up research on the effectiveness of school organisations in ESD. Combining this with the perceptions of our respondents in Study 2, who acknowledged the value of the characteristics in building an ESD-effective school organisation, this thesis brings a simple, yet powerful message: schools can affect the outcomes of ESD, and we are starting to understand the processes behind this.

Dankwoord

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Chapter 1: Introduction

This dissertation enquires into the role the school organisation plays in education for sustainable development (ESD). At the start of this trajectory, one central question was asked: “What makes a school organisation ESD-effective?” This opening chapter sets the theoretical perspective of this PhD. Secondly, the context of this research and the larger research project of which it is part are described. Finally, the structure of the studies and their methodology are described. A more detailed account of the theoretical concepts and scientific methods of this PhD research is provided in the chapters dedicated to the individual studies.

Education for sustainable development: The way forward to a sustainable future

Our society has come a long way towards a stable future for everyone. Extreme poverty has been reduced in several regions of the world, and many people have never known war in their lifetime (Moatsos, 2021; Pinker, 2011). Still, a number of old and new challenges remain, however, and these require action (United Nations, 2020). Global climate change is breaking records, the wealth gap is increasing and fake news is spreading faster than the technology that is enabling it (Alvaredo et al., 2018; IPCC, 2014; UNESCO, 2021). These challenges require us to take action in order to shift from our unsustainable ways towards a sustainable future where generations to come will have enough without stretching the boundaries of our planet and its people. Ensuring a sustainable future for all requires overhauling way of acting many areas of our lives and society (Wals et al., 2017). While this transition towards a more sustainable future was set in motion several decades ago (World Commission on Environment and Development, 1987), there are still too many activities of our human society that contribute to an unsustainable future. Shifting towards a sustainable future will require action from the citizens of today and tomorrow on a local,

national and global scale, and the role of education in this cannot be overlooked. With the UN Decade of Education for Sustainable Development (UNESCO, 2014), education for sustainable development (ESD) has clearly established its crucial role in the global effort towards sustainability. However, continuous efforts are needed if we are to sustainably integrate ESD into education (UNESCO, 2014). ESD is an educational approach that empowers learners *“with knowledge, skills, values and attitudes to take informed decisions and make responsible actions for environmental integrity, economic viability and a just society”* (UNESCO, 2020, p. 8).

While ESD has obvious similarities with other educational approaches, such as environmental education and citizenship education, it goes beyond these types of education as its holistic approach combines the different perspectives, such as the connection between environmental issues like toxic waste from the textile industry and its social and economic impacts on the people working in these industries. Another facet of ESD is the pluralistic pedagogy, characterised by attempting to recognise and start a dialogue on different viewpoints on issues related to sustainable development (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). Within the holistic and pluralistic nature of ESD, there is a need for action for sustainability. As it is crucially important for ESD to impact the transition towards sustainability, it is evident that the pluralistic and holistic pedagogies should be combined with an action-oriented teaching approach (Sinakou et al., 2019). ESD aims to enable students to develop the competencies needed to take action towards a sustainable future (UNESCO, 2020). Empowering students to take action means they have knowledge of their action possibilities, they are willing to take action and they are confident in their capacities and the outcomes of their actions (Sass et al., 2020). ESD as a pedagogical approach empowers the students with these competencies via a holistic approach that combines different perspectives. A desirable outcome of ESD, at the student level, can be defined as action competence in sustainable development (ACiSD) (Sass et al., 2020). This refers to the goal of ESD to influence the willingness, knowledge of action possibilities and confidence the students have for resolving a topic related to sustainable development (SD) (Sass et al., 2020).

In all of this, the school organisation could play a crucial part, and with this thesis we want to grasp how a school can be an enabler for the desired outcomes of ESD. While scholarly interest into the role of the school organisation in ESD has been increasing, it remains unclear what contributes to an effective school organisation in ESD. The need to delve deeper into what characterises a school organisation as an effective facilitator of ESD is two-fold. On one side, there is a good deal of documentation on the importance of the school organisation in school effectiveness and school management research (see for example: Huang et al., 2018; Reynolds et al., 2014; Sammons et al., 1995; Teddlie & Reynolds, 2006). This research, in the context of ESD, would allow for a clearer perspective on how ESD can be managed, facilitated or enabled by the school in an effective manner. In ESD research, however, there is no such extensive knowledge based on the role of the school organisation. As organisational characteristics influence all different aspects of working, thinking and learning within a school, for example, classroom practices for ESD (Sinakou et al., 2019) or students' knowledge, competences and attitudes (Sass et al., 2020), it will be necessary to map the impact of schools' organisational characteristics on ESD. Secondly, there are the uncharted benefits of an effectiveness-oriented perspective in ESD. Incorporating the perspectives of the fields of organisational and effectiveness research within ESD research will allow the empirical description of how a school organisation can be enabling for ESD. Incorporating an empirically based or evidence-informed perspective in ESD is not only being advocated by several authors (Boeve-de Pauw et al., 2015; Mogren, 2019; Wals, 2009; Waltner et al., 2018); rather, a number of researchers are answering this call and are taking on an empirically grounded way of investigating ESD (e.g.: Boeve-de Pauw et al., 2015; Cincera & Krajhanzl, 2013; Olsson et al., 2020). ESD is one piece of the solution in tackling unsustainability; it is therefore only right that we take this seriously and examine at what contributes effectively to the desired outcomes of ESD. If we do not know what makes schools effective at ESD, then we cannot know how we can contribute to ESD-effective schools.

What is an ESD-effective school (organisation)?

To date, there is plenty of research on ESD implementation in schools (e.g.: Iliško & Badyanova, 2014; Mogren & Gericke, 2017a), but while this research was able to describe the processes behind the successful implementation of ESD, there is little conclusive and quantitatively substantiated research on what contributes to effective ESD in a school organisation. In addition, a recurring feature of these studies seems to be that they mainly rely on qualitative methods of investigation. To list some examples, Iliško and Badyanova (2014), Leo and Wickenberg (2013), Mogren and Gericke (2017a); (2017b) and Bennell (2015) all provided valuable and in-depth contributions to our understanding of how school organisations contribute to the implementation of ESD and the processes that lie behind this.

Moreover, it is necessary to acknowledge that there is a substantial body of research on ESD in higher education which often does include a quantitative perspective. For example, Ozdemir et al. (2020) developed an instrument to measure the sustainability of campus services and the perception of students on the matter. A second example from the area of higher education is the study by Holm et al. (2015), who investigated university management and developed a framework to include ESD in the quality assurance systems in higher education. However, student population, curriculum and organisation structures in higher education differ in important ways from compulsory education (i.e. primary and secondary education). Moreover, alongside providing education, universities and other higher education institutions often have a complex and widely diverse number of activities (Ozdemir et al., 2020). For these reasons, we would argue that the insights and conclusions of this branch of ESD research, while valuable, are not directly applicable to school organisations in compulsory education. While all of the different branches of ESD research have their value, with the two cases above as examples, ESD research on the school organisational level remains sparse and the call for ESD-school management practices persists (Laurie et al., 2016; Mogren & Gericke, 2017a).

Setting the scope of this PhD research on ESD effectiveness within the school organisation in compulsory education explores the issue and potential of incorporating an effectiveness-oriented perspective within ESD research. In this, a first step would be defining what is meant by a school organisation. In our perspective, three levels can be distinguished within a school: the student level, the classroom level and the organisational level. The organisational level, the key focus of this thesis, includes all the processes and entities referring to the organisational traits of the school that transcend the classroom, individual student and individual teacher level. This demarcation differs from other perspectives such as the *school-wide capacity* perspective (Slegers et al., 2014; Thoonen et al., 2012) that includes both the school and teacher-level. Nevertheless, the focus on the school organisation level comes from the assumption that the school level has both direct and (mainly) indirect effects at the student level via the teacher and classroom level (Creemers & Kyriakides, 2008).

School effectiveness and school management literature provides evidence on what makes a school organisation effective and what the facilitating role of the school organisation in achieving this effectiveness can be (Creemers & Kyriakides, 2008; Scheerens, 1990; Teddlie & Reynolds, 2006). Arguably, an ESD-effective school organisation will be able to achieve its ESD-related goals via the facilitation of the processes at the different levels of the school. An example of the importance of the facilitating role of the school organisation can be found in the literature related to ESD teaching practices (e.g.: Sinakou et al., 2019; Van Poeck et al., 2019). Notwithstanding that this literature offers guidance on designing powerful learning environments and didactical approaches towards ESD, the complexity of ESD still means that teachers can encounter difficulties and uncertainties when implementing ESD in their classroom (Evans et al., 2012; Kennelly et al., 2012; Oulton et al., 2004). To deal with these issues, characteristics of the school organisation can provide valuable support for teachers. Highlighted by the study of Slegers et al. (2014), organisational characteristics have a significant influence on teaching practices via the teachers' motivation and learning, next to the impact of teacher-level factors. Furthermore, their study identified organisational factors such as a schoolwide vision, shared decision-

making and school leadership as factors contributing to teachers identifying the school and its organisational goals (Slegers et al., 2014).

So far we have explained (a) what an ESD-effective school organisation in this thesis entails and (b) that such an effective school will be more effective because of its ability to facilitate processes influencing the outcomes at the different levels of the school. A third aspect that is needed to understand an ESD-effective school are the goals of such an ESD-effective school – that is, the educational outcomes. While there is consensus on the idea that ESD should work towards action competence (AC), there is a variety of interpretations of this concept (Sass et al., 2020). Some see AC as an educational ideal that is to be pursued by ESD. This perspective stems from action competence as an educational approach that proceeds from critical and reflective thinking and democratic and participatory principles. In this perspective ESD is situated in a problem-oriented and holistic line of action that is not solely focused on a technical solution to a specific issue (Mogensen & Schnack, 2010). Another interpretation of AC is based on AC as the competence of an individual or a group of people (Cincera & Krajhanzl, 2013; Olsson et al., 2020; Sass et al., 2020). This perspective allows for the interpretation of AC as a competence that can be obtained and measured, and which can therefore be seen as an acceptable and measurable educational outcome of ESD (Cincera & Krajhanzl, 2013; Sass et al., 2020). Sass et al. (2020, p. 9) described this competence within an individual student as the commitment and passion to solve a societal- (or sustainability- related) issue while having relevant knowledge of the topic and the processes behind it. This perspective on AC as a competence also includes the confidence of the student in their own abilities to undertake action as well as in the impact of said actions (Sass et al., 2020, p. 9).

Bringing everything together provides us with a conceptual understanding of what an ESD-effective school organisation encompasses. Thus, when we talk about an ESD-effective school organisation in this thesis, we are referring to a school wherein the organisational level is facilitative for the different organisational, didactical and pedagogical processes in order to attain higher learning outcomes for AC. Our main aim with this thesis is the

identification of organisational characteristics that are key in contributing to school effectiveness in ESD. While there are a number of frameworks available on school effectiveness and said characteristics (e.g.: Reynolds et al., 2014; Sammons et al., 1995; Scheerens, 2016; Vanhoof & Van Petegem, 2016), the gap this thesis seeks to fill focuses on the complexity of an educational approach such as ESD with the outcome of AC as a desirable outcome of this education. By deducing which characteristics of a school organisation determine the outcomes of ESD, the question of what makes an ESD-effective school organisation is further investigated.

School effectiveness in ESD: A topic for debate

While offering many opportunities for the research field, research on school effectiveness in ESD is somewhat contested. On one side there is the argument that ESD-research should be effectively contributing to a more sustainable world and thus should efforts in this area be effective (Boeve-de Pauw & Van Petegem, 2018). Next to this *normative tradition* (Van Poeck et al., 2018), there is the *pluralistic* paradigm within ESD research that is wary of an overly normative approach to measuring the effectiveness of ESD, stating that this overlooks the complexity of sustainability issues and the impossibility to define universally applicable guidelines (Öhman & Östman, 2019; Van Poeck et al., 2018). In this pluralistic tradition, it is argued that the collection of empirical evidence with the objective of assessing the outcomes and effectiveness of ESD contributes to a predetermined disposition that does not allow for a pluralistic and holistic perspective on ESD or sustainability (Van Poeck et al., 2018). In line with this thinking, ESD is seen as an educational ideal that implies a commitment of the school to continuously improve towards this ideal (Mogren & Gericke, 2017a, 2017b; Vare & Scott, 2007). We would argue that if there were no evidence on what makes a school organisation more effective at achieving the educational ideal, such a school improvement perspective might very well lead to a situation where schools continuously aim at improving without understanding what contributes to this improvement.

While we acknowledge that a strictly positivistic perspective on school effectiveness is not desirable in the procurement of ESD's pluralistic and holistic principles, we advocate for a multidimensional school effectiveness perspective that is conscious of the school characteristics' conditional role in educational outcomes (Creemers & Kyriakides, 2008; Scheerens, 2016). In school improvement, the focus is placed on innovation and change to deal with changing goals and means. This discourse often builds on the knowledge of different stakeholders as the main information source (Creemers & Reezigt, 1997). In ESD research, a school improvement lens is advocated as it offers a response to the critique that school effectiveness research has a too technical and unidimensional perspective on what makes a school effective (Bennett & Harris, 1999; Mogren, 2019). The reservations regarding school effectiveness in ESD can be traced back to the concern that *validated and objective evidence* may lead to a bias as it only measures readily available criteria for effectiveness and therefore cannot take into account the complexity and nuance that lie behind these (Biesta, 2009; Van Poeck et al., 2018).

Nevertheless, there are benefits to a rational and positivistic perspective. By taking validated and objective evidence on what is effective into the equation, organisational learning and school improvement can be substantiated with knowledge on what works (Creemers & Reezigt, 1997). A contemporary, multidimensional perspective on school effectiveness can overcome the existing reservations as this does not exclude a pluralistic perspective and acknowledges the importance of "outcomes and impacts, both positive and negative" without imposing certain (measured) criteria as an absolute truth (Nikel & Lowe, 2010). ESD is and will be an ongoing learning process, and school organisations can provide firm ground for the implementation of this (Scott, 2013). Enabling schools will require feedback on their organisational functioning. By being cognizant of the guiding educational ideal of ESD, with its pluralistic and holistic approach towards sustainability, a school effectiveness perspective allows for an indication of the extent to which this ideal is met and enabled by the school organisation. In this thesis, school effectiveness is seen as the organisational striving towards a certain defined goal and the degree to which school organisations achieve their goals (Nikel & Lowe, 2010; Scheerens, 2011). This perspective

will guide us in our investigation on which organisational characteristics of a school contribute to the attainment of said goals – in this case, those characteristics that contribute to delivering action-competent students.

Context of the dissertation

The VALIES research project

While being a research project in its own right, this PhD was embedded in the VALIES project and relied on the other research lines within this project. VALIES¹ is a large-scale research and development project focusing on the valorisation of action-oriented approaches to education for sustainable development. This project commenced in September 2017 and was scheduled to run for four years. The VALIES team consists of several partners from research and educational umbrella organisations (University of Antwerp, University of Leuven, Artevelde University College, Provincial Education Flanders and Catholic Education Flanders). In addition to this core team, which is responsible for the day-to-day operation of the project, there is also a supervisory committee overseeing the progress of VALIES and providing feedback on this. In this supervisory committee several NGOs working with ESD and sustainability, educational umbrella organisations and governmental educational organisations are represented.

The objective of the VALIES project is dual. First, there is the research part in which the critical factors for effective ESD implementation are investigated. Throughout this investigation, action competence is seen as a desirable outcome of ESD (Mogensen & Schnack, 2010; Sass et al., 2020). In addition to this PhD trajectory, four other researchers were involved in the VALIES project, each with their own specific research focus. Secondly,

¹ VALIES stands for Valorizing Integrated and Action Oriented Education for Sustainable Development at School.

there is the professionalization trajectory in which around 50 primary and secondary schools (from all educational networks) participated. During this professionalization trajectory, with a pilot in 2018–2019 and a main run in 2019–2021, core teams consisting of two to four teachers for each school were initiated and trained in ESD, the key concepts such as holism, pluralism and action, and relevant didactical methodologies. The goal of this professionalisation trajectory was to equip schools, teacher teams and teachers with the ability to elicit AC via ESD with their students. The main focus during this trajectory lied on teacher development and classroom practices. The school organisation and how to implement ESD within the school organisation, was not part of the professionalization trajectory.

ESD in Flemish school organisations

Although this dissertation does not intend to describe the state of the art of ESD effectiveness within Flemish schools, it is important to convey the specificity of this regional and policy context to the reader so that situational factors can be correctly situated. In Flanders, the Dutch-speaking northern region of Belgium, the educational field enjoys substantial autonomy. With freedom of education embedded in the Belgian constitution, the jurisdiction of the Flemish government is largely limited to defining the minimum educational goals, recognition of schools and the allocation of finances. The pedagogical methods, curricula and educational vision all remain the responsibility of the schools, which are often grouped in governing boards and linked to educational umbrella organisations (European Commission, 2020).

As from the 2019-2020 school year, the Flemish government implemented new minimum educational goals for secondary education, starting with the first grade (12 to 14 years old). Over the course of the next three years, the new goals are to be implemented in these grades (Decreet betreffende de onderwijsdoelen voor de eerste graad van het secundair onderwijs, 2019) . In these new minimum goals, sustainability and key principles of ESD are incorporated. For instance, one key competence focusses on sustainability and is reflected

in more than ten different educational goals such as “the students explain the complexity and entanglement of sustainability issues”. The minimum educational goals for primary education, in effect since 2010, do not directly refer to sustainable development or ESD as such. Nevertheless, here too a clear association can be found with the core principles of ESD. For example, for the learning area 'people and society' it is stated that phenomena should always be approached from different angles and that such a *holistic perspective* should be integrated when working on these educational goals (AHOVOKS, 2021). While the autonomy of the schools offers many opportunities to define their own trajectory and educational approach, it also necessitates a responsibility to invest in an effective organisational functioning to go beyond what is minimally required and translate the complexity of sustainability and ESD into effective education.

Research goals

Embedding an organisational effectiveness perspective in ESD requires an approach that combines different educational disciplines and takes note of existing evidence of school effectiveness. There are a multitude of frameworks on school effectiveness and school organisations, and several researchers were able to link ESD to existing school organisational frameworks such as policy-making capacity (Boeve-de Pauw & Van Petegem, 2018) and the whole-school approach (Mogren et al., 2019). Nevertheless, there are hardly any school organisational frameworks with a specific focus on ESD and its distinctive principles of holism, pluralism and action-orientation. In answering our central research question “what makes a school organisation ESD-effective?”, such a framework will be needed as this offers a perspective from which school organisation as an enabling agent for ESD effectiveness can be mapped out. The first research goal will therefore be the development and validation of a conceptual framework that incorporates those organisational characteristics of a school that are important for ESD effectiveness. A second research objective will focus on making this conceptual framework measurable. The development of a valid and reliable instrument for the organisational characteristics defined in this conceptual framework enables the further integration of an empirical

perspective on the school organisation in ESD. Moreover, by accomplishing this research goal, the developed instrument can also be used to meet the demand for more empirical research within ESD (Boeve-de Pauw et al., 2015; Bormann & Nickel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). Building on research objectives one and two, the third and final research goal sets out to investigate the influence of the school organisation on ESD effectiveness and on the outcomes of ESD, and to determine the role of the organisational characteristics.

RG1: Development of a conceptual framework for an ESD-effective school organisation

RG2: Development of a measurement instrument for the organisational characteristics of the ESD-effective school organisation

RG3: Investigate the influence of the school organisation on ESD outcomes

The three research goals above cannot be seen in isolation: to achieve one, the others are essential. If we want to develop a measurement instrument, we will need a valid and theoretically sound framework; vice versa, if we want to assess the validity of the conceptual framework, we will need empirical evidence. Achieving the three research goals and answering the question of what makes a school organisation ESD-effective will require a multi-method, interdisciplinary (ESD-SE) approach.

Outline and methods of the studies

Four different studies make up this thesis. The combination of their specific methodologies and triangulation of their results will create the possibility to achieve our research goals. This section gives an overview of the four studies in the thesis and describes their general outline and research questions. Figure 1 below gives a brief summary of the four studies, the methodology used and the research goals that are linked to the study. This thesis is structured as a collection of four separate studies. As a result, the chapters may overlap and

repeat certain information given that they are based on independent articles that build on the same conceptual framework.

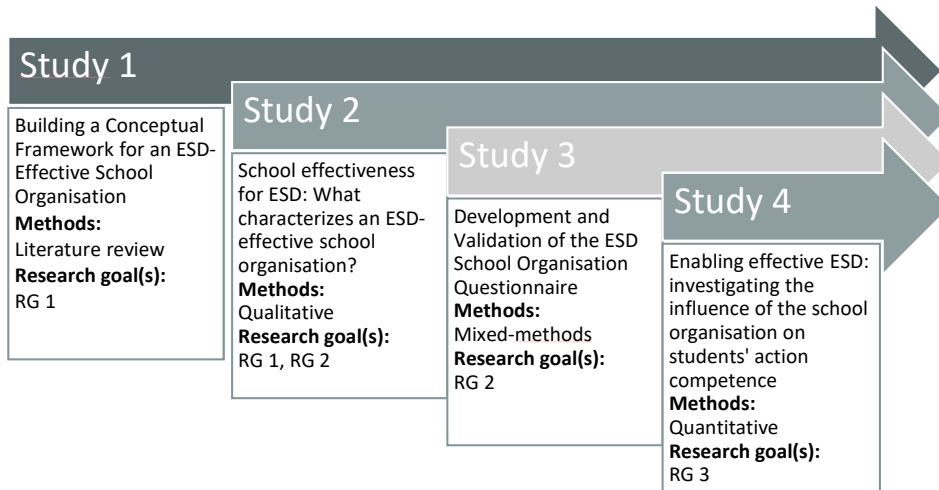


Figure 1: Outline of the four studies in this dissertation.

Study 1 (Chapter 2) sets out to develop the conceptual framework of an ESD-effective school. Using a purpose-driven methodology, namely a critical review (Grant & Booth, 2009), this study combined evidence from the broad field of educational management and school effectiveness as well as evidence from ESD literature. The resulting framework for an ESD-effective school comprises eight characteristics: sustainable leadership, school resources, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision. Not only does this study tick the box of research goal 1, but the subsequent studies in this thesis also build on the developed conceptual framework. As triangulation of methods would further enhance the validity of our conceptual framework, Study 2 (Chapter 3) validated the framework via a qualitative method. By interviewing nineteen teachers and school leaders on their perceptions of an ESD-effective school, we added an empirical and qualitative layer to the conceptual framework. Moreover, the acquired qualitative data served as an inspiration for the

measurement instrument developed in Study 3 (Chapter 4). This study aims to develop a measurement instrument as put forward in research goal 2. The measurement instrument, the Education for Sustainable Development School Organisational Questionnaire (ESD SOQ in short), initially builds on both the conceptual framework from Study 1 and the qualitative data from Study 2, and was further refined by cognitive interviews and statistical analyses. The validation of the ESD SOQ also validates the framework, as it shows that the different characteristics can indeed be measured as distinctive characteristics of a school organisation. In the fourth and final study in this dissertation (Chapter 5), we focus on the investigation of the link between the school organisational characteristics and the outcomes of ESD (i.e. AC). Via a multilevel approach, this study found evidence of a connection between the school organisational level and outcomes of ESD. The findings indicate that sustainable leadership, school resources, pluralistic communication, supportive relations, adaptability, and democratic decision-making relate positively to the students' AC.

Chapter 2: Building a conceptual framework for an ESD-effective school organisation

This chapter is based on: Verhelst, D., Vanhoof, J., Boeve-de Pauw, J., & Van Petegem, P. (2020). Building a conceptual framework for an ESD-effective school organisation. The Journal of Environmental Education, 1-16. doi:10.1080/00958964.2020.1797615

Abstract

This study aims to identify the characteristics of the school facilitating ESD-effectiveness. Via a literature study, we synthesized different notions of educational management in relation to education for sustainable development. The ERIC and GreenFILE databases were searched in combination with strategies such as citation chasing, leading to 46 sources. This resulted in a framework that identifies eight characteristics of an ESD-effective school organisation: sustainable leadership, school resources, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision. The identification of these characteristics could be a starting point for further research on ESD effectiveness and ESD at the school level. Furthermore, this framework offers educational practitioners working with ESD better insight into their school organisation.

Introduction

Education for sustainable development at the school organisational level

Since the UN Decade for Education for Sustainable Development (DESD; 2005-2014), education for sustainable development (ESD) has received an increased amount of attention, both in research and in the daily practices of schools (Boeve-de Pauw et al., 2015). Although ESD has several links with other educational areas, such as environmental education (EE) and citizenship education (CE), it offers a different perspective on sustainability issues.

Firstly, the holistic approach of ESD combines environmental, social and economic viewpoints. These viewpoints are considered based on their past, present and future implications and on local, regional and global scales (Boeve-de Pauw et al., 2015; Öhman, 2008). Secondly, pluralism is another facet of ESD and is characterized by the attempt to recognize and partake in a dialogue, inclusive of different viewpoints, on issues related to sustainable development (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). Thirdly, there is also the need for action towards sustainability. Within ESD, this need is increasingly linked to *action competence*, which is the intention and competence one has to undertake action for sustainable development (Mogensen & Schnack, 2010).

Research on ESD has increased over the last decade with publications in a wide array of contexts. Although this research, such as on ESD implementation programs, ESD classroom management and ESD in higher education, is of great value, it is striking that ESD research on the school organisational level remains sparse (Boeve-de Pauw et al., 2015; Mogensen & Schnack, 2010; Mogren et al., 2019). Moreover, there is considerable documentation in the school effectiveness literature on the important facilitating role of the school organisation (Creemers & Kyriakides, 2008; Scheerens, 1990; Teddlie & Reynolds, 2006), yet the effectiveness of a school organisation towards ESD has received scant attention.

Hence, the present study explores which school organisational characteristics are of importance when it comes to ESD effectiveness.

To investigate this topic, it is important to understand what is meant by a school. Within a school, we define three different levels: the student level, the classroom level and the organisational level. This study focuses on the third level: the school organisational level. The school organisation includes all the processes and entities within the school that transcend the classroom, individual student and individual teacher levels and refers to all the organisational traits of the school. The main goal of this study is the identification of organisational characteristics of a school organisation in relation to ESD effectiveness.

What does it mean to be an ESD-effective school organisation?

In addition to the need for more scientific evidence on the role of the school organisation, efforts in ESD and related fields (e.g., environmental education) should be effective (Boeve-de Pauw & Van Petegem, 2017; Scott, 2009). However, as ESD tends to remain rather abstract (Iliško & Badyanova, 2014), it is difficult to determine how the school organisational functioning influences the outcomes and effects of ESD. Evidence from the field of educational management and effectiveness research can aid in understanding what it means for a school organisation to be ESD-effective.

Educational effectiveness research has a longstanding tradition of looking at the characteristics of a school to gain insight into school performance (Teddlie & Reynolds, 2006). Contemporary scholars on educational effectiveness have a multidimensional view on educational effectiveness wherein the school organisation plays a conditional role in the outcomes at the student level (Creemers & Kyriakides, 2008; Scheerens, 1990; Teddlie & Reynolds, 2006).

When it comes to defining school effectiveness, it can be assumed that organisations strive toward certain goals, and the degree to which school organisations are able to achieve these goals, gives an indication of the effectiveness of the school organisation (Nikel &

Lowe, 2010; Scheerens, 2011). Critics of school effectiveness see this “goal attainment” as a normative assumption as if there is only one preferred goal. But this does not have to be the case, as (Nikel & Lowe, 2010) state that there is nothing within this understanding of ‘effective’ that demands that the actual nature of the aims or the process that has led to their selection become the focus (p. 596). In order to measure the extent in which school organisations are able to achieve their goals, student outcomes play a key role (Frederick, 1987). The essence of school effectiveness research is thus looking for those (organisational) conditions that are facilitating output measures demonstrating the effectiveness of a school (Scheerens, 2016).

Placing this in the context of ESD, an ESD-effective school organisation is, via a facilitating role, able to achieve the goals related to ESD. For example, sustainability competencies of the students might be facilitated via a classroom practices that are holistic, pluralistic and action-oriented (Sinakou et al., 2019). These practices can in turn be facilitated by given traits of the school organisation. An ESD-effective school organisation will be able to achieve their goals further extent when compared to a not so effective, but otherwise similar, school. Notably, these learning outcomes should consist of more than knowledge on sustainability issues; possible outcomes can also take competencies, affective dispositions and other traits into account.

Educational effectiveness does not come automatically. Sammons et al. (1995) identified 11 factors that make up school effectiveness: professional leadership, a shared vision and goals, a learning environment, concentration on teaching and learning, purposeful teaching, high expectations, positive reinforcement, monitoring progress, pupil rights and responsibilities, home-school partnership and a learning organisation. These factors can serve as an inspiration for schools aiming at educational effectiveness for ESD and can aid in identifying scientific evidence on schools organisational effectiveness towards ESD. However, not every factor is directly linked to the school organisational level. For example, purposeful teaching is not manifested at the organisational level, although the school organisation can influence it.

Filling the gap: Towards a framework for an ESD-effective school organisation

Given the evidence on the facilitating role of the school organisation in educational effectiveness (Creemers & Kyriakides, 2008; Scheerens, 1990; Teddlie & Reynolds, 2006) as well as the factors Sammons et al. (1995) identified, the lack of evidence on the school organisations' influence on ESD is a concern. It is therefore desirable to pay more attention to the school organisation as a key facilitator for achieving educational effectiveness in relation to ESD.

ESD literature often has presented ESD as an educational ideal wherein there is a predisposition towards school improvement. In this paradigm, it is argued that ESD does not have a final destination to reach and that there is no need for measurement and effectiveness thinking. Opponents of effectiveness research in ESD even argue that collecting empirical evidence is inherently normative, which could hinder the further implementation and organic development of ESD (Block, Goeminne, & Van Poeck, 2018). For them, ESD is seen as an educational ideal that implies qualitative education, which contributes to sustainable development as an effect of this education. Hereby, quality is seen as a commitment of the school to continuously improve to attain this ideal (Mogren & Gericke, 2017a, 2017b; Vare & Scott, 2007). This school improvement perspective, wherein educational practitioners and researchers aim at continuous improvement towards an ideal, can arguably lead to a situation in which the processes are treated as more important than the actual learning outcomes.

In line with educational effectiveness researchers, such as Teddlie and Reynolds (2006) and Mortimore and MacBeath (2001), we argue that this gap is apparent between the school improvement perspective and the educational effectiveness perspective should be bridged. We contend that an educational effectiveness perspective that does not put the guiding educational ideal aside, but rather measures the extent to which extent this ideal is met, will provide the school improvement perspective with evidence on what works

(Creemers & Reezigt, 1997). By providing this evidence, school effectiveness supports the educational ideal of ESD as this effectiveness is orientated at mapping the extent the ideal is met, without assuming or stating that this course of action is the only valid course for the school organisation (Nikel & Lowe, 2010). In order to do so, it is necessary to describe the goals for the school organisation and measure the characteristics and learning outcomes of a school so that it is able to set goals in improving its effectiveness (Teddlie & Reynolds, 2006).

With a number of scholars addressing the lack of a systematic and empirical perspective in ESD research, recent years have seen a steady shift towards a more empirical way of looking at ESD (Boeve-de Pauw et al., 2015; Bormann & Nikel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). Such an empirical and effectiveness focused perspective, in combination with the need for research on the school organisation, requires a framework that incorporates the characteristics of a school organisation linked to ESD effectiveness. Developing such a framework will increase our understanding of the catalyst function a school has on ESD outcomes. The proposed framework also could provide practitioners with the necessary tools to achieve desired learning outcomes of ESD.

The present study therefore aims to develop a framework that could grasp the characteristics of an effective ESD school organisation. With the development of this framework, we will establish a baseline for an ESD-effective school organisation. To generate this framework, we will synthesise different notions of school organisations in ESD literature together with existing theories of educational management. This will provide us with a framework that offers insight into the different characteristics of an ESD-effective school organisation. The scope of this present study lies at ESD in the context of compulsory education (i.e. primary and secondary schools) and seeks to answer the following question: Which characteristics of the school organisation facilitating the effectiveness of ESD are addressed in previous research? Answering this question will enable us to incorporate these identified characteristics in a conceptual framework.

Analysing literature on ESD-effective school organisations: Methodological approach

Given the specificity of the information they offer, single educational studies are not suitable to draft a comprehensive framework. Therefore, a review of the relevant literature is a valid approach to establish a framework for an ESD-effective school organisation (Davies, 2000; Gough, 2007; Hallinger, 2013; Murphy et al., 2007). As the key objective of this study is the development of a framework that identifies the key characteristics of an ESD-effective school organisation, the most fitting review methodology is a critical review, as described by Grant and Booth (2009). In their definition, a critical review shows that the researcher has 'extensively researched the literature and critically evaluated its quality' (Grant & Booth, 2009, pp. 93-97). A consequence of this methodology is that it might not be as systematic as a traditional literature review. As the goal of this study is the development of a conceptual framework and not an exhaustive overview of the available literature, a critical review appears to be the most fitting methodology.

Search and selection process

The search for and selection of relevant sources for this study was a two-step process. Initially, we searched scientific databases for relevant, peer-reviewed journal articles that primarily focused on ESD (Gough, 2007; Witziers et al., 2003). The sources included in this critical review had to meet certain criteria (Hallinger, 2013). First, they needed to have a focus on the school organisational level and had to be linked to ESD or related areas (e.g., environmental or citizenship education). Since environmental and citizenship education have several similarities with ESD (Krnel & Naglic, 2009), theory and research in these areas provide valuable insights into ESD. We limited our database search to sources published from 2000 until 2019. This way, research produced in the years leading up to the UN Decade for Sustainable Development (DESD; 2005-2014) was included. Furthermore, sources reported in English and Dutch and both qualitative and quantitative sources were included. Finally, since this study addresses ESD in primary and secondary schools, sources

that focused on a different education level (e.g., kindergarten and higher education), or were outside the scope of formal and compulsory education, were excluded.

Use of the EBSCO search engine enabled us to search two databases simultaneously. The first database consulted was the Educational Resources Information Centre (ERIC), which is regarded as the most comprehensive database in the field of education (Evans & Benefield, 2001). The second database was GreenFILE, which has an environmental and sustainability focus. Table 1 provides an overview of the search queries used and the number of 'hits' to which they led. The Boolean operator 'NOT' was used to exclude the following words: higher education, college, universities and university. The resulting sources were first screened based on their titles and keywords. If these were connected to the scope of this study, a further screening based on the abstracts was carried out. The database search led to 16 selected sources.

Table 1: Overview of search queries

Search query ²	# hits	# relevant ³
ESD AND school organisation	16	3
Education for Sustainable Development AND school organisation	9	3
Education for sustainability AND school organisation	8	3
Education for Sustainable Development AND school management	13	2
Education for Sustainability AND school management	6	1
ESD AND School culture	9	2
Education for Sustainable Development AND School culture	6	3
Education for Sustainability AND School culture	11	4
Education for Sustainable Development AND School leadership	9	7
Education for Sustainability AND School leadership	5	3
ESD AND School leadership	15	4

In the second step of our search process, we expanded our search via methods such as citation chasing, searching Google Scholar and reviewing handbooks on educational management. In accordance with Witziers et al. (2003), we screened the reference lists of the sources we found as well as sources that cited those that we had discovered to obtain additional sources for any undiscovered sources. The Google Scholar search engine was used to look for relevant sources that were not found in the databases. Finally, as this study aims to develop a framework for the ESD-effective school organisation, handbooks on school organisation and administration were screened for relevant sources (Witziers et al., 2003). The work of Hoy et al. (2013) provided a starting point for this stage of the review.

² Both ESD and Education for Sustainable Development were used as search query. When any noteworthy differences were found, both search results are reported.

³ Doubles in the same query are excluded. Doubles in other search queries are included.

In this second search round, the same criteria, as described, were also used when selecting publications. However, while the initial database search focused on peer-reviewed journal articles, the second search round also included other types of sources, provided they had clear links with the subject and a sound methodology that ensured their validity and reliability. Moreover, since a vast amount of the research on educational and organisational management was conducted before 2000, this date-criterion did not apply on relevant sources with a focus on educational or organisational management. Sources found in the second search round were first screened based on titles and keywords and then on their abstracts. Via citation chasing, Google Scholar and a review of handbooks, an additional 30 sources were selected, setting the total number of sources used in this critical review to 46. Appendix 1 provides an overview of the consulted sources.

Method of analysis

After the screening of the abstracts, all of the selected sources were thoroughly read by the first author. During this first read, different school organisational aspects related to ESD-effectiveness that came forth in the literature were highlighted and categorised with similar aspects. Initially, the eleven factors identified by Sammons et al. (1995) guided this process of categorising. Of these eleven factors, the following eight factors could be linked to the school organisation and were therefore of great value when categorising the different aspects found in the literature: professional leadership, a shared vision and goals, high expectations, positive reinforcement, monitoring progress, pupil rights and responsibilities, home-school partnership and a learning organisation. Additionally, via a process of reading, rereading and critical reflection by all authors, a table containing 16 initial categories was developed (Cohen et al., 2011a).

The different text fragments taken from the sources were placed under the best fitting category. If needed, one text fragment was attributed to two or more categories. This categorisation of the text fragments initially took place based on the wording of the text fragment, taking into account synonyms, field-specific vocabulary and the context and

origin of the source consulted. By analysing the text fragments attributed to different categories, similar or related categories were combined. Throughout this process, one researcher did the initial coding; the other researchers provided critical feedback. The quality of the coding work was evaluated by the entire team of researchers during various consultation moments. This process resulted in the identification of eight characteristics of an ESD-effective school organisation. Table 2 features an overview of the initial 16 categories, their connection to Sammons' factors and the 8 characteristics that were derived from these. Appendix 2 provides examples of text fragments that were attributed to the final characteristics via this process of categorisation.

Table 2: Overview of initial 16 categories

Initial Category	Characteristic of the ESD-Effective School	Related factor of educational effectiveness (Sammons, 1995)
School culture	Intertwined within the eight characteristics	Learning organisation
Collective efficacy	Collective Efficacy	High expectations, positive reinforcement
Curriculum	Schools resources	N/A
Structural characteristics of the school	Schools resources	N/A
Communication	Pluralistic Communication	N/A
Supportive relations	Supportive relations	High expectations, home-school partnership
Involvement of the whole school	Supportive relations	High expectations, learning organisation
Responsiveness to external demands	Adaptability	Home-school partnership
Adaptability	Adaptability	Monitoring progress, learning organisation
Leadership	Sustainable leadership	Professional leadership
Durability	Sustainable leadership	Monitoring progress
Distributed leadership	Democratic Decision Making	Pupil rights and responsibilities
Learner participation	Democratic Decision Making	Positive reinforcement
Vision	Shared Vision	Shared vision and goals, learning organisation
Task of the school	Shared Vision	Shared vision and goals
Well-defined ESD-program	Shared Vision	Shared vision and goals

Ensuring reliability and validity in the present study

With clear and consistent descriptions of the different steps and methods, we aimed to foster the reliability, validity and replicability of this study to the best of our abilities. Since this study aims at building a conceptual framework for an ESD-effective school organisation, theoretical validity is of the utmost importance. As Maxwell (1992) noted, theoretical validity determines how valid a piece of research is as a theory for a phenomenon. In this study, certain steps were taken to ensure theoretical validity. Firstly, several (peer-reviewed) sources, both within the field of ESD and from the field of school organisational management, were used as a primary source of information. Secondly, the different definitions and concepts applied in the sources were closely compared in such a way that similar concepts could be described in the same way.

A conceptual framework for an ESD-effective school organisation

Drawing on the literature review, we identified eight characteristics that are assumed to contribute to the ESD effectiveness of a school and incorporated them into a framework. On the subcontextual level, which refers to the school organisation level context and not the larger educational context (e.g., regional, state or federal level) in which the school as a whole is situated, two characteristics set the field for six central characteristics. On the subcontextual level, school resources and sustainable leadership were identified as important characteristics. The six characteristics on the central level are pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision making and shared vision. Figure 2 gives a representation of the different characteristics in our proposed framework for an ESD-effective school organisation. In the following section, we will first describe the two subcontextual characteristics of an ESD-effective school organisation. We will then closely examine the six characteristics on the central level. Finally, we elaborate on the division between the subcontextual and central levels and the relationship of the various characteristics.

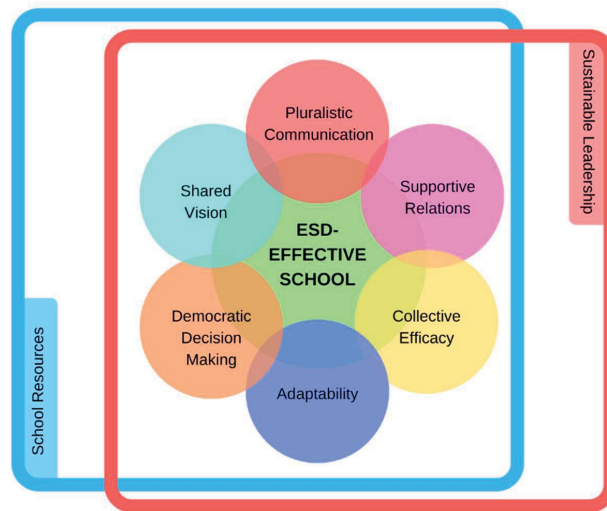


Figure 2: Conceptual framework of an ESD-effective school

Characteristics of an ESD-effective school organisation on a subcontextual level

Sustainable leadership

School leaders are often seen as the initiators and play a key role in an ESD programme and its implementation at a school (Bennell, 2015; Carr, 2016; Zachariou et al., 2013). For example, they factor into paving the path for a shared vision, allocating the resources of the school and setting up communication channels to facilitate ESD in schools (Bennell, 2015; Carr, 2016; Harris, 2018; Iliško & Badyanova, 2014; Kadji-Beltran et al., 2013; Leo & Wickenberg, 2013). As Hargreaves and Fink (2006) stated, 'Sustainable educational leadership and improvement preserves and develops deep learning for all that spreads and lasts, in ways that do no harm to and indeed create positive benefit for others around us, now and in the future' (Hargreaves & Fink, 2006, p. 17). Building on Hargreaves and Fink's definition, Iliško and Badyanova (2014) commented that a long-term strategy wherein continuous improvement with respect for both past traditions and recent innovations is necessary for a successful school organisation. Both descriptions incorporate the holistic

aspect of ESD - namely, an integrated view of the past, present and future, here and elsewhere. These descriptions also place school leadership in the position as a catalyst for ESD. Based on these descriptions for sustainable leadership, it is clear that school leadership for ESD is similar to the base principles of sustainable development.

This concept of sustainable school leadership found in ESD literature can be substantiated with more managerial approaches towards school leadership. The model of *transactional and transformational leadership* (Bass, 1985; Bass & Riggio, 2006) has been considered in ESD literature focusing on school leadership (Wildy & Pepper, 2008). This model describes three types of leadership: transactional, transformational and laissez-faire. The laissez-faire leadership style involves the absence of leadership or a lack of commitment. This absence of leadership could in some situations be a well-considered action by the leader. On the other hand, this style may also lead to negative results for a school and school team (Hoy et al., 2013). Transactional leadership is characterised by the exchange of rewards for efforts and responding to the needs of subordinates. Moreover, transformational leadership goes further than the mere exchange of rewards. It involves a proactive style in which four I's are central: *idealised influence*, *inspirational motivation*, *intellectual stimulation* and *individual consideration* (Bass & Riggio, 2006). Transactional and transformational leadership are complementary rather than contradictory (Kelchtermans & Piot, 2010). This discourse has also been present in ESD literature on school leadership. In ESD literature, the terms *transmissive* and *transformative* are often used when discussing the ESD-implementation process. These terms are highly similar to the transactional and transformational leadership perspectives (Mogren & Gericke, 2017b). Mogren and Gericke (2017b) found that Swedish school leaders use a combination of transactional and transformational strategies when implementing ESD. (Sammons et al., 1995) also highlighted the importance of school leaders and the sustainability of their leadership when it comes to school effectiveness. According to Sammons (1995), professional leadership and the monitoring of progress are two important factors for effectiveness.

School resources

Based on the literature, we found that school resources involve three components: time management, professional structure and physical structure. In order for a school to be ESD effective, these three components should facilitate the central characteristics of a school (Leo & Wickenberg, 2013).

Time management within a school consists of planning and scheduling subjects and timeslots. These can be scheduled in a specific manner to facilitate pluralistic, interdisciplinary and integrated methods of teaching and learning (Mogren & Gericke, 2017a). For example, by arranging the lessons so that there is room to integrate ESD in different subjects, it becomes easier to work in a pluralistic and interdisciplinary way. Moreover, as research has shown that teachers often see ESD as more work (Gyberg & Löfgren, 2016), efficient and integrated planning might reduce teachers' workload.

The *professional infrastructure* of a school refers to the different professional positions and how they are grouped and organised. It is closely related to Hoy et al. (2013) description of 'structure' and practical examples can be found in for example grade level teams or subject area departments within the school organisation. A school's professional infrastructure can support ESD effectiveness by for example forming formal teacher teams that allow for a pluralistic and holistic corporation (Mogren & Gericke, 2017a). By organising teacher teams in which teachers of different ages, cultures, subjects and other features are represented, teaching and, by extension, learning could take a holistic and pluralistic approach. As with planning, the professional infrastructure can aid in minimising the workload of teachers. For example, by efficiently structuring who works with whom, channels for supportive relations are facilitated, which in turn might reduce the workload.

Lastly, the physical infrastructure of the school was identified in the literature as a component of schools' resources (Kuzich et al., 2015; Schelly et al., 2012). By setting an example for sustainable development in the way a school is built and run, a school working with ESD invigorates its sustainability principles. Additionally, it also sets an example for

the students, teachers and everyone working and learning in the school. Examples include investing in solar energy and a 'green' playground.

While there are other parties that may influence the allocation of the school resources (e.g., the school group or other governing institutions), this is largely the responsibility of the school leader. The pluralistic aspect of ESD implies that this allocation occurs in a democratic manner, in which the school leader is a key figure. It is the leader their responsibility to allocate the appropriate resources and time that the integrated and holistic way of teaching ESD requires. For example, in regard to the teaching staff, the school leader is responsible for supervising and facilitating the work of different teacher teams and allocating resources for teacher development programmes (Kadji-Beltran et al., 2013). When school leaders can allocate the resources of schools so that they facilitate ESD, the implementation and functioning of ESD will be more effective (Iliško & Badyanova, 2014; Leithwood & Jantzi, 2008). On the other hand, an incorrect allocation of resources could negatively influence the self-efficacy of a school leader and, by extension, the effectiveness of ESD (Leithwood & Jantzi, 2008).

Central characteristics of an ESD-effective school organisation

Pluralistic communication

Pluralistic communication refers to the way in which different actors in a school, such as the teachers, students and school leaders, communicate. It is the process of conveying messages from a sender to a receiver and occurs through the formal or informal networks of the school organisation (DeFleur et al., 1993; Hoy et al., 2013). The pluralistic pedagogy of ESD requires a specific type of communication. It is characterised by the attempt to recognize different viewpoints and get these to participate in a dialogue (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). This idea can be transferred to the organisational level, where communication needs to take different viewpoints and critical voices into account and provide space for reflection.

While effective communication is an important characteristic of an ESD-effective school organisation, this is often a point of issue in ESD (Leo & Wickenberg, 2013). Since sustainable development and, by extension, ESD are difficult and complex concepts (Bormann & Nickel, 2017; Gyberg & Löfgren, 2016; Wildy & Pepper, 2008), effective communication is essential to obtain a common understanding of them (Leo & Wickenberg, 2013; Schelly et al., 2012). Leaders of ESD-active schools have indicated that open and direct communication channels, both within the school and in the external environment, are important when implementing an ESD trajectory (Mogren & Gericke, 2017a).

In an ESD-effective school organisation, communication is completely integrated and high functioning and has open communication channels (Leo & Wickenberg, 2013; Mogren & Gericke, 2017a). In a pluralistic and open communication climate, there is a willingness to learn from the experiences, viewpoints and arguments of others. In such a climate, communication is more descriptive, oriented, spontaneous, empathic, on an equal level and provisional (Haney, 1967).

Supportive relations

As a part of a school organisation, people can feel supported by other members of the organisation or by people outside of it. These supportive relations lead to a more integrated way of working. By working together, issues related to the implementation of ESD are easier to overcome. Within these relations, individuals' high expectations of themselves as well as their external partners can aid in school effectiveness (Sammons et al., 1995). Research on the implementation processes of ESD has shown that this support can manifest itself at different levels: within the school, between school leaders, between schools and with outside partners.

Supportive relations within the school team. When teachers have the opportunity and are willing to share knowledge and experiences with each other, they obtain access to more knowledge to become skilled educators for sustainable development. They also facilitate the development of a collective drive for action towards implementing ESD in the school

(Bennell, 2015; Henderson & Tilbury, 2004; Iliško & Badyanova, 2014; Kuzich et al., 2015). This support between individual teachers is only possible if teachers are given the opportunity to form and take part in supportive networks (Bennell, 2015). For example, a school can set up a teacher room that facilitates the exchange of information among teachers.

Supportive relations between schools. Research on the implementation of ESD has shown that supportive school networks provides participating schools with insights into their own functioning via outside supervision, collegial learning, a platform for knowledge sharing and increased motivation (Henderson & Tilbury, 2004; Mogren & Gericke, 2017a). These supportive relations between schools can also occur at an international level. This presents the possibility to learn from international contacts, thus increasing the opportunities for pluralistic and holistic perspectives (Bennell, 2015; Mogren & Gericke, 2017a).

School leaders' supportive networks. Several sources found that school leaders often engage in supportive networks with each other when implementing ESD at their schools. School leaders obtain the most support from other school leaders (Leo & Wickenberg, 2013; Mogren & Gericke, 2017a). This support consists of the exchange of knowledge and ideas for implementing ESD (Mogren & Gericke, 2017a). Lastly, these supportive relations also allow school leaders to set high expectations for themselves and their colleagues (Leo & Wickenberg, 2013; Sammons et al., 1995).

Supportive networks with outside partners. In order for a school to achieve ESD effectiveness, support from outside partners is important. Examples of external partners include the (local) community, parents, guidance services and external experts (Bennell, 2015; Mogren & Gericke, 2017a). For instance, teachers and school leaders might need further professionalization to obtain the necessary skills for implementing and working with ESD in their schools (Zachariou et al., 2013). Sammons (1995) referred to the partnership between schools and the parents as 'home-school partnership'.

Democratic decision making

Evidence has shown that in order for a school to be ESD-effective, shared or distributed leadership is needed (Bennell, 2015). *Distributed leadership* means that both teachers and pupils are involved in the decision-making process of a school (Hargreaves & Fink, 2006; Nikel & Lowe, 2010). Research findings that have indicated school effectiveness is linked to the level of involvement of pupils, teachers and other stakeholders in decision-making processes, substantiate this need for a democratic approach to decision making (Leithwood & Mascal, 2008; Sammons et al., 1995). The role for the school leader is to oversee and steer this process and step in if necessary (Mogren & Gericke, 2017a).

The pluralistic aspect of ESD also implies a democratic decision-making process. A democratic and distributed way of decision-making can strengthen attributes of ESD, such as different viewpoints, critical thinking and reflection. This might, in turn, lead to a school climate that is open to ESD (Mogren et al., 2019).

Shared vision

A school incorporating ESD will often have a common, school-wide understanding of what they as an organisation mean by ESD, why they feel a need to incorporate it and what they hope to achieve by working with ESD. Research has shown that such a shared vision is essential for an integrated and school-wide effective school policy towards ESD (Boeve-de Pauw & Van Petegem, 2011a; Iliško & Badyanova, 2014; Leo & Wickenberg, 2013; Mogren et al., 2019; Sammons et al., 1995). However, it is not easy to set the baseline for a shared vision since a common understanding of ESD is often inconclusive (Cars & West, 2015; Zachariou & Kadji-Beltran, 2009). During the process wherein the school gives meaning to its understanding of ESD and the shared vision that comes with it, all participants should understand that there is not a single correct understanding of the concept. Therefore, it is important to set ground rules for this process. Common ground can be found in the central principles of ESD: holism, pluralism and action-oriented. If the various stakeholders communicate about how these concepts are integrated in a school, it will lead to the

development of a shared vision. ESD will then be the guiding vision for the school (Leo & Wickenberg, 2013).

Although a single understanding of ESD is not always possible or necessary for a school to be ESD-effective, attitude towards ESD should be a crucial aspect of this vision. Research findings on ESD, EE and CE have presented three possibilities regarding schools' stances towards ESD (Boeve-de Pauw & Van Petegem, 2011b; Kavadias & Dehertogh, 2010). Self-determination theory (SDT) offers a way to describe such stances (Deci & Ryan, 2008). SDT considers several types of motivation, such as intrinsic and external motivation and the lack of motivation or amotivation (Deci & Ryan, 2008). When linked to the different stances of schools towards ESD, three main types of motivation for ESD are observable. The first possibility is that schools not involved with ESD and do not view ESD as their responsibility. In other words, they do not see it as their task and refrain from engaging in ESD-related activities. They adhere to the obligated curriculum and the ESD-related subjects that might be found in there. These schools have an '*amotivation*' for ESD. A second possibility is that schools experience an external pressure for ESD. These expectations can, for example, come from a higher governance level that seeks to implement ESD in education (Scott, 2009) or from other school leaders who are engaged in ESD (Leo & Wickenberg, 2013). By responding to these external demands, a school is externally motivated to work on ESD (Deci & Ryan, 2008). Another example of external motivation can be found in schools that engage in certification and other programmes due to the prestige these offer. However, research has shown that these programmes do not always lead to the desired outcomes, which might suggest that external motivation is not the best option for achieving ESD effectiveness (Boeve-de Pauw & Van Petegem, 2017; Krnel & Naglic, 2009). Lastly, schools might view ESD as something that they regard as intrinsic to their organisation. This *internalised motivation* often starts with a small number of teachers within the school team, but it results in an 'oil stain' that spreads throughout a school and becomes a characteristic of it (Krnel & Naglic, 2009; Mogren & Gericke, 2017a). The engagement of the whole school in ESD will aid in its successful implementation (Henderson & Tilbury, 2004). In addition to the obligated curriculum, a school that is strongly internally motivated

towards ESD might be able to add the shared school vision to this curriculum. This is often referred to as the hidden curriculum of the school (Carr, 2016).

Adaptability

Adaptability refers to the way schools adapt to internal and external demands or opportunities for change. An effective school is able to respond to these demands and can improve by doing so (MacBeath & Mortimore, 2001). Linked to the factors described by Sammons et al. (1995), an effective school should be learning while meeting these demands. These demands will or will not initiate a change discourse. For change to be sustainable, a school should have a holistic perspective to change whereby it looks at the valuable aspects of the past in order to change the present and aim for a more effective future (Hargreaves, 2007).

When changing, schools can adapt two strategies: single loop organisational learning or double loop organisational learning (Argyris, 1976). In *single loop organisational learning*, the organisation adjusts by incorporating new elements in the existing procedures and value system of the organisation (Argyris, 1977, 2002). Implementing the new knowledge does not change the underlying and existing organisational values. With *double loop learning*, the organisation changes by altering the procedures and values on which the organisation itself is based (Argyris, 1977, 2002). School personnel ask 'Why do we do it like this?' prior to implementing a change (Argyris, 1977, 2002).

In ESD literature, two perspectives on how schools as organisations might tackle change have been put forward: transmissive and transformative. These two perspectives show similarities with the concepts of single and double loop organisational learning. The *transmissive perspective* focuses on implementing new aspects, such as an ESD programme, within the existing school procedures (Hargreaves & Fink, 2004; Mogren & Gericke, 2017a). The *transformative perspective* relies more on adapting and developing the school working procedures (Hargreaves & Shirley, 2009).

Since critical thinking and reflection are essential aspects of pluralism within ESD, we can expect an effective ESD school to address the issues of how to adapt, implement and measure change in a critical and reflective manner. It is important for the presented issue to receive an appropriate response. While there is sometimes a need for single loop strategies, at other times, an organisation will need to undergo a more thorough transformation via double loop learning.

Collective ESD efficacy

Collective efficacy refers to a school team's conviction that their efforts will have a positive effect on the student outcomes and their high expectations of what the school and its pupils can achieve (Bandura, 1997; Hoy et al., 2013; Sammons et al., 1995). Experiencing a feeling of efficacy means that one feels able to properly perform a task. It is not about the actual ability; instead, it pertains to the ideas one has regarding her or his perceived ability (Bandura, 1997). Sources have shown that collective efficacy is a crucial aspect of student achievement and school effectiveness (Hoy et al., 2013; Leithwood & Jantzi, 2008; Leithwood & Mascall, 2008).

There are four sources of collective efficacy (Bandura, 1997; Hoy et al., 2013): mastery experiences, vicarious learning, verbal persuasion and the affective state of an organisation. When a school team experiences success after a demanding task, it contributes to building collective efficacy. Moreover, when these success experiences or *mastery experiences* are frequent, they will support the collective efficacy of a school. *Vicarious* or *indirect experiences* are the second collective efficacy source. Stories of other teachers or other schools are an example of this source type. *Verbal persuasion*, which is the third source of collective efficacy, refers to all the verbal arguments that enforce the idea that a school is capable of performing its task. On its own, verbal persuasion is not likely to have a substantial impact. However, when included with one of the other sources, it can strongly facilitate the collective efficacy of a school. The final source is *the affective state* of the school. How schools manage stress and other disruptive forces will influence how they interpret certain challenges, which will in turn influence the collective efficacy.

The four sources listed above will steer the collective efficacy of a school team and, in doing so, will influence the effort, persistence and success of the school as it undertakes certain endeavours (Bandura, 1997; Hoy et al., 2013).

Due to the positive effect of high collective efficacy on school performance, it is an essential aspect of an ESD-effective school organisation. A school with a high sense of collective efficacy will see itself as more capable of successfully achieving ESD related goals, which may then lead to more effective results.

Interconnectivity among the characteristics of the ESD-effective school organisation

In the previous paragraphs, we described the eight characteristics of an ESD-effective school organisation: sustainable leadership, school resources, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision. When studying the different characteristics of an ESD-effective school organisation, it is important to be aware of their interconnectivity. On the subcontextual level, the school resources and sustainable leadership set the stage for how the six central characteristics are manifested. These two subcontextual characteristics also affect each other. For example, the resources of a school are not infinite, which limits a school leader's distribution of them. This connection between resources and school leadership will shape the organisation of the school, hence influencing the central characteristics. The central characteristics also mutually influence each other. The way that one of the characteristics is organised will influence the presence of the other characteristics. For example, when several channels for pluralistic communication exist within a school, the way in which a school team communicates about their vision on ESD will greatly differ when these channels are not available. The interconnectivity between the different characteristics is illustrated in Figure 2, which depicts the characteristics at the central level as overlapping circles within the squares of the subcontextual characteristics.

Finally, it is important to note that culture is not seen as a separate characteristic. Each characteristic of an ESD-effective school organisation, at both the subcontextual and central levels, will have notions of an ESD culture incorporated within it. The ways in which the different characteristics are expressed within the organisation reflect the ESD school culture. For example, an ESD-effective school organisation will know a culture in which the importance of supportive relations is embedded in the organisational values.

Conclusions and implications for the field of ESD

Situating the framework for the ESD-effective school organisation in the field of ESD

This study provides a comprehensive framework that examines ESD from the viewpoint of the school as an organisation. Based on the literature, we were able to identify eight characteristics, two subcontextual and six central, which lead to ESD effectiveness within schools. On the subcontextual level, we distinguished sustainable leadership and resources of the school. On the central level, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision were identified as being important characteristics for an ESD-effective school organisation.

Although ESD has been a research theme in recent decades, insufficient evidence has restricted claims on schools' ESD effectiveness. However, recently, research has shifting towards the idea that the effects and impact of ESD should be measured in a more empirical way (Boeve-de Pauw et al., 2015; Bormann & Nickel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). The framework presented in this study supports this shift towards a more empirical way of examining ESD.

Limitations of the study and need for further validation of the proposed framework

While this study achieved its goal by identifying the characteristics of a school organisation argued to influence ESD effectiveness, it is important to note the confinements and limitations of the study and research design.

An important delimitation to this study is the fact that it mainly focused on the conceptual development of the framework. A way forward from this delimitation could be found in checking how schools that are already actively engaged in ESD see the different characteristics of the ESD-effective school organisation. By adding an empirical layer to the framework, its validity could be further substantiated. The focus of this study on the identification of the different characteristics, so the specific relationships between the different identified characteristics were not the main subject of investigation. Nevertheless, there is reason to believe that the different characteristics are interacting and interfering with each other in a more dynamic manner than is shown in Figure 2. Further empirical and quantitative research is needed to unravel these relationships. A better understanding of the characteristics' dynamic relations could greatly affect the ESD effectiveness of a school. Another delimitation can be found in the focus of the search and selection criteria on formal education. Other (educational) areas might provide valuable insights in ESD-effectiveness of school organisations, but these fell outside of the scope of the current study. Furthermore, since most of the sources were situated in a Western European and Anglo-Saxon context, further research is also necessary to determine how this new framework will hold its ground in a different cultural setting. Comparing the framework to literature that has featured different contexts can achieve this, but we argue that empirical validation in a different cultural setting will provide deeper insight into how generalizable the framework is.

While steps were taken to conduct the study in a rigorous way, ensuring its reliability and validity to the best of our ability, there is still a need for further validation of the framework.

Firstly, given that it is impossible to guarantee that all possible relevant sources were found in by search, we attempted to provide a clear and concise description of our search and selection criteria and strategies. Nevertheless, it remains possible that during the search, we failed to identify other relevant sources. Secondly, as the categorisation of the text fragments involved some level of interpretation, researcher bias might have an influence on this process. By actively looking for critical feedback and continuous examination of our analyses, we strived to limit this.

Importance for further research and practice

The identification and incorporation of the different characteristics of the ESD-effective school organisation paves the path for further research on ESD effectiveness and the key role of a school, as an organisation, in this. By adding the perspective of the school as an organisation to the ESD field, the important catalyst function of the school towards ESD effectiveness is highlighted. However, as the dynamic model of educational effectiveness by Creemers and Kyriakides (2008) shows, other levels are also of importance in determining educational outcomes and effectiveness and must be taken into account in future research. The framework presented in this study provides a basis for school effectiveness research in the field of ESD. Since school effectiveness research has shown that schools play an important part in determining learning outcomes (Scheerens, 1990), a framework such as presented in this study offers valuable insight into school ESD effectiveness. We hypothesise that schools that perform well on the different characteristics will be more effective when it comes to ESD. Nevertheless, future research, linking the school organisational characteristics to educational outcomes remains needed to gain insight in how the characteristics facilitate those outcomes. The similarities between several of the identified characteristics and the 11 factors for school effectiveness (Sammons et al. (1995) also signifies the importance of these characteristics. Moreover, given the connection between the field of ESD and other educational areas such as EE, we argue that the proposed framework for the ESD-effective school organisation can be inspirational for effectiveness research in the area of EE. While the identified school

characteristics are linked to ESD, the similarities between educational areas as EE and ESD make that schools working with ESD will have notion of at least some aspects of EE.

As it stands, the newly proposed framework for an ESD-effective school organisation can provide a reference for school leaders, pedagogical counsellors and others working with and for ESD at the school level. By showing which characteristics influence the functioning of the school organisation concerning ESD, the school organisation can use the framework to look at its own functioning when implementing or reforming an ESD programme. In the end, further valorisation of this framework could lead to several instruments for schools working with ESD. For example, this framework might be operationalised in a measurement instrument that can be used to measure and compare the ESD effectiveness of the school with teacher and student outcomes related to ESD. Other practical appliances might include a self-evaluation tool or a roadmap that aids schools towards ESD-effectiveness. When schools are more aware of their organisational ESD performance, they can obtain a better grasp of the purpose of ESD: to provide pupils with the necessary competencies to ensure a sustainable world

Chapter 3: School effectiveness for ESD: What characterizes an ESD-effective school organisation?

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Abstract

While research on education for sustainable development is expanding, empirical evidence on its impact and outcomes remains very limited. Moreover, the facilitating role of the school organisation, while extensively documented in literature on school management and school effectiveness, is lacking. In this study, we present and qualitatively validate a framework for an ESD-effective school, previously developed via a critical review of ESD and school management literature. This framework consists of eight characteristics: sustainable leadership; school resources; pluralistic communication; supportive relations; collective efficacy; adaptability; democratic decision-making; and shared vision. Via semi-structured interviews, the framework for an ESD-effective school was theoretically validated via a sample of nineteen teachers and school leaders with expertise on education for sustainable development. The findings from the interviews show that the participants largely confirm the framework and the individual characteristics are recognized by the sample. There were relevant differences between the respondents in terms of positioning the different characteristics within the framework. Specifically, views on pluralistic communication differed from the initial conceptual framework.

Introduction

Education is viewed as a key solution in transforming today's unsustainable reality into a sustainable future (Van Poeck et al., 2019; Wals et al., 2017). With research on education for sustainable development (ESD) expanding, it becomes clear that a single solution for ESD-implementation is not readily available. Moreover, empirical evidence on the impact and outcomes of ESD remains much needed (Boeve-de Pauw et al., 2015; Laurie et al., 2016). Several scholars therefore call for a more systematic and empirical perspective on ESD (Boeve-de Pauw et al., 2015; Bormann & Nickel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018).

While an array of ESD literature is available, research on school organisations in relation to ESD has received scant attention. While school organisational aspects can influence, for example, classroom practices for ESD (Sinakou et al., 2019), the impact of a school's organisational characteristics on these and other educational outcomes of ESD in compulsory education is not well documented (Boeve-de Pauw & Van Petegem, 2017; Mogren & Gericke, 2017a; Scott, 2009). This lack of literature stands in contrast with evidence from educational management and effectiveness literature, which acknowledges the influence of the school organisation on educational outcomes (Creemers & Kyriakides, 2008; Huang et al., 2018; Scheerens, 1990; Teddlie & Reynolds, 2006). While a call for monitoring and evaluating ESD was launched at the end of the United Nations Decade of Education for Sustainable Development (UNESCO, 2014; Wals, 2009), a tangible framework for ESD-school effectiveness is, although vital, still lacking.

In this study, we present and validate a conceptual framework for ESD school effectiveness comprising of eight school characteristics, potentially facilitating ESD. These characteristics stipulate the outlines of a school organisation that is effective towards ESD. Based on our previous critical literature review (reference left out for peer review) and evidence from school effectiveness research (e.g. Sammons et al., 1995), we hypothesize that these characteristics facilitate ESD school effectiveness. This study aims to validate whether these

characteristics are recognized by teachers and school leaders of ESD active schools in Flanders, Belgium. A qualitative validation allows us to check the real-world applicability of the framework and triangulate the conceptual framework with the views of people who have experience and expertise in ESD. Moreover, this adds to the theoretical validity of the framework (Maxwell, 1992) and will in turn augment our understanding of an ESD-effective school.

A proposed framework for an ESD-effective school

The conceptual framework described in this study was developed through a critical review of relevant literature on school management and school organisation in combination with existing literature on ESD (see Authors, 2020) (*reference left out for peer review*). This conceptual framework refers to the organisational level of schools, referring to all processes and entities within the school that transcend the classroom, individual student and individual teacher levels of the school.

The framework for the ESD-effective school (Figure 2) consist of eight characteristics, situated on two levels: the subcontextual level and the central level. The subcontextual level refers to the school its internal organisational context, not the larger context in which the school organisation itself is situated (e.g., political context, cultural context, economic context,...). This level contains sustainable leadership and the school resources, shaping the organisational context. The six central characteristics are pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making, and shared vision. The three main principles of ESD as an educational ideal: holism, pluralism, and action-orientation (HPA), are reflected in all of the organisational characteristics, hence these characteristics express the organisational culture and values. Holism implies a combination of environmental, social, and economic perspectives within a time and spatial dimension (Boeve-de Pauw et al., 2015; Öhman, 2008). Pluralism resolves around recognizing different viewpoints and establishing a dialogue between these (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). Action-orientation,

refers to the motivation and ability to undertake action, frequently labelled as action competence (Mogensen & Schnack, 2010).

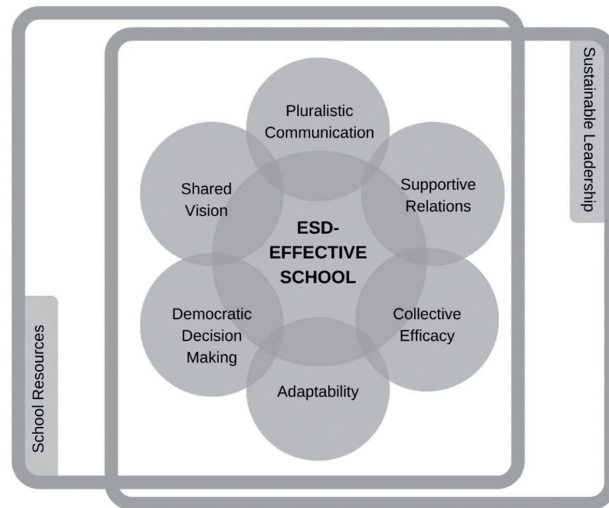


Figure 2: Conceptual framework of an ESD-effective school

The first subcontextual characteristic, sustainable leadership, refers to leadership that is ought to be holistic, involving an integrated view of the past, present, and future, locally and elsewhere (Hargreaves & Fink, 2006). The role school leadership plays, be it the principal or leadership distributed among the school team (Spillane, 2005), can be manifested both on the level of the teaching and learning within the school as in the leadership in the school as an organisation (Carr, 2016). In the present framework of the ESD-effective school, school leadership is seen as the organisational educational leadership that has influence on the teaching and learning within the school via the organisational workings of the school. This perspective is substantiated by the findings of Witziers et al. (2003), who reported very small direct effects between educational leadership and student outcomes and larger effects for leadership specific behaviour as a mediated effect, such as defining and communicating the mission, contribution to the school as an organisation. In an ESD-effective school, the subcontextual characteristic of sustainable leadership refers

to leadership that is ought to be holistic and involves an integrated view of the past, present, and future, locally and elsewhere (Hargreaves & Fink, 2006). This definition of sustainable leadership that goes further than the temporal aspect is underlined by Fullan (2006) who also concludes that investing in this sustainable leadership will provide school organisations with leaders who can see and act within the larger system in mind when investing in the development of people and the organisation. For example, sustainable leadership that develops the professional structures of the school, will enable teachers to go even further than what is presently possible thus facilitating continuous learning within the school organisation (Fullan, 2006). Sustainable leadership leads to a long-term holistic strategy that combines the best of past traditions with innovations for the future, without it depleting available resources for future development (Bottery, 2012; Hargreaves & Fink, 2006; Iliško & Badyanova, 2014). Moreover, as implementing ESD asks for different leadership perspectives (Mogren & Gericke, 2017b), sustainable leadership involves the ability to adapt the appropriate leadership style, given the specific time and context and taking holistic, pluralistic, and action-orientated perspectives into account. The transactional and transformational leadership model offers three potential leadership styles (Bass, 1985; Bass & Riggio, 2006). The laissez-faire style indicates the absence of leadership. However, this absence is not necessarily negative. To illustrate, school leaders may deliberately take a step back and allow teachers to take the lead for ESD in the school. Secondly, transactional leadership involves the exchange of rewards. Finally, transformational leadership is a proactive style that builds on four elements: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Antonakis et al., 2003). For instance, when communicating and implementing a long-term holistic strategy, individualized consideration and support by the leadership contributes the transmission of this strategy among the school staff as they see that their concerns are being acknowledged (Antonakis et al., 2003; Bass & Riggio, 2006; Leithwood & Riehl, 2005).

The second subcontextual characteristic, the *school resources*, comprises of three components: *time management*, *professional structures*, and *physical structures*. Time

management signifies the planning and scheduling of different subjects and the allocation of timeslots. Efficient time management facilitates pluralistic, interdisciplinary, and integrated teaching and learning for ESD (Mogren & Gericke, 2017a). Next, the professional structures of the school refer to the different professional positions within the school and how they are grouped and organized (Hoy et al., 2013). The professional structures can enable pluralistic and holistic teamwork (Mogren and Gericke 2017a), and an ESD-effective school will indeed organise the professional structures so that they are facilitating for the other organisational characteristics and ESD effectiveness. Lastly, the school its physical structures embody the infrastructure and financial resources of a school (Kuzich et al., 2015; Schelly et al., 2012). In an ESD-effective school, these resources will facilitate the other characteristics of the school.

Between the two subcontextual characteristics, a reciprocal relationship exists in the sense that sustainable leadership and the resources of the school together create the context within the school for the central characteristics; hence they are situated on the subcontextual level. This relationship is characterized by the fact that the course of action of the school leadership is influenced by the resources of the school. And maybe more importantly, by the ability of the leadership to link different parts within and beyond the school organisation (Fullan, 2006). Sustainable leadership steers and allocates the school resources in order to facilitate ESD in the school. For example, when the teaching staff at a school is diverse, this creates opportunities for the sustainable leadership to put a policy on diverse teaching teams (professional structures) into practice. If the teaching staff is more homogenous, such a policy will be harder to achieve. Leo and Wickenberg (2013) stated the following about this reciprocal relationship:

“Principals should work with the structure of the school to: manage the resources to promote development in terms of arranging timetables and schedules to promote cross-curricular activities [i.e. time management]; organise the teachers in different teams promoting cross-curricular activities [i.e. professional structures]; and allocate budget for in-service teacher training on topics related to the vision [i.e. physical structures].” (Leo & Wickenberg, 2013, p. 419)”

The six central characteristics of an ESD-effective school organisation are manifested within the organisational context shaped by the two subcontextual characteristics. The first central characteristic is *pluralistic communication*. This communication implies the recognition of, and the dialogue between, different viewpoints and ideas (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). Pluralistic communication contributes to a communication climate wherein learning from the experiences, viewpoints, and arguments of others is encouraged and facilitated. Such a communication climate can contribute to the other characteristics (e.g. democratic decision-making will benefit from the fact that the stakeholders are informed of each other's perspectives).

Secondly, the *supportive relations* in an ESD-effective school provide an integrated way of working towards and together on ESD related issues. Four types of supportive relations can be distinguished. Support within the school team, contributing to knowledge sharing and facilitating the development of a collective initiative towards ESD (Bennell, 2015; Henderson & Tilbury, 2004; Iliško & Badyanova, 2014; Kuzich et al., 2015). A second type, are supportive relations between schools. These can be on a regional, national, or international level and provide participating schools with insight into their own workings via peers, collegial learning, and opportunities for knowledge sharing and increased motivation (Henderson & Tilbury, 2004; Mogren & Gericke, 2017a). Thirdly, support between school leaders from different schools can also provide opportunities for knowledge sharing, exchanging ideas and will contribute to (Leo & Wickenberg, 2013; Mogren & Gericke, 2017a). The fourth type are supportive relations with external partners, such as the (local) community, parents, guidance services, and external experts (Bennell, 2015; Mogren & Gericke, 2017a).

Democratic decision-making, the third central characteristic, involves all relevant stakeholders in the decision making process (Bennell, 2015; Hargreaves & Fink, 2006; Nikel & Lowe, 2010). The principle of pluralism substantiates decision making with different opinions, viewpoints, and critical self-reflection, resulting in democratic decision-making. A democratic manner of decision-making can facilitate a school climate open to ESD

implementation (Mogren et al., 2019). Moreover, actively involving relevant stakeholders (e.g. teachers and pupils) in the decision-making process, leads to positive outcomes regarding school effectiveness (Harber & Trafford, 1999; Leithwood & Mascall, 2008).

The *shared vision* of an ESD-effective school reflects the common, school-wide understanding of what ESD means and how the school is motivated towards ESD. The presence of a shared understanding and vision toward ESD are vitally important for an integrated and school-wide effective school policy toward ESD (Boeve-de Pauw & Van Petegem, 2011a; Leo & Wickenberg, 2013; Mogren et al., 2019). The HPA principles are vital in developing such a vision. Next to an understanding of what is meant by ESD, it is important that the school is motivated to invest in it. Three types of organisational motivation, linked to the motivational theory of Deci and Ryan (2008), can be exhibited (Boeve-de Pauw & Van Petegem, 2011b; Kavadias & Dehertogh, 2010). The first type, amotivation, signifies the lack of motivation, meaning schools do not view ESD as their task and do not engage in ESD activities. The second motivation type, external motivation for ESD, refers to schools that experience and respond to an external pressure for ESD. Lastly, internal or autonomously motivated schools experience ESD as an inherent part of their organisation; an internalized motivation will in this scenario be their key driver to invest in ESD.

An (ESD-)effective school knows how to adapt to internal and external demands and opportunities for change (MacBeath & Mortimore, 2001), making adaptability the fifth central characteristic. Notably, responding to such demands does not always lead to change. A holistic perspective in this ensures that valuable aspects of the past are not neglected when changing the present towards a more effective future (Hargreaves, 2007). When a change is needed, a transmissive or transformative implementation strategy can be used. These concepts are similar to single and double loop learning (Argyris, 1976, 2002). The transmissive approach, related to single loop learning, focuses on implementing new aspects within existing school procedures (Hargreaves & Fink, 2004; Mogren & Gericke,

2017a). On the other hand, the transformative approach, related to double loop learning, will adapt and develop working procedures of a school (Hargreaves & Shirley, 2009).

The sixth central characteristic of the ESD-effective school is *collective efficacy* (Bandura, 1997; Hoy et al., 2013). ESD-effective schools will be convinced that their collective efforts positively influence student outcomes. This idea concerns perceived ability rather than actual ability (Bandura, 1997). Collective efficacy greatly affects student achievement and school effectiveness (Hoy et al., 2013; Leithwood & Jantzi, 2008; Leithwood & Mascall, 2008). A school will arguably be more effective when it comes to ESD if they experience a strong sense of collective efficacy as an organisation.

Research objective

Maxwell's (1992) conception of theoretical validity concerns an abstract and conceptual understanding of a phenomenon that can be substantiated by, but goes further than, the interpretation of people involved in the phenomenon. To check the theoretical validity of our ESD-effective school framework, we compare the conceptions of experts on ESD in the school organisation with the described framework. Our primary research question is as follows: to what extent do teachers and school leaders with expertise in ESD reaffirm the framework of the ESD-effective school? Answering this question, via consulting people who have expertise in ESD at their school, will provide the information needed to check the validity of the framework.

Research methodology

Given the scope of this study, a qualitative research method generating rich data was necessary. Data collection via interviews allows for interaction between the researcher and the participant, which will augment the understanding of the subject and the different viewpoints (Cohen et al., 2011a).

Sample selection

We specifically looked for school leaders and teachers with expertise and experience in the area of ESD. To obtain an apt sample, we used purposive sampling (Patton, 2015). The supervisory committee of the research project was consulted in order to obtain a suitable sample. This committee consists of seventeen external organisations (e.g.: educational umbrella organisations, university-colleges, pedagogical support services,...), all situated in Flanders, and have expertise with sustainable development and/or ESD and access to a broad network of schools. Moreover, they are familiar with our project and research goals. Via the representatives in the supervisory committee, we obtained the contact information of schools that they identified as being suitable for our qualitative study. These schools were knowledgeable and active regarding ESD within their organisation and therefore able to provide in-depth information on the topic (Ball, 1990). Initially, ten schools were sampled for our study, but due to time constraints, one school cancelled their participation after the interviews were scheduled. This led to a total of nine schools that participated in our study: six primary schools and three secondary schools. The participating schools varied from governmental to independent (faith-based) schools and from schools in a (segregated) urban area to a uniform school in a rural area. All participating schools are recognized and (directly or indirectly) financed by the government of the Flemish community. We asked for at least one teacher and the school leader to participate in the interviews and left open the option to interview more than one teacher within a school, should participants be willing to. In total, 19 respondents were interviewed: eight school leaders and eleven teachers. In school D, only a teacher was interviewed, as the school leader was unavailable and rescheduling the interview within a reasonable timeframe was not feasible. Table 3 provides an overview of the respondents, their experience within the school, and the educational level of the school. At the time of our study, most respondents had at least 10 years of experience in the school. To ensure the participants' privacy, we have kept the individuals and schools anonymous. We refer to each interviewee as a "school leader" or "teacher" and include a number (1, 2, 3, 4, etc.). Prior to the interview, respondents were notified about how their personal data would be collected and used in

this study via an informed consent. Respondents maintained the right to stop their participation at all times, though none of them appealed on this right.

Table 3: Overview of the respondents in Study 2

School	Function	Years of experience in the current school	Primary/secondary school
A	School leader 1	15	Primary
A	Teacher 1	13	
B	School leader 2	17	Primary
B	Teacher 2	12	
B	Teacher 3	15	
C	School leader 3	39	Primary
C	Teacher 4	20	
C	Teacher 5	32	
D	Teacher 6	2	Primary
E	School leader 4	25	Primary
E	Teacher 7	12	
F	School leader 5	39	Primary
F	Teacher 8	15	
G	School leader 6	41	Secondary
G	Teacher 9	10	
H	School leader 7	23	Secondary
H	Teacher 10	20	
I	School leader 8	19	Secondary
I	Teacher 11	7	

Data collection

Data was gathered via semi-structured interviews allowing for a systematic way of asking questions without eliminating relevant information that was not included in the interview

guide (Patton, 2015). To ensure the validity of the interview guide (Maxwell, 2005), three pilot interviews were conducted with a former school leader, a primary school teacher, and an educational supervisor (all with expertise in ESD). The interviews themselves consisted of two parts. The first section, started with clarifying how the school organisation stands towards ESD and its *Holism, Pluralism and Action* principles. After this introductory question, the interview covered the eight characteristics of the ESD effective school. The characteristics were not explicitly named during this part of the interview to prevent social desirable answers. For example, when inquiring about supportive relations, the respondents were asked why external partners are of importance for schools investing in ESD. In the second section, interviewees participated in a think-aloud exercise that featured cards for each of the characteristics. The respondents were asked to freely organize the cards and discuss why they choose a certain configuration. This information was linked with their statements from the first half of the interview and offered us insight into how the respondents perceived the relations between the different characteristics.

To address the issue of social desirability, all of the respondents were informed that the interviews did not have the objective to 'evaluate the functioning of the school' and that it was our sole intention to get an insight in the respondents' perceptions on ESD in the school. During the interview itself, we used repeated questions and open answer questions to circumvent the risk of socially desirable answers.

Analysis of the data

The recordings were transcribed for analysis. After a process of reading and rereading, the transcripts were coded in NVivo (Version 12 Pro). A coding tree (Appendix 3), derived from the framework for the ESD-effective school, was used to deductively code the data (Benjamin & William, 1999). Via selective coding, specific fragments were assigned to the coding tree. Subsequently, a combination of selective and open coding was used to go through the data again. Relevant fragments were coded in vivo when there was no existing node in the coding tree (Cohen et al., 2011a). Through the use of peer examination when

constructing the coding tree and two researchers for analysing the data, the internal validity of this study was addressed (Cohen et al., 2011a). To check the reliability of the data analysis, we double coded 10% of the data. This process resulted in 90% agreement between the coders. Taking chance into account, a substantial agreement with a .62 kappa value was found (Landis & Koch, 1977).

Findings

Overall, the respondents report similar conceptualizations of the different characteristics of an ESD-effective school as described in the theoretical framework. Almost all of the respondents indicate that their ideal ESD school incorporates the eight characteristics presented in the framework. None of the respondents present features of a school organisation that could not be linked to one of the described characteristics. However, as to the connection between the different characteristics and the influence they have on each other was not completely clear among the respondents. For example, several respondents felt pluralistic communication was of a different nature compared to the other central characteristics. When reading and interpreting these results, one must be aware of the fact that our sample is situated in a specific context and thus the results are also contextually depended and thus cannot be automatically generalised to other contexts. Nevertheless, these findings do provide valuable insights in the perceptions of teachers and school leaders on the conceptual characteristics of an ESD-effective school, contributing to our conceptual understanding of the ESD-effective school organisation.

Sustainable leadership and school resources

All of the respondents note the value of sustainable of leadership, whether via the school leader or via teacher leaders. Although, several respondents indicate that it is not easy to set out a long-term course for ESD, they all highlight the importance of sustainable leadership, as it supports the school policy towards ESD.

“Sustainable leadership is more than just a function; [it] is broader. It’s people following, striving, and embodying a certain vision for the long term.” – School leader 7

The importance of an holistic dimension towards ESD-initiatives, is also illustrated by the following citation of a school leader who describes that it is easy to implement new ideas but hard to make these sustainable over time. This school leader notes that he believes that it is important for the leadership to preserve the good ideas and not replace them when a new idea comes around.

“We are ought to guard that what happens is then salvaged and that’s not always easy. . . The new ideas are always good, but the sustainability [over time] should be taken into account” – School leader 1

The majority of respondents sees the ability to apply the appropriate leadership style for a given situation as an important asset of sustainable leadership. The school leaders recognize the different styles and note that these allow for different strategies of leadership, such as taking a step back to give the teaching staff the initiative to implement ESD-related projects or ideas, offer support or facilitate where needed. Both school leaders and teachers specifically point out that they find transformational leadership important in order to inspire the team to invest and contribute to ESD. However, transformational leadership is not limited to the school leaders themselves. From the school leaders’ perspective, via a deliberate laissez-faire approach, school leaders can give teachers the autonomy to take on an inspirational, motivational, influential, or intellectually stimulating role in ESD leadership. Nevertheless, even when taking a step back, the school leaderships’ support for ESD remains important according to our respondents.

“Our [former] school leader gave me a carte blanche, but action was needed on a higher level. And as a teacher, I’m just a pawn; it’s really hard for me to have an impact on that level. So I hope when we get a new school leader after the holidays, that he or she will support us when it comes to ESD.” – Teacher 6

Both teachers and school leaders note the school leaders’ responsibility for allocating the right resources at the right time, location and for the right individual(s) in order to facilitate

ESD. Nearly every participating school leader believes that this is a requirement for an ESD-effective school. According to the school leaders, this flexibility to move around the available resources aids their application of ESD. Though this flexibility applies to the three types of resources, a clear example can be found in terms of time management: the respondents stated that being flexible with timing, such as shifting the timetable, makes it easier to work together with other colleagues and/or participate in training opportunities with external partners.

“As a school leader, I make sure that there is time available. So if one of the teachers wants to go to an ESD-related training, for example, I make sure that his or her classes are covered.” – School leader 4

The presence of teacher teams dedicated to ESD or a related educational area’s (e.g., environmental education, citizenship education) in almost every school illustrates the importance of professional structures. All of the respondents agree that it would be ideal if a teacher team acts as a facilitator that motivates and supports the school team for ESD. Furthermore, the respondents declare that a heterogeneous group composition, including teachers from different subjects, and of different ages, races/ethnicities, and genders, would be an asset to these teacher teams.

A majority of the respondents state that they believe it is important to enhance the physical infrastructure of the school as a way to demonstrate the sustainability values of the school. For instance, enhancement can occur through involving students when transforming the playground into a green playground. One of the schools discovered its opportunity to have an open debate and discussion about it. During the development as well as after the finalization of the project, those involved felt a sense of ownership regarding the new ‘green’ playground.

“We found that our old concrete playground did not match our values. And, as we have limited resources for our infrastructure, we looked for external funding for the playground. It takes time and paperwork, but the old concrete playground is now replaced with a ‘green’ one.” – Teacher 11

Central characteristics

When asked about pluralistic communication, the participants unanimously expressed the view that such communication stimulates people to actively engage with different perspectives. Moreover, the incorporation of different perspectives in communication is deemed necessary by the majority of the sample when setting up ESD initiatives since incorporating pluralism in the communication will make it easier to involve different perspectives, thus enabling a more holistic approach.

“Well, I think that the more viewpoints you put forward, the wider one’s own viewpoint gets. And this leads to a more ... well, yes, if you only know of one way of looking and thinking about something, you can’t really understand it. So I think that we as a school should look for as many different aspects and incorporate all of these in the way we talk about things.” – Teacher 7

Several respondents conveyed that a pluralistic way of communicating has a positive impact on a school’s efforts toward ESD and that this specific way of communicating presents opportunities to start a dialogue with and among students. According to our respondents, it also increases the opportunity to involve students in democratic decision-making.

Most of the respondents also emphasized the importance of supportive relations and illustrated that by working together on ESD projects or even knowing each other’s projects, strong inter-school team support can contribute to the development of common ground for ESD. According to several of the respondents, this ‘team work,’ could in turn, facilitate the development and anchoring of the shared vision. A number of teachers and school leaders indicated that the benefit of the external relations could differ. Although nearly everyone reaffirmed the many opportunities these external relations impart to ESD initiatives, not every external partner offers the same assets for ESD. Beyond securing extra financial means, the external partners’ expertise about ESD or SD-related topics are considered highly valuable by the respondents.

“For example, from ‘Kleur Bekennen’ [Kruit, a knowledge center for World Citizenship Education] we’ve got[ten] some financial resources, but the most important asset was their guidance and coaching. They were really there for us!” - School leader 4

The respondents’ statements varied regarding parents as external partners. Some viewed them as an asset to ESD, as they actively help the school via direct support or highlight the principles of ESD at home. Others, though, perceived them as a hindrance, as some parents’ views of ESD differ from a school’s implementation of ESD. Most respondents noted that it is important to incorporate the parents involved in the school. In doing so, according to our respondents, there are opportunities for dialogue that might aid in overcoming potential barriers for ESD at the school.

“We aim to get ESD at our school as broad as possible and involve everyone that should be involved. Together with Djapo [educational organisation with expertise on ESD], we organize evening sessions to get the teachers, parents, and students together. And, in fact, that’s the ideal scenario for me: We ought to open up the school to the neighbourhood.” – School leader 4

In nearly all of the cases, the teachers and school leaders reported that supportive relations with other schools and school leaders are a valuable source of inspiration and ideas. For instance, some of the respondents conveyed that they try to have their school serve as an example for other schools that may want to set up ESD initiatives. However, as to partnerships with other school leaders, none of the school leaders stated that this is a priority for them.

All of the respondents agreed on the need for a common school-wide understanding of ESD. According to them, the lack of a shared vision of ESD can be of hindrance for the ESD effectiveness of a school. Seeing that, as stipulated by a respondent, ‘without a common vision, it is easy to lose track’, a clearly defined understanding of the concept could contribute to the awareness that ESD is a broad concept that needs a holistic view, without falling in the trap of labelling everything as ESD. Moreover, if all the members of a school have a solid understanding of what ESD means for them as a school organisation, it becomes easier to be motivated to put effort in ESD-initiatives. One of the respondents

notes that if the schools vision on ESD contains a clear understanding of ESD, other teachers will more easily see ESD as a part of their job.

“That way, everyone is aware of it [ESD]. Without the need to ask about it, everyone is aware that it [ESD] is a part of their job. And you can chose where, when and how you incorporate it [ESD] in your job, but it should be incorporated. For us, it just makes sense that it [ESD] is a part of the job.” – School leader 5”

Although the benefits of a clear understanding of ESD are highlighted by the majority of the respondents, some respondents also mentioned that this development of a shared understanding can be a potential pitfall, as it is easy to develop a one-sided (environmental-focused) view of ESD. Nevertheless all respondents agreed that a shared vision towards ESD would be an essential characteristic of a school working on ESD.

“Most of our colleagues used to refer to the ecological perspective when talking about sustainability. So when we decided to shift from environmental education to ESD, we really broadened our horizon with different perspectives on sustainability . . . I think that it’s important to make this shift as a team, to get to this consciousness. That’s the first step in developing a vision.”– School leader 1

Besides the statement that a clear understanding of ESD will contribute to the motivation towards ESD, as illustrated by the above citation of school leader 5, most respondents were familiar with the different types of motivation related to ESD. The majority of the sample stated that an internal motivation provides the best foundation for ESD within a school. Nevertheless, several respondents indicated that external motivation could help to get colleagues acquainted with ESD, which (potentially) lead to a more desirable internal motivation. Additionally, most of teachers and school leaders reported that a sense of societal necessity is an important source of motivation regarding ESD. This source of motivation (e.g., *“We need to do something because it is needed for the better of the society and our planet”*) often evolves into an internalized motivation within a school.

“If I’m told what to do by someone else, I won’t like doing it and I will only do the minimum of what is expected. But in the ideal situation, it is ought to be a tad more than the what is expected. People have to want it themselves. Then you really notice the difference and people will put much more effort and energy in it. That’s just amazing! And as to ESD, for us it’s just normal to do it. It’s who we are.” – School leader 4

The bigger part of the respondents emphasized the importance of a support base for ESD and conveyed that this is achievable through a democratic method of decision-making. As previously noted in both our conceptual framework and testimonials of respondents, pluralistic communication that involves relevant stakeholders can be facilitating for this democratic decision-making process. The respondents listed several positive outcomes of democratic decision-making. First, by including relevant stakeholders in the process, ideas and initiatives have the opportunity to grow and mature. A number of respondents explicitly stated that this is important for ESD. Second, when relevant stakeholders participate in the decision-making, actively or informed, a sense of ownership can be established. In turn, this ownership could facilitate the development of a shared vision of ESD. Third, a democratic method aids in making decisions more sustainable and holistic and allows for a pluralistic way of making such decisions.

“If you want a decision to last, it should be a collective story . . . It’s also important to take note of who participates in the decision. In a diverse school like ours, you can’t expect 3 or 4 people to represent everyone’s opinion.” – School leader 7

Adaptability was viewed by our respondents as an important, though difficult to achieve, ESD-effective school characteristic. According to the respondents, choosing when and when not to act on an opportunity is a major strength of an ESD-effective school. This ability precludes the school team from being overburdened by initiatives. The importance of the school leader in shaping the context for the central characteristics is clearly reflected in the adaptability of the school. For example, if a school leader simply forwards every proposition that the school receives to teachers; ESD-working conditions will greatly differ from those in a school in which a clear strategy exists for how demands are addressed. Following citation of a school leader illustrates this:

“We get a lot of emails and phone calls from all types of organisations who ask us to partake in their initiatives. It’s our job to filter those out . . . Via consulting the team, we make a decision: Shall we engage with this or that initiative or not? Is it achievable for the team, and, if not, will it be achievable in the future?” – School leader 8

The respondents noted that ESD-effective schools need to sense when and how to adapt. They illustrated that the ability to choose when and how to adapt (single loop strategy or double loop strategy) is clearly linked with organizing a school in order to achieve the ESD vision and goals the school has put forward. Several respondents also stressed the need to take different perspectives into account when evaluating the current way of working, with an emphasis on the temporal dimension.

“We always take into account where we came from and where we want to land. That’s an important perspective for us when we want to change things at school.” – Teacher 7

The respondents’ answers contributed to the conceptual description of collective efficacy seeing that many of them noted that if a school believes it has a positive effect on students’ competencies that are linked to sustainability, it will be likely to be successful in regard to achieving the presupposed learning outcomes for ESD. They held the common view that an ESD-effective school requires some sort of idealism if it wants to succeed in the ESD goals it set out to achieve for students. For example, one teacher stated that the ability of a school to believe it has an effect on ESD is one of its major strengths. However, another teacher noted that collective efficacy is a vicious circle: If a school is convinced of its positive effect, it continues making an effort. If a school does not believe it can make a difference, it will not put forth additional effort. Consequently, there will be no effect, and the school’s belief that it cannot make a difference is strengthened. The respondents shared the opinion that a collective sense of efficacy leads shows genuineness.

“If you are convinced of something yourself, of the way you do it, the content, the message you bring, you can lift your students to a higher level. If you radiate positivity, it doesn’t matter if it’s the teacher, the school leader, or the cleaning staff, you notice that the children are happy to come and learn at school.” – School leader 2

While the respondents deemed a sense of collective efficacy an important feature of an ESD-effective school, they expressed concern regarding the influence a school can have on children when their parents are not open to the sustainability of ESD. One common view was that when parents did not support ESD, the positive effects of the school were cancelled out. However, it is interesting that respondents who sensed a high level of collective efficacy stated that they use ESD to reach the parents via the children. As several respondents explained, when they are able to teach children about sustainability and ESD, they can also try to inform the parents about it.

Structuring of the characteristics of an ESD-effective school

During the final part of the interview, respondents were asked to organize cards depicting the different school characteristics while expressing their thoughts aloud. The results provide insight into how the respondents see the different characteristics in relation to each other. While none of the respondents provided a viewpoint that fully contradicts the structuring of the characteristics in the original framework, it is worth noting that several respondents put emphasis on the importance of pluralistic communication. As stated by a number of respondents, pluralistic communication has a significant influence on the other characteristics, whether they are central or contextual. For example, in order to develop a shared vision or make decisions in a democratic way, (a pluralistic way of) communication is necessary.

“I think that in the decision-making process, people should have the opportunity to state and communicate their viewpoint even if it’s not in line with what everyone else is thinking. You need both the people who agree and those who don’t agree in the dialogue to set up the shared vision.” – School leader 7

In the interconnectivity of the central characteristics, pluralistic communication plays an important part in bridging the different characteristics, according to some of the respondents. As communication is seen as vital in order to attain the other characteristics of the ESD-effective school, it is argued by the respondents that it could also be seen on a different level compared to the other characteristics. Moreover, one respondent raised the

point that in a school that invests in ESD, pluralistic communication is ‘the sauce around everything’.

Conclusions and discussion

This study aimed to qualitatively validate the proposed framework for an ESD-effective school and did so in the context of both primary and secondary Flemish schools. It focused on a primary research question: “To what extent do teachers and school leaders with expertise in ESD reaffirm the framework for an ESD-effective school?” The respondents in this study agreed with the proposed characteristics in the framework for an ESD-effective school. As none of the interviewees brought forth additional characteristics, our hypothesis that the eight identified characteristics make up the organisational traits of an ESD-effective school was strengthened. It is also to be noted that school leaders as well as teachers highlighted the importance of the eight characteristics in the framework. Furthermore, the results reaffirmed that school leadership and school resources, and the connection between both, can be conceptualized on a higher hierarchical level than the other characteristics. It is encouraging to compare the results from our study with the fifth principle of Hargreaves and Fink (2004), which describes sustainable leadership as a developer of human and material resources. Moreover, our findings are also in line with the role of the school leader as an agent between the school and the wider community (Carr, 2016). In addition, sustainable leadership, and the need for an integrated and holistic perspective to leadership, was reflected in the statements of the respondents. The respondents noted, in line with the framework for the ESD-effective school, that sustainable leadership is broader than the person of the school leader himself or herself and that being aware of the past and future contributes to a policy on ESD. Thus, based on the testimonials of our sample, we would argue that sustainable leadership, school resources, and their reciprocal relationship facilitating ESD can indeed be situated on the subcontextual level of the ESD-effective school. This reciprocal relation is also reflected in the educational leadership literature with examples as Leo and Wickenberg (2013), Hargreaves and Fink (2004) and Fullan (2006). Our findings regarding the central

characteristics are overall consistent with what is described in the proposed framework and with the literature on which it was based. For example, when considering collective efficacy, the respondents in this study echoed the positive effects described in the literature (Hoy et al., 2013; Leithwood & Jantzi, 2008; Leithwood & Mascall, 2008). The benefits of supportive relations within and among schools and the need for a shared vision that our respondents put forward, is similar to the results found in the study by Pepper (2013), who interviewed school leaders (school principals, teacher leaders,...) on leadership for sustainable schools.

Although the evidence from our study has clear connections to the characteristics of the framework, we also found that the interconnectivity between the different characteristics sometimes differs regarding how the respondents conceptualized the interconnectivity and how it is described in the conceptual framework. As the results indicate, pluralistic communication might not completely fit in with the other characteristics on the central level. Many respondents conveyed the need for pluralistic communication within other central and contextual characteristics. Since this statement was much more explicit than other statements about the interconnectivity between the different characteristics, it is potentially better to regard pluralistic communication more so as an agent that enables a school to implement the other characteristics. However, to allow for a better understanding of how the relations between the characteristics of the ESD-effective school are manifested, further research is needed. This way we can obtain further insight into how specific characteristics (positively or negatively) steer other characteristics. Furthermore, a greater focus on pluralistic communication as a catalyst for both the central and contextual characteristics can potentially lead to interesting findings that can expand our understanding of an ESD-effective school. Another finding that could be further investigated, would be the relationship of the school with the parents, and specifically on the collective efficacy of the school. This could by extent also influence the educational outcomes of ESD within the school. Addressing these gaps will allow for the empirical connection of ESD school characteristics with the actual learning outcomes of the school. This type of school effectiveness research will contribute to a more empirical way of looking

at ESD, which several ESD scholars have requested (Bormann & Nikel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018).

In terms of the limitations of the study, the generalisability of the findings has to be taken into account. While our sample and the perceptions of our respondents were more than adequate to provide empirical evidence on the conceptual framework for an ESD-effective school, they were situated in a specific context. Seeing that our sample was situated in Flanders, a Western European region with a distinct educational system, the results should be situated within this context. Although we were interested in our respondents' perceptions on the characteristics, not the specific situation within the school, it is evident that these perceptions are also contextually dependent. Concerning the reliability of our study, we obtained a fairly high kappa value (.62). While the nature of qualitative research does not guarantee an entirely objective and verifiable result (Choy, 2014), this kappa value tends to indicate that our study does offer reliable insights into the conceptualization of an ESD-effective school. By involving several researchers in this study, both actively in the analysis of the data and from the sideline as critical peers, we were provided with critical feedback on our work, thus further ensuring the reliability of the results. Nevertheless, further research is necessary in order to enhance the generalization of our proposed framework. Seeing that the availability of academic sources on educational management and administration tends to be predominantly situated in the Anglo-American tradition (Hallinger & Kovačević, 2019) and the fact that our study only included Flemish schools, we encourage future, both qualitative and quantitative, research to investigate how this framework holds its ground in different contexts across the globe. The application and potential adaptation of the framework for the ESD-effective school to different contexts would not only enrich the framework itself, it would also allow for comparative research on ESD in different contexts. That said, with almost every respondent being an experienced and well-informed teacher or school leader, the purposeful selected sample allowed for rich and in-depth perspectives into the conceptualization of an ESD-effective school.

In conclusion, ESD remains fairly uncharted terrain when it comes to educational management and educational effectiveness. Many of the concepts of these two research areas have already undergone extensive examination. With our study, we sought to connect these particular research areas, though further progress in the field of ESD can occur by linking the existing knowledge of educational management and organisational science to the concepts and ideas in ESD research. The findings in this study further our understanding of how a school can be organized to ensure ESD effectiveness and should inspire more empirical and effectiveness studies in the field of ESD.

Chapter 4: Development and Validation of the Education for Sustainable Development School Organisation Questionnaire

This chapter is based on: Verhelst, D., Vanhoof, J., & Van Petegem, P. (under review: minor revisions). Development and Validation of the Education for Sustainable Development School Organisation Questionnaire.

Abstract

Empirically based tools to map education for sustainable development within school organisations are not readily available, which is both a cause and a consequence of the scarce empirical and quantitative research on school organisations and education for sustainable development. In present study, the Education for Sustainable Development School Organisation Questionnaire (ESD-SOQ) was developed and validated. This instrument measures the organisational characteristics of an ESD-effective school. During the development and validation of the ESD-SOQ, different steps were taken. First, data from prior research was consulted to draft the initial scales. These were further refined via cognitive interviews (n = 3) and consulting critical peers (n = 7). Next a pilot study (n = 108) was set out to retain the best items per scale and thus reduce the size and load of the questionnaire. Finally, a large-scale validation study (n = 764) ensured the reliability, the content validity, the cognitive validity and the construct validity of the final instrument. Based on the findings of our development and validation study, ESD-SOQ proves to be a valid and reliable instrument for the investigation school organisational characteristics related to education for sustainable development.

Problem statement

Need for empirical and quantitative evidence on ESD schools

The implementation of education for sustainable development (ESD) has been increasing over recent decades fostered by initiatives such as the United Nations Decade of Education for Sustainable Development (DESD, UNESCO, 2014). ESD is an educational approach empowering learners *“with knowledge, skills, values and attitudes to take informed decisions and make responsible actions for environmental integrity, economic viability and a just society”* (UNESCO, 2020, p. 8). Despite these increased efforts, the DESD concluded with a call for the further monitoring and evaluation of ESD (UNESCO, 2014; Wals, 2009). This challenge remains today, with empirical research on ESD still appearing to lag behind the pressing needs. Without ignoring the valuable steps that have been taken towards a more empirical approach in the ESD field, most of the existing research efforts and instruments focus on the student level (e.g. Olsson et al., 2020), the teachers and classroom level (e.g. Varela-Losada et al., 2020) or on higher education, thus overlooking the organisation of compulsory education (e.g. Holm et al., 2015; Rampasso et al., 2019). The fact that measurement instruments to map ESD within school organisations are not readily available is both a cause and a consequence of this lack of empirical and quantitative research on ESD within school organisations.

While school effectiveness research has recognised the importance of the school organisation in facilitating the outcomes and impact of education (Creemers & Kyriakides, 2010; Teddlie & Reynolds, 2006), the gap in the knowledge base of ESD is concerning. Moreover, while existing studies provide valuable insights into the functioning of school organisations implementing or working with ESD, these studies often take a theoretical or qualitative approach and lack an empirical or quantitative perspective (e.g.: Bennell, 2015; Iliško & Badyanova, 2014; Laurie et al., 2016; Scott, 2013). Nonetheless, this is not to say that no empirical studies have been done. For example, Mogren et al. (2019) adapted a conceptual framework for school improvement into a measurement instrument that

allowed them to quantitatively investigate ESD implementation in relation to the whole school approach. As a number of scholars have also highlighted the need for more evidence on the impact and outcomes of ESD (Boeve-de Pauw et al., 2015; Bormann & Nikel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018), this study set out to develop and validate a questionnaire on school organisational characteristics in relation to ESD.

A frequently expressed concern about effectiveness in the context of ESD relates to bias in effectiveness research; that is, it only measures that which is readily measurable and neglects precisely what lies behind the outcomes (Biesta, 2009). In line with Nikel and Lowe (2010), we argue that effectiveness does not exclude a pluralistic perspective on quality education. Acknowledging that it is important to be 'aware of outcomes and impacts – both positive and negative – that are not pre-specified' (Nikel & Lowe, 2010, p. 596), a focus on school effectiveness can provide valuable insights into school organisational characteristics that influence both the effectiveness and impact of education. As to what this effectiveness perspective should focus on within the school organisation, Laurie et al. (2016, p. 440) list the adaptation of ESD management practices as one of the requirements for ESD to contribute to quality and effective education. While the need for empirical research on the school organisation level is evident, the tools to conduct this research in the area of ESD are still lacking. To investigate how school organisations can facilitate effective or quality ESD, a validated and comprehensive measurement tool is desirable. Such a measurement instrument can aid in bridging the gap on school effectiveness in the field of ESD and facilitate an empirical perspective on the school organisation's influence on ESD outcomes.

Recognising these needs in the field of ESD, the goal of this study was to develop and validate a questionnaire on ESD school effectiveness, aiming to operationalise a previously developed framework for the ESD-effective school (Verhelst et al., 2020). This framework consists of eight organisational characteristics and is based on a critical review combining existing ESD literature on school organisations with other sources on school effectiveness and educational administration. The theoretical validity of both the framework and the organisational characteristics was substantiated through a qualitative inquiry with school

leaders and teachers at ESD active schools (Verhelst et al., 2021). The previous conceptual and qualitative research served as a baseline for the development of the different scales and items on the ESD School Organisational Questionnaire (ESD-SOQ). Following the development of the instrument, we conducted a validation of the ESD-SOQ to check the construct validity and the reliability of the different items and scales (Cohen et al., 2011b, pp. 188-189). To address the central goal of this study – the development of a tool enabling the measurement of the constructs within the framework for the ESD-effective school in a reliable and valid way – we posed the following research questions:

- How can the characteristics of the ESD-effective school organisation be operationalised?
- To what extent are the items in the ESD-SOQ valid for measuring the characteristics of the framework for the ESD-effective school organisation?
- How reliable are the different scales in the ESD-SOQ?

The target population for the ESD-SOQ includes all staff members within a school organisation. These may be teachers and school management, as well as policy officers, support staff and others. These people, who all make and shape the organisation together, are expected to be able to give a good indication of what the school organisation looks like.

Conceptual framework: the ESD-effective school

In the following, we provide a description of the conceptual framework for an ESD-effective school. The framework for an ESD-effective school holds a specific focus on the organisational level of the school (Verhelst et al., 2020). The organisational level includes all processes and entities connected to organisational functioning of the school that transcend the classroom, individual student, and individual teacher level. Arguably, an ESD-effective school organisation will be able to achieve its ESD-related goals via the facilitation of the processes at the different levels of the school. Different from the school-wide capacity perspective (Slegers et al., 2014; Thoonen et al., 2012), the present framework is situated at the organisational level of the school, referring to all processes and entities

connected to organisational functioning of the school that transcend the classroom, individual student and individual teacher level. Whereas the school-wide capacity perspective includes both the school and teacher level. For an in-depth report on this framework, we refer a prior conceptual article (Verhelst et al., 2020). The framework for an ESD-effective school consists of eight characteristics: sustainable leadership, the school resources, pluralistic communication, democratic decision-making, collective efficacy, shared vision, adaptability and supportive relations. As Mogren and Gericke (2019) found, specific aspects (factors) of a school organisation can facilitate ESD within the school via a transmissive (providing structure and anchors) of transformative perspective (focussing on development and processes). The different organisational characteristics will thus facilitate ESD via for example offering anchors via the professional structures (e.g.: workgroups) or having a development focussed perspective via a strong believe in the collective efficacy. Arguably, an ESD-effective school organisation will be able to achieve its ESD-related goals via the facilitation of the processes at the different levels of the school. These processes can include an interdisciplinary approach, project implementation, specific didactical approaches, such as an interdisciplinary or holistic perspective on sustainability issues, or any other process within the school that relates to ESD (Sinakou et al., 2019).

Within an ESD-effective school organisation, the organisational context will be largely determined by the resources the school has at its disposal and the sustainable leadership within the school organisation. These two characteristics shape the sub-contextual level of the organisation, referring to the internal organisational context rather than the broader educational context in which the school organisation itself is situated. Leadership within an ESD-effective school organisation is described as *sustainable leadership*, indicating leadership that is sustainable over time and that incorporates a holistic and integrated perspective on the past, present and future, locally and beyond (Bottery, 2012; Hargreaves & Fink, 2006). Sustainable leadership will contribute to a long-term holistic strategy, as it adapts to the specific time and context while considering holistic, pluralistic and action-oriented perspectives. Sustainable leadership is not understood as a one-person show: an ESD-effective school organisation might have several *sustainable leaders*. Moreover,

sustainable leadership is ought to have a clear perspective on the main focus of the school, namely teaching and learning (Starratt, 2007), and this in the context of ESD.

Central to the sub-contextual level of an ESD-effective school organisation is the reciprocal relationship between sustainable leadership and the resources the school has at its disposal (Leo & Wickenberg, 2013). These *school resources* fall into three different categories: *time management*, *professional structures* and *physical structures*. Within an ESD-effective school, the available time will be efficiently managed in order to facilitate pluralistic, interdisciplinary and integrated teaching and learning. Moreover, the specific configuration of different professional positions will enable pluralism and holism within the school team (Mogren & Gericke, 2017a). Finally, in an ESD-effective school organisation, the *physical structures* refer to the infrastructure and financial resources of the school organisation (Kuzich et al., 2015; Schelly et al., 2012). These are allocated, used and managed so that the school is able to reach its educational goals while at the same time demonstrating the organisational values related to ESD.

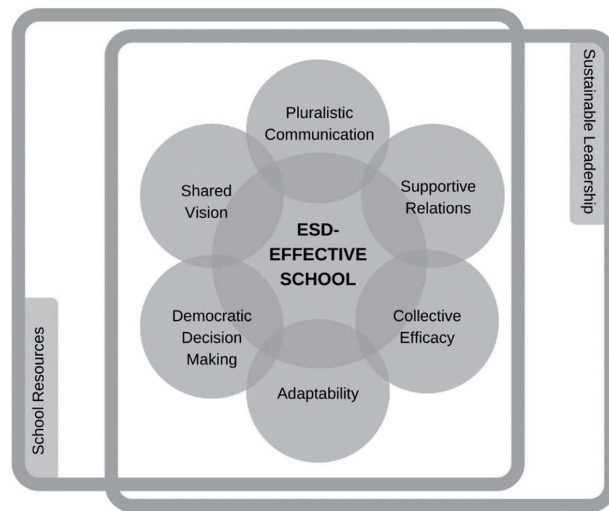


Figure 2: Conceptual framework of an ESD-effective school

In an ESD-effective school organisation, the presence of sustainable leadership and adequate resource management is expected to lead to a situation that facilitates those organisational traits necessary for the school to attain the educational goals related to ESD. The conceptual framework for the ESD-effective school organisation includes six central, interrelated organisational characteristics contributing to ESD effectiveness: *pluralistic communication*, *democratic decision-making*, *adaptability*, *supportive relations*, *collective efficacy* and *shared vision*. *Pluralism* is the recognition of, and dialogue between, different viewpoints and ideas (Boeve-de Pauw et al., 2015; Lijmbach et al., 2002; Rudsberg & Öhman, 2010). As it is central to ESD, it is evident that members of an ESD-effective school organisation will be able to communicate in a pluralistic fashion. Within an ESD-effective school organisation, *pluralistic communication* contributes to a climate where there is a willingness to learn from, and a critical reflection on, the experiences, viewpoints and arguments of others. Pluralistic communication enriches decision-making processes, with different opinions, viewpoints and critical self-reflection contributing to a *democratic decision-making process*. Such a mode of decision-making involves all of the relevant

stakeholders in making decisions, leading to broadly supported decisions in an ESD-effective school organisation.

The adaptation strategy of an ESD-effective school organisation is characterised by being able to make well-supported decisions regarding both internal and external demands. Moreover, an effective school knows how to improve itself when responding to internal and external demands (MacBeath & Mortimore, 2001). Thus, *adaptability* is the characteristic of the school linked to its ability to change or not, depending on the situation. By having a holistic perspective when responding to opportunities or demands, the school can ensure that existing aspects are not overlooked in favour of future change (Hargreaves, 2007).

Another central characteristic is the school's *supportive relations*, which may be manifested within the team, with other schools or external partners and between school leaders of different schools (Leo & Wickenberg, 2013). These supportive relations aid in knowledge-sharing and facilitate the establishment of a collective initiative to pursue ESD, both within and between schools. The support of external partners, such as the local community, parents, guidance services and external experts, may also aid schools by providing expertise, resources and other benefits contributing to the attainment of the educational goals of the school (Bennell, 2015; Mogren & Gericke, 2017a).

A heightened sense of *collective efficacy* in an ESD-effective school organisation indicates that the school feels able to positively influence the learning of the pupils in the school (Bandura, 1997; Hoy et al., 2013). School members feel able to achieve positive outcomes with their students in the area of ESD and, in turn, they positively contribute to the actual student outcomes and school effectiveness. Finally, a *shared vision* in the pursuit of ESD will ensure that everyone within the ESD-effective school organisation is aware of what the school means by ESD and that the school as a whole is motivated to invest in it. Figure 2 provides a visual representation of the conceptual framework, with its two subcontextual characteristics and the six central characteristics.

Validity and reliability in questionnaire development

A measurement instrument should demonstrate its validity in a number of areas. Firstly, the theoretical constructs that are to be measured should be translated into items that cover the full concept they intend to measure. If this is the case, the *content validity* of the items or questionnaire is guaranteed (Carmines & Zeller, 1979). This content validity can be evaluated by consulting people who have expertise in the subject area of the items (Karabenick et al., 2007). Secondly, as respondents read and interpret the different items in a questionnaire independently, they should be able to do this correctly. Thus, the *cognitive validity* of the questionnaire items also needs to be addressed.

Karabenick et al. (2007) described a series of sequential cognitive tasks during which the respondent has to perceive, process and respond to a questionnaire item. Questionnaire items that are cognitively valid will evoke a response similar to the response the item intends to elicit. However, Karabenick et al. (2007) notes that several things can go wrong during this process. For example, if a respondent misinterprets a word because, for example, in his or her school this word has a different meaning, this can affect how the respondent retrieves the necessary information to address the item, thus influencing their response. Thus, in order to assess cognitive validity, the intended respondent population should be investigated through cognitive pre-testing. This cognitive pre-testing offers several advantages for instrument development, as qualitative data about how items are interpreted by the respondents can be used to assess the cognitive validity of the items and adjust or remove them as needed (Karabenick et al., 2007; Willis, 2005).

Moreover, it is also a prerequisite that the items measure the intended construct. *Construct validity* thus also refers to the extent to which an item used to measure a construct relates to other items measuring the same theoretical construct, thus indicating how valid it is for measuring a certain construct (Carmines and Zeller, 1979). Another aspect of validity that is to be established, concerns the issue of discriminant validity. This relates to items being

empirically distinguishable and not measuring another theoretical construct of interest (Rönkkö & Cho, 2020).

Even if it is established that a questionnaire is valid, it is still necessary to check whether the scales in the questionnaire are reliable. Reliability can be seen as a condition of validity, and it requires an instrument or scale to be stable, replicable and internally consistent under similar conditions ((Cohen et al., 2011b). Reliability can be evaluated in terms of the internal consistency of questionnaire scales (Cohen et al., 2011b).

Developing a valid and reliable questionnaire: process and methodology

In the following sections, we describe the steps taken in the operationalisation of the conceptual framework and the development and validation of the ESD-SOQ. Figure 3 gives a general overview of this process. The four main steps in this study were: the development of the scales for the questionnaire, pre-testing the questionnaire, piloting the questionnaire and, finally, validating the ESD-SOQ.

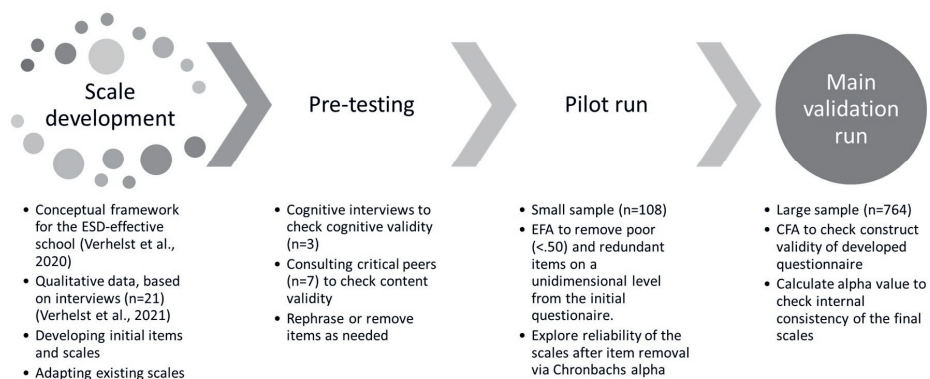


Figure 3: Steps of the development and validation process in Study 3

Step 1: Scale development

The starting point for the development of the questionnaire was a theoretical framework for the ESD-effective school organisation (Verhelst et al., 2020). The conceptual framework, which serves as the theoretical basis for the novel questionnaire, was the result of a review that synthesizes ESD-literature, school management literature and organisational literature. However, the focus was the identification and development of a framework with a focus on ESD-effectiveness. For the development of the different scales and items, the conceptual framework was substantiated by qualitative data provided by school leaders and teachers with experience and expertise in ESD ($n = 21$) (Verhelst et al., 2021). As described above, school resources include three components (*time management*, *professional structures* and *physical structures*). For each component a separate scale was developed. The same applies for supportive relations, also leading to three scales: *supportive relations within the school team*, *supportive relations with external partners and other schools* and *supportive relations between school leaders*. The latter was exclusively oriented at school leaders seeing that teachers might not be able to provide valid reports on the supportive relations between school leaders. As a result, twelve scales were developed to measure the eight characteristics of the ESD-effective school. Throughout the process of drafting the first version of the scales, the conceptual framework for the ESD-effective school organisation and the data from the qualitative study were consulted to effectuate the content validity of the items and scales.

Of these twelve scales, two were based on existing instruments. The scale for collective efficacy was based on the collective efficacy subscale from the SAOS questionnaire, with a reported alpha coefficient of .91 (Hoy et al., 2006). The original scale was translated into Dutch and adapted to the context of ESD. The scale for supportive relations within the school team was based on a scale developed by Aelterman et al. (2002) in their research on teacher well-being. This scale was also used by Van Petegem et al. (2010), who reported a Cronbach's alpha value of .84. The other scales were developed from scratch based on data from our theoretical study and the qualitative framework itself.

Furthermore, in order to retain the best items for each of the scales, we purposely developed more items than needed. Typically, a minimum of four items is preferred to provide good coverage of the theoretical construct (Hair et al., 2010). With this in mind, we developed eight to nine items for each of the twelve scales, with the intention to ultimately reduce this number to four to six items for each scale. Every item of the ESD-SOQ has the following answering options: (1) completely disagree; (2) somewhat disagree; (3) neither agree nor disagree; (4) somewhat agree; (5) completely agree. There is also the option to indicate if an item is not applicable.

Step 2: Pre-testing

To address cognitive validity (Karabenick et al., 2007; Willis, 2005), a pre-test consisting of three cognitive interviews was conducted: one with a primary school teacher, one with a secondary school teacher and one with a primary school policy advisor. Based on these interviews, items that respondents perceived as unclear were reformulated. If needed, items were reformulated in order to make them comprehensible for all staff from both primary and secondary schools. Following these cognitive interviews, a panel of critical peers (n = 7) with expertise in ESD, school policy and teacher development programmes related to ESD was consulted. They filled in the questionnaire and simultaneously provided written feedback which was used to check the content validity of the items and scales (Carmines & Zeller, 1979). Moreover, this feedback was used to adapt the questionnaire look and feel, as well as flow and ambiguities in the formulation. This pre-test led to an initial version of the measuring instrument that was piloted on a small sample of schools in step three.

Step 3: Pilot

The initial version of the ESD-SOQ was piloted on a sample of fifteen schools. This pilot enabled us to remove redundant items if necessary, thus leading to a more parsimonious questionnaire. The pilot sample had an equal representation of both primary and secondary schools. As this pilot still had an exploratory and developmental character, the

sample of $n = 108$ (consisting of school leaders, teachers and other staff of the school) was deemed sufficient. The sample consisted of a small number of school leaders ($n = 11$), and therefore, it was not possible to conduct analyses on the scale for supportive relations between school leaders. This scale was therefore omitted from further analyses bringing back the number of scales in the ESD-SOQ from twelve to eleven.

The data from this pilot allowed for a unidimensional exploratory factor analysis (EFA) with varimax rotation. Items with a factor loading lower than .50 were removed (Hair et al., 2010). To support this unidimensional approach, we assessed the screeplots and eigenvalues of the separate organisational characteristics. The main rationale for this unidimensional approach comes from the theoretical grounding of the different factors: each scale measures one of the organisational characteristics. Moreover, as we developed a larger number of items with the intent to limit the final scales to the best four to six items, those items with the lowest factor loadings within a scale were also removed. In the case of the scale for 'adaptability', an item with a factor loading of .47 was retained, as this was only slightly below the cut-off value and allowed for the retaining of four items in the scale. Following the EFA, the internal consistency of the provisional scales was checked using Cronbach's alpha, leading to the removal of items that negatively influenced the internal consistency of the scales. Table 4 gives an overview of the different scales, the number of items in the scale, an example item and the corresponding alphas and the factor loadings of the items within the scale. Overall, the reliability of the scales after the pilot proved to be more than sufficient, with alphas ranging from .69 to .94. The pilot led to the reduction of the total number of items in the ESD-SOQ from 85 to 55, with four to six items for each scale. The post- pilot version of the ESD-SOQ, as a product of the process of developing, pre-testing and piloting, allowed us to answer the first research question in this study: How can the characteristics of the ESD-effective school organisation be operationalised? This version of the ESD-SOQ with the eleven scales for the eight characteristics, was then further validated to assess its construct validity.

Table 4: Overview of the scales after the pilot

(Sub)scale	Description	No. of items		Factor loadings of retained items	Example item	Post pilot alpha
		Pre-pilot	Post-pilot			
Sustainable leadership	The presence of sustainable leadership at the school.	8	5	.70 .68 .87 .71 .78	The leadership at this school shows that ESD is here to stay.	.86
Time management	The extent to which planning and time allocation facilitate ESD.	7	6	.69 .70 .71 .74 .68 .88	At this school, we have enough time to work in an investigative fashion with ESD.	.88
Professional structures	The extent to which professional resources and how these are organised facilitate ESD.	7	6	.73 .85 .51 .78 .91 .80	At this school, teachers from different courses and grades collaborate on ESD.	.87
Physical structures	The extent to which the school's physical structures facilitate ESD.	8	4	.55 .70 .59 .50	The infrastructure at this school shows that we focus on ESD.	.69
Pluralistic communication	The extent to which there is a pluralistic communication climate in the school.	9	5	.85 .93 .92 .80 .79	At this school, different opinions on ESD are respected.	.92
Democratic decision-making	The extent to which (ESD related) decisions are made	8	6	.73 .64 .69 .73	At this school, different viewpoints are considered	.85

Questionnaire

	in a democratic fashion.			.76 .71	when making decisions about ESD.	
Adaptability	The extent to which a school is able to deal with internal and external demands.	7	4	.86 .87 .47 .52	At this school, we are open to suggestions about ESD that come from within the school.	.80
Supportive relations school team	The extent to which supportive relations within the school team are present and facilitate ESD.	7	5	.75 .90 .91 .75 .75	At this school, teachers are involved in each other's ESD tasks and projects.	.91
Supportive relations external partners	The extent to which supportive relations with external partners and other schools are present and facilitate ESD.	8	6	.77 .83 .92 .97 .89 .73	This school gains inspiration for ESD from collaboration with external partners.	.94
Collective efficacy	The extent to which collective efficacy, focused on ESD, is present at the school.	9	5	.78 .79 .59 .72 .70	At this school, we are convinced that we can provide good ESD education to our pupils.	.87
Shared vision	The presence of a common understanding and motivation towards ESD.	7	4	.86 .79 .70 .52	At this school, it is clear for most of the colleagues what is meant by ESD.	0.82

Step 4: Validation

The last step in the development of the ESD-SOQ involved a large-scale validation study using a purposively selected sample (Teddle & Yu, 2007). This allowed the assessment of construct validity and the reliability of the final version of the ESD-SOQ. As this study was part of the ANONYMISED research project – a research and development project with a professionalization trajectory for schools that want to implement ESD – the primary and secondary schools participating in this project proved to be an appropriate purposive sample for this study. An online questionnaire was distributed to 52 schools via email. This communication made clear that all members of the school organisations were eligible to complete the questionnaire. Following the first round of email invitations, paper versions of the questionnaire were sent out with a second invitation to fill in the online questionnaire. The final sample size was set at 764 responses. The resulting sample contained an equal representation of experienced (> 10 years of experience) and relatively novice staff (< 10 years of experience), from primary (36%) and secondary (64%) schools. The majority of the respondents identified as female (70%). The larger part of the respondents were teachers (83%), with other respondents having a coordinating function or being the school leader, a policy advisor or having another function within the school.

The validation analysis started off with the calculation of the descriptive statistics. The mean was calculated for each scale, along with the kurtosis and skewness of the scales to check whether the data was normally distributed. This allowed an informed decision on which estimator to use for the confirmatory factor analysis (CFA), which was conducted to check the construct validity of the ESD-SOQ. Factor loadings higher than .50 indicate a good item (Hair et al., 2010). The factor analysis was computed using the lavaan package for latent variable modelling version 6.5 (Rosseel, 2012). The sample size of $n = 764$ was sufficient for this analysis (Hair et al., 2010). Using the scales of the ESD-SOQ to define the latent variables, an eleven-factor model was defined, with each of the characteristics of the ESD-effective school organisation as factors.

The MLR estimator was used to calculate standard errors that were robust to non-normality and hierarchically clustered data, as this estimator uses more conservative standard errors. Moreover, this estimator is suitable to use with incomplete data (Beaujean, 2014). The following indices were consulted to assess the model fit of the CFA: χ^2 (cut-off: $p = 0.05$, sensitive to sample size), Standardised Root Mean Residual (SRMR, cut-off: .08), the Tucker Lewis index (TLI, cut-off: .90), the Root Mean Square Error of Approximation (RMSEA, cut-off: 0.05 to 0.10) and the comparative fit index (CFI, cut-off: .90) (Hooper et al., 2008). To improve model fit, modification indices were consulted to add error covariances between items to the model. To assess the discriminant validity, we applied the CI_{cfa} approach as described by Rönkkö and Cho (2020) and we inspected the standardized factor solution.

Results of the validation

Descriptive statistics

The descriptive statistics of the dataset provided a general overview of the data collected by the ESD-SOQ. Overall, the scales for physical structures, pluralistic communication, adaptability, collective efficacy and shared vision differed from normal distribution and tended to be somewhat leptokurtic, confirming the need for an estimator that calculates robust standard errors. Table 5 provides an overview of the different scales and subscales in the ESD-SOQ.

	Mean	Std. Deviation	Kurtosis	Skewness
Sustainable leadership	3.419	.731	-.475	.513
Time management	3.114	.831	-.365	.021
Professional structures	3.616	.785	-.591	.569
Physical structures	2.982	.561	-.393	1.272
Pluralistic communication	3.898	.649	-.464	1.182
Democratic decision-making	3.371	.759	-.484	.316
Adaptability	3.760	.626	-.552	1.236

School team	3.261	.575	-.347	.618
External partners	3.177	.784	-.488	.798
Collective efficacy	3.377	.533	-.518	1.023
Shared vision	3.038	.452	.005	2.484

Confirmatory factor analysis

The eleven-factor CFA model provided a good fit for the observed data. To further improve model fit, error covariances were added between the items of 'Adaptability 1' and 'Adaptability 2' (0.58) and between 'Professional structures 2' and 'Professional structures 4' (-0.32). Although the p-value for χ^2 was not significant, this fit indicator is known to be sensitive to larger sample sizes. The model fit suggested by the other fit indices did show a good fit. The SRMR value of .05 remained well below the cut-off value of .08 and indicated an acceptable fit (Hooper et al., 2008; Hu & Bentler, 1999). In addition, the TLI (.90) and CFI (.91) indicated a fair model fit with respect to the cut-off point of .90 (Hooper et al., 2008). Moreover, the RMSEA value of .045 (with 90% CI [.043, .047]) also support our model. Table 7 gives an overview of the standardised factor loadings for the eleven factors in the CFA model. All factor loadings were sufficiently high, with 41 items having a factor loading higher than .70. Only 'Physical structures 1' had a factor loading of .46 and did not meet the proposed .50 cut-off value suggested by Hair et al. (2010), but only by a small margin. Next, the correlation matrix (Table 8, lower triangle) shows that most of the factors correlated on a level that was to be expected, indicating that they are related but also sufficiently distinctive to measure different constructs. As none of the correlations were higher than .80, we did not assume any worrying issues with regard to the discriminant validity of the different factors (Rönkkö & Cho, 2020). Secondly, we compared the 95% confidence intervals (CI) against the cut-off values proposed by Rönkkö and Cho (2020) and found that the upper level for the CI for the correlation between democratic decision making and sustainable leadership just exceeds the .80 cut-off value proposed by Rönkkö and Cho (2020). Nevertheless, even if the correlations between the factors is high, this does

not automatically mean that there is a discriminant validity problem as these correlations can also be expected based on the theory (Rönkkö & Cho, 2020). Table 6 gives an overview of the proposed classification and the CI upper levels can be found in the upper triangle of table 8.

Table 6: Classification and cut-offs by Rönkkö and Cho (2020)

Classification	Clcfa
Severe problem	$1 \leq UL$
Moderate problem	$.9 \leq UL < 1$
Marginal problem	$.8 \leq UL < .9$
No problem	$UL < .8$

The results of the CFA thus indicate that the ESD-SOQ and the different scales are valid to measure the constructs represented by the different factors. In answering the second research question, our results show that the different items provide a valid measurement of the characteristics of the framework for an ESD-effective school organisation.

Reliability

The reliability of the ESD-SOQ was evaluated by examining the internal consistency of the different scales. Cronbach's alpha values of the scales indicated an acceptable to high internal consistency. The only scale with an alpha value below .70 was that for physical structures in the school, with a value of .69. The values suggested high internal consistency for each of the ESD-SOQ scales. Based on these results, it can be stated that the scales are a reliable measurement of the characteristics of an ESD-effective school organisation.

Table 9 provides sample items for each of the validated scales of the ESD-SOQ. A complete version of the questionnaire can be found in Appendix 4 (original Dutch version) and Appendix 5 (English translation).

Table 7: Standardised factor loadings⁴

Factor	Item	Factor loading	Factor	Item	Factor loading
Sustainable leadership ($\alpha = .89$)	Item 1	.78	Pluralistic communication ($\alpha = .91$)	Item 1	.75
	Item 2	.76		Item 2	.83
	Item 3	.80		Item 3	.81
	Item 4	.75		Item 4	.86
	Item 5	.80		Item 5	.87
Time management ($\alpha = .90$)	Item 1	.68	Democratic decision-making ($\alpha = .92$)	Item 1	.80
	Item 2	.63		Item 2	.68
	Item 3	.85		Item 3	.86
	Item 4	.87		Item 4	.88
	Item 5	.77		Item 5	.87
	Item 6	.89		Item 6	.76
Professional structures ($\alpha = .86$)	Item 1	.67	Supportive relations school team ($\alpha = .86$)	Item 1	.72
	Item 2	.81		Item 2	.80
	Item 3	.74		Item 3	.89
	Item 4	.74		Item 4	.83
	Item 5	.72		Item 5	.56
	Item 6	.57	Supportive relations external partners ($\alpha = .94$)	Item 1	.80
Physical structures ($\alpha = .71$)	Item 1	.46		Item 2	.86
	Item 2	.59		Item 3	.91
	Item 3	.79		Item 4	.86
	Item 4	.64		Item 5	.93
Adaptability ($\alpha = .86$)	Item 1	.69		Item 6	.81
	Item 2	.70	Collective efficacy ($\alpha = .83$)	Item 1	.57
	Item 3	.78		Item 2	.69
	Item 4	.84		Item 3	.68
Shared vision ($\alpha = .78$)	Item 1	.86		Item 4	.76
	Item 2	.83		Item 5	.84
	Item 3	.51			
	Item 4	.60			

⁴ All factor loadings were statistically significant: $p < 0.005$

Questionnaire

Table 8: Correlations between the factors (lower triangle) and upper limits of 95% CI (upper triangle in italic)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Sustainable leadership (1)	1.00	<i>0.686</i>	<i>0.737</i>	<i>0.651</i>	<i>0.735</i>	<i>0.580</i>	<i>0.562</i>	<i>0.658</i>	<i>0.773</i>	<i>0.737</i>	<i>0.810</i>
Time management (2)	.615	1.00	<i>0.669</i>	<i>0.674</i>	<i>0.642</i>	<i>0.601</i>	<i>0.422</i>	<i>0.573</i>	<i>0.631</i>	<i>0.619</i>	<i>0.614</i>
Professional structures (3)	.631	.576	1.00	<i>0.621</i>	<i>0.765</i>	<i>0.592</i>	<i>0.476</i>	<i>0.644</i>	<i>0.702</i>	<i>0.705</i>	<i>0.702</i>
Physical structures (4)	.529	.582	.475	1.00	<i>0.551</i>	<i>0.535</i>	<i>0.354</i>	<i>0.544</i>	<i>0.563</i>	<i>0.555</i>	<i>0.541</i>
Supportive relations school team (5)	.638	.554	.692	.441	1.00	<i>0.569</i>	<i>0.557</i>	<i>0.729</i>	<i>0.725</i>	<i>0.745</i>	<i>0.722</i>
Supportive relations external partners (6)	.475	.501	.516	.423	.476	1.00	<i>0.410</i>	<i>0.558</i>	<i>0.531</i>	<i>0.550</i>	<i>0.550</i>
Pluralistic communication (7)	.483	.319	.392	.228	.466	.319	1.00	<i>0.515</i>	<i>0.679</i>	<i>0.528</i>	<i>0.628</i>
Collective efficacy (8)	.565	.491	.550	.409	.664	.461	.434	1.00	<i>0.725</i>	<i>0.747</i>	<i>0.652</i>
Adaptability (9)	.693	.539	.600	.436	.625	.445	.616	.639	1.00	<i>0.666</i>	<i>0.751</i>
Shared vision (10)	.636	.527	.627	.435	.666	.451	.431	.651	.566	1.00	<i>0.664</i>
Democratic decision-making (11)	.736	.526	.620	.431	.640	.460	.558	.586	.684	.587	1.00

Table 9: Sample items for each of the final scales in the ESD-SOQ	
Scale	Sample item (translated from Dutch)
Sustainable leadership	The school leadership makes efforts towards anchoring ESD-initiatives on the long term.
Time management	At this school, lessons are scheduled in such a way that they facilitate cross-curricular ESD-activities.
Professional structures	At this school, we devote a lot of attention to who works with who in order to facilitate ESD.
Physical structures	At this school, the infrastructure shows that we are working on ESD.
Supportive relations school team	At this school, there is a pleasant atmosphere among colleagues when working on ESD.
Supportive relations external partners	At this school is stronger when it comes to ESD thanks to the cooperation with external partners.
Pluralistic communication	At this school, we are allowed to be critical about ESD.
Collective efficacy	At this school, we are convinced that we can provide good ESD to our students.
Adaptability	At this school, we are open for suggestions related to ESD that come from inside our school (e.g., teachers, students, staff).
Shared vision	At this school, we work on ESD because we think it is important as a school.
Democratic decision-making	At this school, teachers are involved when making decisions about ESD.

Discussion and conclusions

With the need for more empirical and quantitative research on school organisations in the area of ESD, this study developed and validated the ESD School Organisational Questionnaire (ESD-SOQ). A framework for the ESD-effective school (Verhelst et al., 2020) provided the starting point for the development of the scales and items in this questionnaire. In the following, we discuss the results of the development and validation process in relation to the three research questions of this study.

The first research question, concerning the operationalisation of the conceptual framework in a questionnaire, was answered by developing a survey instrument consisting of eleven scales that encompassed the breadth and depth of the conceptual framework. By conducting several cognitive interviews (Willis, 2005), consulting critical peers and piloting

the questionnaire, we effectuated the cognitive and content validity of the questionnaire (Carmines & Zeller, 1979; Karabenick et al., 2007).

To answer the second research question, concerning the extent to which the items were valid for measuring the characteristics of an ESD-effective school organisation, the construct validity of the ESD-SOQ was taken into account. The confirmatory factor analysis using the MLR estimator with robust standard errors to compensate for non-normality and nested data showed that the items of the eleven-factor model were indeed valid for measuring the characteristics of the conceptual framework for an ESD-effective school organisation. With the exception of 'Physical structures 1', which was marginally below the advised cut-off value, all items exceeded the minimum factor loading of .50 proposed by Hair et al. (2010). Fit indices indicate that the model is adequate in terms of construct validity of the questionnaire (SRMR: .05; TLI: .90; CFI: .91; RMSEA: .041) (Hooper et al., 2008; Marsh et al., 2004). With regards to the discriminant validity, no moderate or severe issues were found. The marginal problem of the 0.810 upper CI for sustainable leadership and democratic decision-making does stand out but does not point at serious issues (Rönkkö & Cho, 2020). We expect the relatively high correlations between the different factors, and especially for sustainable leadership and democratic decision-making, to be because the different characteristics they aim to measure were empirically interrelated, as was discussed in the description of the framework (Verhelst et al., 2020).

With regard to the third research question, we found that all of the scales are more than sufficient internal consistency, with alpha values ranging from .69 to .94, and thus deemed reliable. As none of the scales had a value higher than .95, we argue that no redundant items were left in the scales, as very high alpha values are an indication of this (Taber, 2018). Comparing the alpha values of our scales for supportive relations within school teams and collective efficacy to the original scales, shows that our scale for supportive relations within school teams has a similar alpha value of .82 (alpha: 0,84; Van Petegem et al., 2010), while the alpha value for collective efficacy dropped to .78 (alpha: 0,91; Hoy et al., 2006). Although our alpha for collective efficacy is still acceptable, a potential

explanation can be found in the fact that we transformed the scale so that it would be appropriate for the context of ESD, while the original scale concerned collective efficacy within school in general.

The ESD-SOQ provides researchers and educational stakeholders with a means to survey different organisational characteristics related to ESD in school organisations. This instrument offers plenty of opportunity for research on school effectiveness and ESD, and it is also a promising starting point as a self-evaluation tool for schools who want to gain insight into their own working procedures and policy. Via this questionnaire, a school team can obtain insights in characteristics of their organisation related to ESD. This can be a valid starting point for (self-)reflection and organisational development as opening up this information can enable schools to set their own goals for their organisational growth. Knowing that similar measurement instruments are scarce, especially in the school organisational context, we believe that the ESD-SOQ will allow further exploration of the effects of the school organisation on ESD effectiveness, outcomes and impact. By operationalising the framework of the ESD-effective school organisation, we are now able to obtain a broad and holistic perspective on school organisational characteristics. Linking this novel instrument to existing instruments allows for a broad array of possible future research. Seeing that more and more instruments are being developed with a focus on action competence as a potential outcome of ESD (Olsson et al., 2020; Sass et al., 2021), future research could explore the empirical connections between ESD at the student level and the school organisational characteristics. As the organisational characteristics measured by the ESD-SOQ are argued to facilitate ESD-processes, empirically establishing this connection is made possible by these validation studies. Moreover, there are several instruments on attitudes related to ESD or sustainable development (Gericke et al., 2019; Varela-Losada et al., 2020). As the school staff makes up the school organisation, their attitudes and beliefs may prove an important aspect of what shapes the different characteristics of an ESD-effective school organisation. With regards to the study of Mogren et al. (2019), which also focused on the school organisation, we found that there was a different yet potentially complementary, perspective between their study and our

own. While Mogren et al. (2019) had a slightly different perspective, giving prominence to a different conceptual framework and focusing on ESD implementation, they also underlined the need for a holistic and whole school approach (WSA). Nevertheless, we believe that there is a complementarity between the instrument and work by Mogren et al. (2019) and this present study. With a focus on WSA, Mogren and colleagues highlighted the importance of a holistic vision, routines and structures, professional knowledge creation, and practical pedagogical work. An interesting approach would be to investigate how those four constructs, related to a WSA in ESD, are facilitated by the organisational characteristics in present study, which stem from a more organisational-oriented perspective. For example, understanding how the school organisation can contribute and facilitate pedagogical practice, would allow us to gain a more in depth-understanding of how a school influences student outcomes. Additionally, as the quality criteria defined by Mogren (2017a, 2017b), who themselves build on the quality criteria perspective by (Breiting et al., 2005) provided an inspiration for several of the characteristics for the conceptual framework of an ESD-effective school (Verhelst et al., 2020), a similar endeavour concerning the quality criteria linked to ESD-implementation could expand our understanding of what makes a school ESD-effective. Several of the quality criteria could be understood via the different organisational characteristics. For example, creating, implementing and understanding a holistic idea as a quality criteria would be facilitated via the presence of a shared vision and vice versa. In addition, sustainable leadership, as an example, could be facilitating for each of the different quality criteria. However, the focus of the quality criteria goes to the implementation of ESD, sets them apart from the organisational characteristics of an ESD-effective school. The latter are to be understood as organisational characteristics in which a school can grow and develop and that are argued to facilitate processes within the school that are related to ESD, be it its implementation or other processes such as revising and the continuous development of established ESD practices. The role of sustainable leadership in the creation of an holistic idea, as identified by (Mogren & Gericke, 2017a) would be one of the tracks worth exploring.

One limitation to our study that should be mentioned, is that although our sample met all of the criteria required to validate the questionnaire, it solely consists of Flemish schools. This limits our claims to the generalisability of the questionnaire and the results to other contexts. It is therefore desirable to translate, adapt and validate the ESD-SOQ so that it can be used in different contexts. Moreover, the translation of the ESD-SOQ into different languages and its validation in different contexts will offer opportunities for additional and comparative research on ESD in a variety of different regions and contexts. To facilitate this, the original Dutch questionnaire and an English translation are included as supplementary materials. Secondly, while one would conceptually be able to describe a school that has no clear understanding of ESD, based on the characteristics of an ESD-effective school, this would not be measurable with the present version of the ESD-SOQ. This limits the use of the ESD-SOQ to schools that have at least some notion of ESD. Notwithstanding these limitations, the questionnaire allows for empirically substantiated insight into school organisational traits related to ESD. On the methodological side, some limitations and concerns are ought to be mentioned. While the CFA found a good model fit, meaning that the items and scales do indeed measure the intended constructs, there is some reason for caution. As organisational research is often confronted with the issue of multicollinearity, one should be cautious for the high correlations among the latent factors. On the other hand, these correlations and connectedness among the organisational characteristics is to be expected, seeing that they are conceptually interrelated. This interrelatedness is also highlighted by school leaders and teachers of ESD-active schools (Verhelst et al., 2021).

One delimitation to this study is that the questionnaire did not include or recognise other stakeholders' perspective on the school organisation. While this is not a limitation in itself, as our focus was on developing and validating a questionnaire for school characteristics without specifying what source to consult, students and parents are important stakeholders within the school organisation. Future research should investigate how this questionnaire might be adjusted, enabling students and parents to report their perceptions of the school organisation. The addition of their perspectives on the organisational

characteristics will offer researchers an even broader insight into the ESD functioning of school organisations. Another delimitation is related to the fact that this instrument is oriented at a broad and exploratory cross-section of an ESD school organisation that included both a battery of organisational characteristics and a diversity of school staff. While this allows for a good overview of the school organisation in relation to ESD, follow-up research can invest in a more in-depth and specific perspective that focusses on one specific characteristic or the perspective of a specific categories of the school staff separately (e.g.: school leaders, teachers, ...).

This study and the ESD-SOQ offer several opportunities for the field of ESD to further expand empirical research. For instance, a quantitative study linking school-level data to data at the classroom, teacher or student levels, would enable researchers to make empirically backed claims about the influence and effectiveness of the school organisation on ESD outcomes. Furthermore, the ESD-SOQ makes it possible to identify strong ESD-schools allowing for in-depth, qualitative, investigations of these school organisations. As research on school organisational characteristics and educational outcomes is scarce in the field of ESD, the investigation of how a school organisation may enable ESD effectiveness is much needed. In addition to the scientific value of the ESD-SOQ, there are also several opportunities to transform this instrument into a self-evaluation tool for school organisations. As school organisations provide a firm ground for ESD-implementation (Scott, 2013), feedback on organisational characteristics via objective and valid information sources is needed (Creemers & Reezigt, 1997). Providing schools the tools to map their organisational traits, provides them with insight in the organisational characteristics that influence their schools' effectiveness towards ESD can provide valuable information for school improvement.

To conclude, if ESD research aims to investigate how to improve ESD and monitor its impact, the ability to map school organisational characteristics facilitating ESD is imperative. The development and validation of the ESD-SOQ have opened up the

opportunity for research that further investigates how schools can improve their impact and ESD effectiveness.

Chapter 5: Enabling effective ESD: investigating the influence of the school organisation on student's action competence

This chapter is based on: Verhelst, D., Vanhoof, J., De Maeyer, S., Sass, W., & Van Petegem, P. (under review: major revisions). Enabling effective education for sustainable development: investigating the influence of the school organisation on student's action competences.

Abstract

In this study, we investigate the relation between the school organisation and outcomes of education for sustainable development, namely students' action competence in sustainable development. The student data were collected among 629 students. At the organisational level, we collected data among school staff (n = 207) concerning organisational characteristics such as school resources, sustainable leadership, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making, and shared vision. Our results indicate that the school organisation preliminary affects students' knowledge and willingness. They also show that the organisational characteristics sustainable leadership, pluralistic communication, adaptability, and democratic decision-making have a significant correlation with the outcomes at the student level.

Introduction

Achieving a sustainable future for all individuals and moving beyond today's unsustainable reality requires a shift at all levels of society. In such a shift toward sustainability, education has a vital role to play (Wals et al., 2017). Seeing that research areas such as school management and educational effectiveness provide a vast knowledge base for how school organisational characteristics relate to educational outcomes (Creemers & Kyriakides, 2008; Hoy et al., 2013; Scheerens, 1990; Teddlie & Reynolds, 2006), it is striking that this type of research remains scarce in the area of education for sustainable development (ESD) and related fields (Boeve-de Pauw & Van Petegem, 2018; Kopnina & Meijers, 2014).

In the field of ESD, studies of organisational research have primarily incorporated a qualitative approach. For example, the case study of Iliško and Badyanova (2014) mapped the role that organisational characteristics such as sustainable leadership, relationships with the local community, and a shared agenda play in anchoring ESD in the school. In another qualitative study, Leo and Wickenberg (2013) described three schools and their organisational norms as agents for educational change toward ESD. Further, Scott (2013) qualitative research provided a thorough conceptual description of a sustainable school and put several descriptors forward, linking school organisational characteristics to sustainable development (SD). Although desirable learning outcomes are described, empirical evidence linking the school organisational characteristics to these learning outcomes is not provided. Mogren and Gericke (2017a); (2017b) used quantified interview data to identify a number of 'quality criteria' linked to ESD-implementation in school organisations. Moreover, they found empirical evidence that substantiated Scott (2013) framework related to the school organisation. However, they did not link their findings to student outcomes related to ESD (Mogren & Gericke, 2017b, 2019; Mogren et al., 2019). While these studies offer in-depth insight into the organisational functioning of a school, they provide limited evidence of the characteristics that make the school organisation ESD-effective. However, a common concern regarding school effectiveness (SE) research is that it "takes a technical rational view of schools as organisations and focuses its attention on

ensuring that school outcomes are clearly defined and accurately measured" (Bennett & Harris, 1999, p. 536). Moreover, the issue of the normative validity of outcome measures (Biesta, 2009) leads to the argument that SE research might not be in line with the pluralistic nature of ESD. However, as the consensus on desired outcomes of ESD is growing, with concepts such as action competence (AC) (Mogensen & Schnack, 2010; Sass et al., 2020), the critique of using a technical, rational, and normative invalid outcome measure can be countered.

The scarcity of effectiveness studies in the wide field of ESD, namely the limited number of ESD-effectiveness studies that acknowledge the merits of investigating the effectiveness of ESD, reflect these reservations toward SE in ESD. While these certainly have their merit, there seems to be a missing link throughout this research: How does the schools' organisational level affect educational outcomes of ESD? This link has been overlooked because effectiveness studies on ESD outcomes have not typically featured in-depth descriptions of schools on the organisational side. For example, Boeve-de Pauw et al. (2015) showed that ESD as an educational approach has a positive effect on students' sustainability consciousness, but they did not include school organisational variables in their study. Coertjens et al. (2010) study, which focused on data from the 2006 Program for International Student Assessment (PISA) survey, investigated the influence of both student and school level factors on the environmental attitudes of students. Although they found that schools do have a minimal influence on students' environmental attitudes, their explanatory variables for the school level were related to teaching practices and did not provide insight into the overarching level of the school organisation level itself. The influence of the organisational level on the teaching practices can be expected. Studies have shown that organisational factors and school leadership have a significant effect on teachers' motivation, learning, and classroom practices (Leithwood & Jantzi, 2006; Slegers et al., 2014). Also using PISA 2006 data, Duarte et al. (2017) confirmed the influence of schools on environmental attitudes. While they did include explanatory variables on the school level, these remained rather descriptive (e.g., private or public schools, location, student-teacher ratio) and did not provide insight into schools' organisational functioning.

Moreover, they did not include organisational characteristics such as leadership, communication climate, supportive relations, and other features of a school organisation.

To date, only a limited number of studies have attempted to unravel the relation between the school organisational level and the educational outcomes of ESD. With their focus on relevant yet different aspects of the school organisational level, existing studies have applied a fragmented approach and thus lacked an overall framework for the school as an organisation. For example, Cincera and Krajhanzl (2013) investigated the factors that support the development of action competence as part of an evaluation of the ECO-Schools program in the Czech Republic. They determined that participating in decision-making processes at the school created more opportunities for the students to develop their action competence. Moreover, in a large scale, quantitative study that investigated the effects of ECO-Schools in Flanders, Boeve-de Pauw and Van Petegem (2017) found that the policy-making capacities of the schools had an effect on the environmental values of students. Their results showed that support among the school staff and shared leadership results in a decrease in student factors that negatively influence pro-environmental behaviour. Recently, Schröder et al. (2020) identified five components contributing to student participation in ECO-Schools activities related to the school climate, a strong relation with the community, and an adaptive and reflective approach. While they provided clear evidence on a number of components of the school that facilitate the implementation of ESD, Schröder et al. (2020) noted that their five components do not cover the complete range of factors influencing the implementation of ESD-programmes. In their conclusions, they called for more research offering guidance for ESD implementation within a school. Together, these findings from existing effectiveness research on ESD demonstrate the opportunity for a better understanding of, and an empirically substantiated theory on, how school organisations are facilitating for ESD and ESD-related outcomes. As school organisations should provide a strong foundation for ESD implementation (Scott, 2013), a clearer understanding of the influence organisational characteristics have on ESD outcomes will enable school organisations to develop and implement effective ESD. Awareness of the

existing evidence and the focus on school organisations in relation to ESD-effectiveness research will substantially contribute to bridging the gap between the fields of ESD and SE.

Supported by the evidence listed above, or rather the gap in the evidence, we argue that there is a need for investigating how school organisational characteristics influence the outcomes of ESD. Investigating the effect of a school organisation on ESD requires a theoretically substantiated understanding of both desired outcomes of ESD on the student level and the characteristics of the school organisation that are important for achieving these outcomes.

Outcomes and characteristics of an ESD-effective school

As the review of previous literature indicates, research on ESD can benefit from SE. A major concern can be traced back to the rather normative interpretation of SE, whereby a more effective school will perform better compared to other schools (Reynolds et al., 2014). Often, effectiveness is measured via student achievement in the traditional school subjects such as mathematics (Reynolds et al., 2014; Thomas et al., 1997). Evidently, with SD-related issues being complex in nature (Sass et al., 2020), easy-to-measure cognitive outcomes are not a valid measure for the ESD-effectiveness of a school. Nevertheless, the recent shift in SE research to different non-cognitive student outcomes as effectiveness criteria (Reynolds et al., 2014) serves as a first step in overcoming the hesitation toward SE in ESD. The next step to address concerns the rather descriptive approach of SE and the inability to operationalize the findings so that these aspects can contribute to the further development of schools (Bennett & Harris, 1999). We argue that the identification of those organisational characteristics that are positively related to desired outcomes of ESD are of great value for the development, implementation and effectiveness of ESD.

Action competence as an output measure of school effectiveness

As ESD aims to empower students to make informed decisions and take action toward local and global issues related to SD (UNESCO, 2016), students' action competence is a meaningful measure of the educational output of ESD. An *action competent student* is defined as follows:

[A student who is] committed and passionate about solving a societal issue, has the relevant knowledge about the issue at stake as well as about the democratic processes involved, takes a critical but positive stance toward different ways for solving it, and has confidence in their own skills and capacities for changing the conditions for the better. (Sass et al., 2020, p. 9)

In their conceptual study, Sass et al. (2020) defined *action competence in sustainable development (ACiSD)* as a concept that builds on four dimensions that are oriented at action for sustainable development: knowledge, willingness, capacity expectations, and outcome expectancy. *Knowledge* of action possibilities (orientated at SD) entails knowledge about the issue itself and about action possibilities as well as societal (or relational) knowledge of the processes involved in order to address the issue. An integrated understanding, reflective capacities, and a system-wide perspective are important, as sustainability issues are often complex in nature. Regarding *willingness*, students with high ACiSD are willing to contribute to and undertake action for SD. This willingness reflects a commitment and passion toward finding solutions for the SD-related issue; it also involves a willingness to explain, discuss, and reflect on their perspectives and the (anticipated) actions. *Capacity expectations* refers to students' confidence that their own skills and capacities are adequate in order to undertake successful action (for SD). The focus here lies on their confidence in their own efficacy rather than in the outcome of the action. The latter is addressed in the fourth component of ACiSD, *outcome expectancy*, which pertains to students' confidence in their ability to bring about change via their actions. People with

high outcome expectancy are confident that the action(s) they undertake will result in a desired outcome.

As indicated, an outcome measure such as ACiSD offers researchers the opportunity to address the often-expressed concern that the outcome measurement is often limited to those (cognitive) outcomes that are easy to identify as opposed to the actual learning outcomes that have to be pursued (Biesta, 2009). For the case of ESD, the desired outcomes go much further than, e.g., installing a solar panel or recycling used clothes. Rather, they require students to adapt a way of thinking, working, and living that contributes to action for sustainable development (Scott, 2009). Although researchers have expressed reservations toward using AC to measure or evaluate ESD (Mogensen & Schnack, 2010), the theoretical descriptions of AC(iSD) as a type of competence and as a practical application illustrate that AC(iSD) is indeed a valuable measure for educational outcomes in ESD (Cincera & Krajhanzl, 2013; Olsson et al., 2020; Sass et al., 2020). While ACiSD can be seen as a stand-alone concept for ESD outcomes, the descriptions of the four components offer insight into desired learning outcomes of ESD. Thus, using ACiSD as an outcome measure allows for an assessment of the ESD-effectiveness of a school that measures what is valued in ESD: students' commitment, willingness, passion, knowledge, and confidence in order to engage with SD issues.

School organisational characteristics influencing learning outcomes in ESD

A critical literature review (Verhelst et al., 2020) and qualitative follow-up study (Verhelst et al., 2021) identified eight organisational characteristics that potentially facilitate ESD school effectiveness: school resources, sustainable leadership, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making, and shared vision. An ESD-effective school is composed of these characteristics and provides an organisational level that is enabling for ESD, thus facilitating desirable outcomes related to students' ACiSD. In the following paragraph, we provide a brief description of this framework.

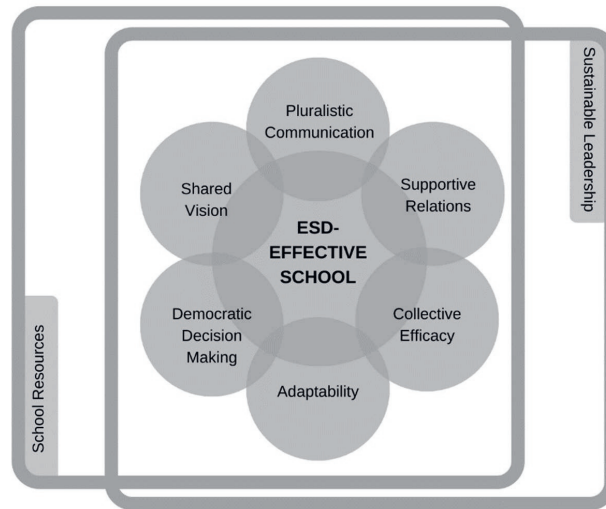


Figure 2: Conceptual framework of an ESD-effective school.

The eight different organisational characteristics are characterized by their influence and reciprocal actions and are located on two levels: the subcontextual level (represented by the squares) and the central level (represented by the circles in the figure). The differentiation between the two levels illustrates that the way a school is governed and the resources it has at its disposal will affect the manifestation of the central characteristics. ‘Sustainable leadership’ and the ‘school resources’ are situated on the subcontextual level, indicating the schools’ internal context, wherein these set the internal conditions within schools’ organisation. Three distinguishable types of school resources are *time management*, which refers to the available time and the planning; *professional structures*, which refer to the different professional functions and the way they are grouped and organized (Hoy et al., 2013); and *physical structures*, which are a school’s “physical means,” such as the available infrastructure and financial means. By allocating and working with the available resources, sustainable leadership can create an enabling setting for the six central characteristics (Leo & Wickenberg, 2013). *Sustainable leadership* indicates a type of leadership that is holistic in nature, and it involves an integrated view of the past, present, and future, locally and elsewhere (Hargreaves & Fink, 2006). Notably, this integrated perspective goes further than the temporal or spatial aspects alone: Sustainable leadership

will actively develop all aspects of the organisation (e.g., the professional capacities of the team) so that continuous learning and development contributes to achieving the long-term holistic strategy of the school (Fullan, 2006; Hargreaves & Fink, 2006).

The six central characteristics are situated within the school's internal context, which is inclusive of the subcontextual characteristics. As a first central characteristic, *pluralistic communication* refers to acknowledging different perspectives and engaging in a dialogue with them. An important aspect of pluralistic communication is the ability to engage in a critical self-reflection about personal (or organisational) perspectives when eliciting them in a dialogue. This type of communication shapes the way teachers communicate among themselves, as well as with students and stakeholders outside of the school. The communication method contributes to the way supportive relations take shape while also exemplifying the dependency that exists between the characteristics. The characteristic *supportive relations* can refer to the supportive relations within a school's team, such as among a teaching team, or to supportive relations with external partners or other schools. The *collective efficacy* of a school refers to the confidence of the school (team) in their ability to have a positive effect on student learning outcomes (Bandura, 1997; Hoy et al., 2013). In the case of an ESD-effective school, it means that the school team is confident that they organize and deliver effective ESD; correspondingly, the team is confident of their positive influence on students' ACiSD. For example, teachers who cooperate can verbally support each other more effectively, and their collective efforts may also lead to more experiences of success, thus increasing their sense of collective efficacy (Bandura, 1997; Hoy et al., 2013). Due to its involvement of all relevant stakeholders and perspectives when making decisions as a school organisation, *democratic decision-making* will contribute to the effectiveness of the school organisation itself (Harber & Trafford, 1999; Leithwood & Mascall, 2008). The characteristic *shared vision* involves a collective understanding of what ESD means and offers the motivation to work on ESD; it also contributes to how a school engages in ESD. When giving meaning to ESD, a pluralistic manner of communicating and the ability to make a supported decision on this will lead to high levels of support and motivation among team members, which in turn will have a positive influence on the

educational outcomes of the school (Verhelst et al., 2021). The sixth characteristic is the *adaptability* of the school. The ability to adequately adapt (or not adapt) to internal and external demands requires, as is the case with the other characteristics, efficient connections among the different characteristics of the ESD-effective school. Knowing when to adapt and when not to adapt is an important trait of an effective school.

Based on the literature review findings, an ESD-effective school hypothetically manifests these eight characteristics in one way or another in order to facilitate the four different components of students' ACiSD. The framework for an ESD-effective school allows for a more development-oriented perspective compared to the frequently used school level explanatory variables (e.g., the school being a private or a public school, its location, or the student/teacher-ratio). Arguably, this perspective on the organisational context in SE will offer schools and researchers further insight into standout organisational characteristics for achieving the desired outcomes of ESD (Harris et al., 2015).

Objective of present study

Building on the conceptual descriptions of ACiSD and the framework for an ESD-effective school, we sought to investigate the extent to which school organisations have an influence on the educational outcomes of ESD – specifically, ACiSD. In addition, in consideration of the school level in relation to the differences among students' ACiSD, we explored which organisational characteristics contribute to these differences. Thus, the following research questions guided this study:

1. Does the school level account for differences in the students' ACiSD?
2. Which characteristics of the school organisation affect the different components of students' ACiSD?

Methods

Sample and data collection

The present study built upon data collected among students and teachers of primary and secondary schools who participated in the VALIES research project: a research and development project focused on schools that seek to implement ESD. In total, 51 schools participated in this project. However, as the questionnaires were voluntary, not all schools participated in the data collection. Moreover, we determined that data on both the student level and the organisational level were needed in order to answer the research questions for this study; thus, we omitted the schools with insufficient data on students or staff (Hox, 2010). We retained schools with a response rate of 15 or more students. For the school level data, a minimum response rate of 10 staff members (teachers and other staff members) within secondary schools was put forward as a criterion. As primary schools tend to have fewer staff members, we individually evaluated whether a school with fewer than 10 complete responses could be retained. Our final sample consisted of 629 students and 207 staff members distributed among 18 schools (8 primary schools and 12 secondary schools).

The student sample was representative with respect to gender, with 49.7% of the students identifying as "boy," 49.4% identifying as "girl," and the remainder identifying with another gender or not disclosing their gender. All students were in the fifth and sixth grade of primary education or in the first and second grade of secondary education. The school staff sample consisted of 59.6% who identified as "woman" and 31.7% who identified as "man"; the remaining 8.7% identified as another gender or indicated that they did not want to disclose their gender. The majority of the respondents in this sample were teachers (77%), and the other respondents were staff with a coordinating, managing, or advisory role or who served in another supportive position. All participants (and parents or legal guardians in the case of participating students) provided active informed consent for the collection and use of their data and were aware they could discontinue their participation at any time.

A privacy officer was appointed to this research project and oversaw ethical aspects throughout the research process.

Variables and Survey instruments

Data were collected via two separate questionnaires: one for the students and one for the school staff. We first describe the measurement instrument and the outcome variables on the student level. Thereafter, we describe the measurement instrument and variables at the organisational level.

Student level variables

The student data were collected using the ACiSD-Q (Sass et al., 2021). This questionnaire consists of four nine-item scales measuring the four dependent variables in this study: the students' knowledge, willingness, capacity expectations, and outcome expectancy. Each of these variables was related to their action possibilities for sustainable development. A five-point Likert scale, ranging from "completely disagree" to "completely agree," was used to record the students' responses. Table 10 features a sample item for each of the four components of ACiSD, together with the descriptive statistics of the student sample. At the student level, we also controlled for gender. As previous research has shown evidence of the influence of gender on students' environmental attitudes (Boeve-de Pauw et al., 2012), we included "gender" as a control variable at the student level.

ACiSD subscale	Example item (original in Dutch)	α	\bar{x}	SD
Knowledge	People contribute to a good life for everyone without damaging the planet if they treat boys and girls as equal.	0.79	4.15	0.53
Willingness	I want to give clothes I do not use any more to people that live in poverty here with us.	0.80	3.94	0.30
Capacity Expectations	I can save electricity and water at home.	0.74	3.94	0.56
Outcome Expectancy	I contribute to a good life for everyone without damaging the planet if I save electricity and water at home.	0.83	4.11	0.59

School organisational variables

For the school organisational characteristics, individual school staff data were collected via the ESD-school organisational questionnaire (ESD-SOQ) (see Study 3). This questionnaire consisted of 11 scales concerning the different characteristics of the ESD-effective school (Table 11). Pluralistic communication, democratic decision-making, adaptability, collective efficacy, shared vision, and sustainable leadership were each measured via a separate scale. The supportive relations were divided into two separate scales: one for supportive relations within the school and one for supportive relations with external partners. As the resources of the school consisted of three categories, each of these categories was also measured via its own scale. The 11 scales of the ESD-SOQ consisted of four to six items, all of which were measured via a five-point Likert scale, ranging from “completely disagree” to “completely agree.” Table 11 provides sample items from the ESD-SOQ, the psychometric properties for each scale, as well as the intra-class correlation coefficients (ICC) of each school characteristic.

All school-level variables were aggregated in order to attribute school scores on the organisational characteristics to the individual student data. In order to justify the aggregation of the lower-level data (collected among the individual staff members) into school scores, a measure of within-group agreement is needed (Woehr et al., 2015). Our inspection of the ICC for the different characteristics of the ESD-effective school organisation demonstrated that individual respondents are likely to be clustered within the schools and can thus be used as aggregated variables (Peterson & Castro, 2006). We controlled for the educational level of the school (primary or secondary education). However, we determined that it did not have a significant influence on any of the dependent variables; thus, educational level was not included as a control variable.

Table 11: Descriptive statistics and sample items of the school organisational variables

Scale	Sample item (original in Dutch)	Items	α	\bar{x}	SD	ICC
Sustainable leadership	The school leadership makes efforts towards anchoring ESD-initiatives on the long term.	5	.84	3.5	0.22	0.13
Time management	At this school, lessons are scheduled in such a way that they facilitate cross-curricular ESD activities.	6	.91	3.1	0.32	0.15
Professional structures	At this school, we devote a lot of attention to who works with whom in order to facilitate ESD.	6	.85	3.6	0.43	0.31
Physical structures	At this school, the infrastructure shows that we are working on ESD.	4	.66	3.0	0.31	0.27
Pluralistic communication	At this school, we are allowed to be critical about ESD.	5	.91	3.86	0.26	0.08
Democratic decision-making	At this school, teachers are involved when making decisions about ESD.	6	.90	3.35	0.29	0.14
Adaptability	At this school, we are open to ESD-related suggestions from inside our school (e.g., teachers, students, staff).	4	.85	3.78	0.22	0.19
Supportive relation w/ school team	At this school, there is a pleasant atmosphere among colleagues when working on ESD.	5	.85	3.33	0.30	0.24
Supportive relations w/ external partners	This school is stronger when it comes to ESD thanks to the cooperation with external partners.	6	.94	3.10	0.32	0.10
Collective efficacy	At this school, we are convinced that we can provide good ESD to our students.	5	.84	3.40	0.30	0.22
Shared vision	At this school, we work on ESD because we think it is important as a school.	4	.76	2.95	0.43	0.27

Analysis

All variables were standardized prior to their analysis. For the control variable “gender,” we created a dummy variable (Lorah, 2018). As the nature of this study required an analysis method that took the nested structure into account, all analyses consisted of random intercept multilevel models that allowed us to determine the influence of the school level on student outcomes as well as the relation between each of the school organisational characteristics and the dependent variables in this study. All analyses were conducted in R, using the lme4-package for linear mixed effects models (Bates et al., 2015).

The first step of the analysis involved the estimation of null models for the four dependent variables: knowledge, willingness, capacity expectations, and outcome expectancy. Inspecting the ICC for each dependent variable provided the proportion of the total variance explained by the school level. The value of the ICC indicated the amount of

variance within a dependent variable attributed to the schools' organisational characteristics or other/not included school level variables.

The second step involved running four exploratory models with a composite variable ("school organisation") which included all independent variables as an explanatory variable on the four components of ACISD. To create the variable "school organisation," we first inspected the correlation matrix (Table 12) of the school level variables in order to determine whether they were, in addition to being conceptually related, also statistically related (Ley, 1972; Song et al., 2013). We also controlled for gender in each model. In order to assess the model fit, we applied an information-theoretic approach using the AIC (Burnham et al., 2011), together with the difference in deviance (-2 log likelihood) between these models and the respective null models.

Table 12: Correlation matrix for the independent variables (i.e., school organisational characteristics).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Sustainable leadership (1)	1.00										
Time management (2)	0.68	1.00									
Professional structures (3)	0.70	0.70	1								
Physical structures (4)	0.13	0.21	-0.02	1							
Pluralistic communication (5)	0.47	-0.04	0.31	0.20	1						
Democratic decision-making (6)	0.85	0.57	0.79	0.24	0.73	1					
Adaptability (7)	0.81	0.73	0.73	0.28	0.38	0.74	1				
Supportive relations school team (8)	0.74	0.54	0.77	0.40	0.71	0.91	0.71	1			
Supportive relations w/ external partners (9)	0.67	0.66	0.65	0.33	0.44	0.76	0.71	0.64	1		
Collective efficacy (10)	0.70	0.68	0.65	0.32	0.46	0.72	0.80	0.81	0.47	1	
Shared vision (11)	0.68	0.60	0.63	0.39	0.50	0.77	0.60	0.81	0.69	0.71	1

Following the models with the composite variable “school organisation,” we explored the relations between the different school organisational characteristics and the four components of ACiSD. In order to do so, we estimated separate random intercept models for each independent variable on each dependent variable, while controlling for gender. The output of these models enabled our identification of the school organisational variables related to the different components of the students’ ACiSD.

For the final step, and in order to further explore our data, we ran four models with those variables that demonstrated notable parameter estimates (i.e., significance at 0.1) for one component or for multiple components of ACiSD. However, our inspection of the variance inflation factor (VIF) indicated an issue with multi-collinearity. Specifically, combining those highly correlated independent variables into composite variables did not lead to an adequate solution. Therefore, we excluded the problematic variables from our models. As O’Brien (2007) noted, when deciding which variables to exclude, one should focus on their conceptual validity. Thus, we removed two of the dimensions of the school resources (i.e., time management and physical resources) and one dimension for supportive relations within the school as these variables were conceptually related to one of the remaining variables (respectively, professional structures for school resources and supportive relations with external partners as the second component of supportive relations). Moreover, we omitted democratic decision-making as this variable highly correlated with sustainable leadership and pluralistic communication. The models with the remaining variables still provided a diverse number of school organisational characteristics without the issue of multi-collinearity, thus allowing for a preliminary exploration of the combined influence of the school organisational characteristics on the components of ACiSD.

Results

To assess whether or not schools accounted for differences in the students’ ACiSD (RQ1), the ICC values of the null models for knowledge, willingness, capacity expectation, and outcome expectations were consulted. An ICC value describes how much of a variance can

be attributed to the school level. Our results (see Table 12) indicated that the school level does have an impact on all four dependent variables. This impact is most substantial for students' knowledge and willingness, with respectively 10% and 11% of the variance attributed to the school in which the students were enrolled. For the students' outcome expectancy, 7.1% of the variance was attributable to the school level. Moreover, while the school seemed to play a smaller part in explaining variation in the students' capacity expectations, it still accounted for 4.6% of the variance.

Knowing that the school level does explain a notable amount of the variance of all four components of ACiSD, we wanted to investigate whether the characteristics of the school organisation affect the different components of the students' ACiSD. A composite variable containing the combined average of all organisational characteristics as a dependent variable proved a valuable way to explore the relation between the school organisation and outcomes of ESD (Table 12). While the estimates for the school organisation on knowledge and willingness were slightly above the 0.05 cut-off point for significance, the parameter estimates indicated the presence of a notable correlation within our sample. Table 12 provides an overview of the four mixed effects models with the school organisation as an independent variable. Both the AIC and difference in deviance for all models demonstrated that the models fit the data better than the null models. While the influence of gender was not the focus of the present analysis, the results demonstrated negative and significant parameter estimates on each component of ACiSD, meaning that being a boy correlated negatively with all four components of ACiSD. Concerning the school organisation, noteworthy estimates were found for both knowledge and willingness, with estimates of 0.42 (with a standard error of 0.22) for school organisation on knowledge and 0.44 (with a standard error of 0.22) for willingness. Both estimates are on the verge of statistical significance, with p-values of 0.073 and 0.057, respectively. As to the variance explained by these models, an easy and solid statistic is not always available or feasible in multilevel analyses (LaHuis et al., 2014). However, looking at the ICC values, 5.5% of the unexplained variance in the students' knowledge related to ACiSD can be attributed to the school

organisational level. For willingness, the ICC indicated that 5.4% of the unexplained variance was attributable to the school organisational level.

Investigating the relations between the separate school characteristics and the components of ACiSD provided a more detailed account of which organisational characteristics affect the outcomes of ESD (RQ2). The results of the separate models in Table 13 presented an answer to our second research question. These results indicated that democratic decision-making, adaptability, and sustainable development correlate significantly with both knowledge and willingness, even after controlling for gender. In addition, a significant correlation was found between pluralistic communication and willingness. Moreover, while not significant at $p=0.5$, notable correlations were found between pluralistic communication, collective efficacy, and knowledge; between supportive relations within the school team, professional structures, and willingness; between physical structures and capacity expectations (negative correlation); and between sustainable leadership and outcome expectancy.

Table 13: Fixed and random estimates and standard error (in parentheses) for the four separate mixed effects models with the average for school organisation as a dependent variable⁵

	Null models			Mixed effects models			
	Knowledge	Willingness	Capacity expectation	Knowledge	Willingness	Capacity expectation	Outcome expectancy
Intercept	-0.016 (0.086)	0.015 (0.089)	-0.004 (0.066)	0.199** (0.077)	0.301*** (0.068)	0.218*** (0.071)	0.178** (0.077)
Gender ⁶				-0.463*** (0.076)	-0.620*** (0.074)	-0.449*** (0.079)	-0.388*** (0.077)
School organisation				0.422* (0.222)	0.435* (0.216)	-0.056 (0.197)	0.211 (0.223)
Random effects							
Student level							
Intercept variance	0.907	0.900	0.947	0.864	0.819	0.905	0.885
Standard deviation	0.952	0.949	0.973	0.930	0.905	0.951	0.941
School level							
Intercept variance	0.101	0.111	0.046	0.050	0.047	0.032	0.050
Standard deviation	0.318	0.334	0.214	0.223	0.217	0.178	0.223
ICC	10.0%	11.0%	4.6%	5.5%	5.4%	3.4%	5.3%
Deviance ⁷	1750.6	1747.4	1773.6	1711.9	1678.3	1735.5	1726.3
AIC	1756.6	1753.4	1773.6	1721.9	1688.3	1745.5	1736.3

⁵ Signif. codes: '****' 0.001 '***' 0.01 '**' 0.05 '*' 0.1 '.' 1

⁶ Dummy variable set for "boy."

⁷ All -2-log likelihood tests were significant.

Table 14: Fixed effects estimates and standard error (in parentheses) of the separate mixed effects models with the school characteristics as independent variables, while controlling for gender.⁸

	<i>Knowledge</i>	<i>Willingness</i>	<i>Capacity expectation</i>	<i>Outcome expectancy</i>
Pluralistic communication	0.339* (0.168)	0.364** (0.163)	0.234 (0.146)	0.226 (0.167)
Democratic decision-making	0.358** (0.162)	0.381** (0.157)	0.041 (0.150)	0.162 (0.167)
Adaptability	0.394** (0.180)	0.441** (0.168)	0.064 (0.163)	0.227 (0.180)
Supportive relations school team	0.217 (0.151)	0.272* (0.143)	-0.003 (0.130)	0.150 (0.146)
Supportive relations w/ external partners	0.247 (0.172)	0.162 (0.174)	-0.114 (0.140)	-0.018 (0.168)
Shared vision	0.186 (0.120)	0.154 (0.121)	-0.045 (0.103)	0.041 (0.120)
Collective efficacy	0.242* (0.134)	0.236* (0.132)	0.006 (0.120)	0.165 (0.132)
Sustainable leadership	0.557*** (0.178)	0.594*** (0.167)	0.084 (0.180)	0.332* (0.192)
Time management	0.061 (0.200)	0.072 (0.198)	-0.231 (0.152)	-0.048 (0.188)
Professional structures	0.155 (0.132)	0.214* (0.122)	-0.073 (0.107)	0.043 (0.126)
Physical structures	0.056 (0.164)	-0.110 (0.160)	-0.223* (0.124)	0.044 (0.154)

Lastly, when combining independent variables that stood out in the previous analysis into one model (Table 15), we determined that only some of the school organisational characteristics have a significant parameter estimate on the components of ACiSD when controlling for the other independent variables in the model. Positive correlations between sustainable leadership and both knowledge (estimate=0.582; $p=0.051$) and willingness (estimate=0.528; $p=0.046$) were identifiable. Pluralistic communication demonstrated a strong positive correlation with capacity expectations. Surprisingly, a negative parameter estimate existed between the schools' physical structures and the students' willingness and outcome expectancy after controlling for the other variables in the model.

⁸ Signif. codes: '****' 0.001 '***' 0.01 '**' 0.05 '*' 0.1 ' ' 1

Table 15: Fixed and random estimates and standard error (in parentheses) for the four separate mixed effects models with the components of ACISD as dependent variables⁹

Fixed effects	Null models				Mixed effects models			
	Knowledge	Willingness	Capacity expectation	Outcome expectancy	Knowledge	Willingness	Capacity expectation	Outcome expectancy
Intercept	-0.016 (0.086)	0.015 (0.089)	-0.004 (0.066)	-0.006 (0.075)	0.137* (0.074)	0.260**** (0.067)	0.191*** (0.067)	0.140* (0.080)
Gender ¹⁰					-0.443**** (0.077)	-0.606**** (0.075)	-0.423**** (0.079)	-0.374**** (0.078)
Pluralistic communication					0.264 (0.194)	0.212 (0.174)	0.415** (0.172)	0.178 (0.215)
Adaptability					0.056 (0.305)	0.198 (0.272)	0.183 (0.268)	-0.042 (0.338)
Supportive relations school team					-0.324 (0.238)	-0.151 (0.212)	-0.303 (0.209)	-0.171 (0.264)
Collective efficacy					0.096 (0.208)	-0.003 (0.187)	0.041 (0.185)	0.113 (0.230)
Sustainable leadership					0.582* (0.256)	0.528** (0.254)	0.006 (0.252)	0.326 (0.312)
Physical structures					-0.046 (0.136)	-0.250** (0.120)	-0.250** (0.117)	-0.035 (0.151)

⁹ Signif. codes: '****' 0.001 '***' 0.01 '**' 0.05 '*' 0.1 '.' 1

¹⁰ Dummy variable set for "boy."

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Random effects									
<i>Student level</i>									
Intercept	0.907	0.900	0.947	0.9163	0.863	0.916	0.901	0.885	
Standard deviation	0.952	0.949	0.973	0.957	0.929	0.903	0.949	0.941	
<i>School level</i>									
Intercept	0.101	0.111	0.046	0.07018	0.026	0.016	0.012	0.037	
Standard deviation	0.318	0.334	0.214	0.2649	0.160	0.127	0.111	0.193	
ICC	10.0%	11.0%	4.6%	7.1%	2.8%	1.9%	1.3%	4.0%	
Deviance ¹¹	1750.6	1747.4	1773.6	1758.1	1704.7	1666.2	1752.1	1717.5	
AIC	1756.6	1753.4	1773.6	1758.1	1724.7	1686.2	1742.5	1737.5	

¹¹ All -2-log likelihood tests were significant.

Discussion and conclusions

The present study was designed to determine whether the school organisation accounts for differences in the students' action competence in sustainable development (ACiSD). It investigated which school organisation characteristics affect the different components of students' ACiSD. By linking the organisational characteristics of a school to ACiSD as a desired outcome of ESD, this study heeds to the call to bridge theoretical and empirical work in SE and acknowledge the explanatory factor of the school organisational level in SE (Harris et al., 2015). Moreover, our results provide insight into whether and how the school as an organisation affects the outcomes of ESD at the student level.

Looking at the results of our analysis, the data seem to confirm that the school organisation does influence the outcomes of ESD to some degree, specifically in regard to students' knowledge and willingness as components of ACiSD. While the model with school organisation as a composite variable in this study did not provide a statistically significant estimate as an explanatory variable for the components of ACiSD, we did find a notable correlation between the school organisation on the one side and knowledge and willingness on the other side within our sample. Notably, both the null models and the models with the school organisation as an independent variable indicate that the school in which students are enrolled affects their knowledge and willingness related to sustainable development issues. In consideration of the limited availability of empirical school organisational literature in the field of ESD (Boeve-de Pauw et al., 2015; Kopnina & Meijers, 2014), these findings suggest that there is much to be gained in investigating the influence of the school organisation. Knowing that the school organisation is connected to ESD-student outcomes illustrates that the important facilitating role of the school organisation, which has been addressed in SE research (Creemers & Kyriakides, 2008). By inquiring in how the organisational characteristics relate to educational processes, outcomes and to one another and would be a valuable contribution in the efforts to implement ESD and ensuring its' effectiveness. Moreover, these results support the idea that SE research can examine a wide array of educational outcomes next to cognitive measures (Reynolds et al.,

2014), particularly when it comes to a valid measure of effectiveness for complex education-related aspects such as ESD.

Focusing on the separate characteristics of a school organisation, several of the characteristics described in our conceptual framework for an ESD-effective school showed a statistically significant and notable link with one or more of the components of ACiSD – namely, pluralistic communication, democratic decision-making, and sustainable leadership. This finding further substantiates the connection between the organisational characteristics of the school and the students' ACiSD. Moreover, this outcome is striking as these organisational characteristics show a number of similarities to concepts that were previously linked to positive educational outcomes in ESD (or related areas). For example, the concept of *adaptability* corresponds to the adaptive and reflective approach Schröder et al. (2020) identified as a component that contributes to student participation in ECO-Schools activities. Moreover, both our study and Cincera and Krajhanzl (2013) study found a positive connection between AC(iSD) and decision-making processes at the school. Throughout our analysis, it also became clear that sustainable leadership as an organisational characteristic is linked to higher values of ACiSD, especially when it comes to knowledge and willingness as well as when considering other organisational characteristics. While this result is supported by Boeve-de Pauw and Van Petegem (2017), who showed that shared leadership decreased student factors with a negative influence on pro-environmental behaviour, the connection between leadership and educational outcomes is more often seen as an indirect relationship (e.g.: Harris et al., 2013; Oldac & Kondakci, 2019; Witziers et al., 2003). Next, the negative estimate of physical structures are somewhat unexpected. A possible explanation to these negative parameter estimates might be explained as a reaction of schools that notice their students are not overly willing to take action toward SD. By investing in the physical structures of the school, they might want to counter these low outcomes. As our current analysis does not allow for causal claims, further research will be needed to provide more conclusive evidence on the direction of this effect.

While our study addressed our proposed research questions, it has certain limitations. First, our data were drafted from schools participating in the VALIES research project, thus leading to a limited sample size that restricted our options to draft complex statistical models (Hox, 2010). This aspect also factors into the second limitation. Specifically, the interdependency between the different characteristics of the school organisation (Verhelst et al., 2020) was not included in the present study. Although a multilevel structural equation modelling (MSEM) would be able to take the mediation between the subcontextual and the central level into account (Preacher et al., 2010), it would require a larger sample size due to the high number of estimated parameters. As our dataset does not meet the minimum ratio of 10:1 respondents for a parameter on the group level (i.e., schools) (Hair et al., 2010), we opted not to include the mediation between the different independent variables. Third, the study and our analysis do not allow for causal claims as to the influence of the organisational characteristics of the school on the students' ACiSD. Finally, one should take into consideration that our sample consisted of schools that voluntarily participated in this project and therefore might have had a certain disposition toward ESD and the participating schools were not representative picture of all schools that invest in ESD.

In spite of its limitations, the study adds to our understanding of the school organisation's role in the effectiveness of ESD by identifying those organisational characteristics related to ESD outcomes at the student level, and it opens up several opportunities for further (SE-related) research on the role of the school organisation in ESD. In order to deconstruct causal relations between the organisational characteristics and the outcomes of ESD, additional research is needed. Moreover, the application of an MSEM approach would enable independent variables to correlate, thus addressing both the issue of mediation between the independent variables and the issue of multi-collinearity in present study. In addition, accounting for the mediation between the school organisation and the classroom level of the school will allow for a better understanding of which and how school characteristics are enabling the outcomes of ESD. Nevertheless, building on the present study, it becomes clear that in order to improve school effectiveness for ESD, both

researchers and practitioners will need to consider the school organisation. By acknowledging the influence of organisational characteristics on the outcomes of ESD, school teams can consider their own organisational functioning when implementing or reforming an ESD program. Being aware of the organisational functioning allows school teams to provide students with the needed competencies to ensure a sustainable world.

Based on our study, we argue that a focus on SE in relation to ESD offers insight into quality education and student outcomes/competencies. While our study found that school organisations do play a part in achieving more effective ESD, additional research on ESD remains needed. With ever-expanding insights into what facilitates desired outcomes of ESD as education that aims for sustainability for all we will be able to achieve such a future.

Chapter 6: General conclusions and discussion

With this dissertation, we pursued the question of what makes a school ESD-effective. In line with the call for a more empirically based perspective on ESD (Boeve-de Pauw et al., 2015; Mogren, 2019; Wals, 2009; Waltner et al., 2018), we aimed to answer this question using a multi-method approach, combining qualitative and quantitative methodologies. In this final chapter, we consider the main findings from and across the four studies. We also delve deeper into the limitations and boundaries of the dissertation. We then discuss the necessary building blocks for a more complete picture of ESD effectiveness (research), and we provide relevant suggestions for practice and policy.

Outcomes and findings

The findings and conclusions of the different studies are a part of the answer to the question this thesis aims to answer (i.e.: what makes a school organisation ESD-effective?) as well as the foundation for potential follow-up research. While the four studies on their own do provide noteworthy insights into our research topic, combining their findings creates the added value that is needed to formulate an answer to the question of what makes a school effective for ESD. Not only did this result in a tangible framework that encompasses a school organisation as a whole, but it also opened up the possibility to report on the different characteristics of the school organisation.

Research goals

Research goal 1 was pursued by studies 1 and 2 and was oriented at the definition and validation of a conceptual framework incorporating the organisational characteristics of an ESD-effective school. To a lesser extent, studies 3 and 4 also contributed to this first research goal, as they also built on the results of the previous studies. The combination of

conceptual work, a qualitative inquiry and quantitative measures across the four studies contributed to the validity of the conceptual framework for the ESD-effective school. Measuring and operationalizing this framework were the key objectives of research goal 2. The development and validation of the ESD SOQ in Study 2 allowed this objective to be achieved. The third research goal was concerned with the question of ESD effectiveness: the role of the school and its organisational characteristics in achieving the desired outcomes of ESD at the student level. The interviews with school leaders and teachers in Study 2 provided a first glimpse into the role and influence the school characteristics have on ESD effectiveness. However, this second study did not explicitly link these to the outcomes of ESD, nor did the methodology allow for solid claims regarding organisational effectiveness. Study 4 did empirically link the school organisation to the outcomes of ESD, thus allowing the determination of the extent the school plays in these outcomes. Moreover, Study 4 shed light on the relations between the distinct organisational characteristics and the outcomes of ESD.

Main outcomes

The first study provides a comprehensive description of the framework for an ESD-effective school and its development. By building on the school effectiveness literature that has been around for several decades (Reynolds et al., 2014; Sammons et al., 1995) and the available literature from the field of ESD, we identified and defined eight characteristics that can contribute to ESD effectiveness. The framework for an ESD-effective school incorporates these characteristics on two levels. Sustainable leadership and the school resources, situated on the subcontextual level, together shape the school's internal organisational context. On the central level, pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision-making and shared vision are important characteristics for an ESD-effective school organisation. These eight characteristics are strongly connected – on the same level as well as across levels. For example, support among the school staff will be greatly beneficial if the team knows how to incorporate different perspectives in their communication, i.e. how to communicate in a pluralistic

manner. In figure 2 below, the squares represent the subcontextual characteristics, and the six overlapping circles within these squares represent the central characteristics.

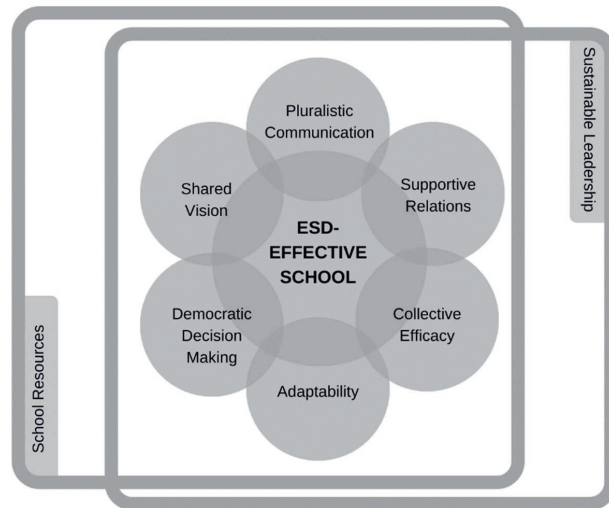


Figure 2: Conceptual framework of an ESD-effective school

With this framework, the need for a more empirically founded perspective on the school organisation in ESD was highlighted and addressed. As Scott (2013) notes that the school organisation is ought to provide a solid foundation for ESD implementation and that the need to “think through the issues” of what such a school organisation might look like remains, we argue that this study and the conceptual framework provide a strong perspective on ESD school effectiveness. The combined evidence across the research fields of ESD, school effectiveness and school organisational management ensured a solid starting position and a range of options to further explore what makes a school organisation ESD-effective.

As the conceptual framework for an ESD-effective school was solely based on the literature, the need arose to (qualitatively) validate the findings from the first study. The second study thus provided an empirically based view of the characteristics via semi-structured

interviews with expert school leaders and teachers (n=19). The testimonials of the respondents in this study showed that the characteristics within the framework for an ESD-effective school indeed have merit. Specifically, the findings in this second study, like those of a number of studies, hint at the importance of sustainable school leadership in facilitating ESD effectiveness. Hargreaves and Fink (2004), Carr (2016) and the respondents assign the school leader with facilitating, developing and network-building responsibility. The importance of distributed leadership, a concept which has been widely discussed in school organisational and leadership literature (Bennell, 2015; Leithwood & Mascall, 2008; Spillane, 2005), was also reflected in this study. According to the school leaders and teachers, you cannot build an ESD-effective school if you do not have widely supported and distributed leadership as an inherent part of sustainable leadership. An important asset of this study was that it found empirical testimonies that reinforced the conceptual description of all characteristics within the framework. Nevertheless, while the characteristics on their own are very recognizable, the specific configuration of the characteristics turned out to be a matter for discussion, just as it is the case in the broader area of educational effectiveness research (Reynolds et al., 2014). The findings in this study can provide guidance for a deeper investigation into the configuration of different school organisational characteristics. The role of pluralistic communication as an agent within the school organisation can be inspirational, as this organisational characteristic stood out in both studies 2 and 4. Perhaps the most important finding of this study is that the in-depth approach to the eight school characteristics opens at least eight doors for further research into school effectiveness, within and outside ESD.

By developing the Education for Sustainable Development School Organisation Questionnaire (ESD SOQ), a quantitative perspective on ESD school effectiveness was made possible. While this questionnaire in itself already answers the second objective of this thesis (i.e. measuring the school characteristics), this study also indirectly contributes to research goal 1. Indeed, with regard to the first research goal, the confirmatory factor analysis used in this study showed that the different characteristics can be seen and measured as separate factors, thus highlighting the validity of the conceptual framework

for an ESD-effective school. Also, the factor analysis provided evidence for the interconnectivity between the characteristics, as the different factors, while separately measured, did correlate with one another.

Situating the ESD SOQ in the field of ESD research, this questionnaire contributes to the demand for more empirical research (Boeve-de Pauw et al., 2015; Bormann & Nickel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). With more and more quantitative tools gradually becoming available – some examples include Sass et al. (2021) and Olsson et al. (2020) on the student outcomes, Varela-Losada et al. (2020) on the attitudes of adults and educators related to environmental change and Mogren et al. (2019) who measured school improvement processes for ESD – the ESD SOQ adds the piece of the school organisation to the puzzle. This perspective offers an insights from the different organisational characteristics which provide a broad (all characteristics of the organisation) yet specific (focused on the organisational level) perspective on the role of the school in ESD. The strength of future research may lie in connecting the different measurement tools and the concepts they measure. As one of the spearheads for future effectiveness research is aimed at mapping the interactions between the school, the class and the student (Reynolds et al., 2015), ESD research knows an array of foci, with research investigating classroom practices, teacher attitudes, the school,... By integrating these foci, ESD research can play a pioneering role in putting forward an integrated perspective on effectiveness.

One of the main outcomes of this thesis also answered a question of one of the reviewers during the review process for Study 1: “Would it be possible for a school with ESD programming to be identified as effective, perhaps even highly effective, on the basis of these six characteristics, but for learning outcomes to be relatively weak in comparison?” (see Appendix 6 for the addendum published with this study). Taken together, the results from and across the studies indicate that there is evidence for the enabling role of the school organisational characteristics in ESD effectiveness. While more research would be needed to provide a conclusive answer on the question above, the fact that it was determined that several of the characteristics contribute to the desired outcomes certainly

strengthened the hypothesis that a school with ESD programming that is identified as effective on the basis of said characteristics, does contribute to learning outcomes related to ESD. The first characteristic that stood out in this, was sustainable leadership. The role of sustainable leadership in educational effectiveness for ESD was at the core of the conceptual framework, as its long-term strategy, with a holistic perspective and the continuous striving for development and improvement of both people and materials, is crucial for a successful school organisation (Hargreaves, 2007; Hargreaves & Fink, 2006; Iliško & Badyanova, 2014). The importance of sustainable leadership was prominent in the results of Study 4 and contributes to the hypothesis that this characteristic is indeed key in paving the path towards effectiveness in other organisational characteristics (Bennell, 2015; Carr, 2016; Harris, 2018; Iliško & Badyanova, 2014; Kadji-Beltran et al., 2013; Leo & Wickenberg, 2013). Secondly, schools that reported they communicate in a pluralistic manner seemed to be enabling action-competent students. As previous research has indicated that school leaders of ESD-active schools use open and direct communication channels (Mogren & Gericke, 2017a) and that effective communication among the school team is essential for a clear understanding of complex concepts such as ESD (Leo & Wickenberg, 2013; Schelly et al., 2012), it is clear that pluralistic communication within a school organisation is a key characteristic in enabling effective ESD. Nevertheless, as the second study indicated, how communication can contribute to the other organisational characteristics remains the question. The same goes for the adaptability of a school organisation and the manner of decision-making. The results indicate that these organisational characteristics are enabling for ESD effectiveness. While there is literature to back this claim, there is still the need for a deeper understanding of the processes behind these characteristics. As the school organisation will be one of the factors facilitating student outcomes related to ESD, a similar hypothesis can be assumed for each characteristic separately and for a configuration of characteristics, such as assumed by the distinction between sub-contextual and central characteristics in this thesis. This thesis, with the conceptual framework, qualitative study and statistical analyses, opened up the

perspective of the school organisation in ESD effectiveness, and with this, the possibilities for assessing the role of each of the separate characteristics in achieving ESD effectiveness.

Limitations and demarcations: Choices made, chances gained?

Although this doctoral research offers added value for the field of ESD, it is also necessary to point out the limitations that set the boundaries for both the research as well as the results of the research. Nevertheless, several of these limitations provide opportunities for follow-up research, which will be discussed in more detail. Below, we will elaborate on the notable limitations pertaining to the PhD research as a whole.

The first important limitation of this PhD is the fact that it is not possible to make any claims as to a causal relationship between the school characteristics in the framework for an ESD-effective school and the outcomes of ESD. While the central question on what makes a school organisation ESD-effective would certainly benefit from an answer that confirmed a causal relationship between the school's organisational characteristics and the outcomes of ESD, the studies that together build this thesis were either conceptual, qualitative, focused on questionnaire development or of a cross-sectional design, and thus did not allow for such a claim. The call for more longitudinal effectiveness research (Reynolds et al., 2015) is therefore also valid in research on ESD effectiveness. Nevertheless, the (combined) results of the various studies provide obvious evidence that there is a link between the school characteristics as described and ESD effectiveness. However, the exact relationships, mechanics and interactions that underlie this connection remain uncharted territory for ESD research. Nevertheless, there can be several assumptions made based on the theoretical and empirical findings of this thesis. First of all, the characteristics on the sub-contextual level, resources and sustainable leadership are conceptually distinguished by a reciprocal relationship (Iliško & Badyanova, 2014; Leo & Wickenberg, 2013). Secondly, the qualitative study suggested that pluralistic communication might be connected to the other characteristics as some sort of catalyst for effectiveness. These are two potential hypotheses on the school organisational level, but other relationships can exist between

the organisational level and the classroom level: potentially, an effective school organisation reaches their desired outcomes by facilitating classroom learning. This connection is, as is the case in this thesis, often overlooked in effectiveness research and should thus be something to consider in follow-up research (Reynolds et al., 2015).

Thirdly, being part of the VALIES project offered a number of advantages but also meant that our sample was limited to the schools that took part in this project. While the VALIES schools and their respective school teams and students provided valuable data to our research, it should be noted that this group does not provide a representative picture of all schools (that have a focus on ESD). The provided sample was situated in a specific context and the results are there for contextually dependent. Although we did not intend to conduct a comparative study between different schools and regions, this specificity of the sample is something to be kept in mind. All of these schools also participated in VALIES with a certain disposition towards ESD: at least some of the teachers or the school leadership were inclined to accept a certain engagement with the project and ESD. That said, our results indicate that there were differences between the participating schools, both on the organisational level as well as on the student level. In addition, our sample only consisted of a small number of school leaders ($n = 11$ in our validation study). This meant that we were not able to validate the scale regarding supportive relationships between school leaders. After all, too few school leaders in our sample would lead to a distorted and incomplete picture of this rich concept.

In addition to the composition of the sample, the sample size also turned out to be a definite limitation. Certainly for those studies in which statistical computing power was required, we reached the limits of our sample as it was not possible to run a multilevel structural equation model (SEM) on our dataset (Preacher et al., 2010). Also, the consequences of the global COVID-19 crisis had on schools in Flanders also played a part in our final sample size. During the data collection of the fourth study, Flemish schools (and society as a whole) went into lockdown. For many participating schools the shift to online education meant that their school teams found it very difficult to complete the

questionnaire in time. In addition, it was also the case that several schools wanted to fill in the questionnaire on paper. However, as the schools were now suddenly closed, the school team could no longer fill in their questionnaires as these were at the school and the personnel had to work from home.

A third limitation of this thesis originated with the development of the conceptual framework and the literature review that was conducted. While we did not intend to develop the conceptual framework for an ESD-effective school with a specific (geographical or cultural) context in mind, it soon became clear that many of the sources on which the framework was based originated from a European and Anglo-Saxon background. As this framework formed the common thread through the four studies, one should consider the geographical and cultural background of the literature that was consulted in the development of the framework. Notwithstanding the importance of this limitation in this thesis, it is to be noted that this is a limitation or bias of the broader field of research on educational management and administration (Hallinger & Kovačević, 2019). As ESD research is evidently also prominent outside of the Western geopolitical context, with examples of comparative research between Sweden, Taiwan and Japan (Fredriksson et al., 2020; Olsson, 2018), more international comparative research will benefit both ESD and school effectiveness research (Reynolds et al., 2015).

Throughout the course of conducting the PhD research a number of choices were made; although they cannot be interpreted directly as a limitation, they entailed a certain demarcation with regards to the set-up, methods, findings and conclusions of this thesis as a whole and the studies within it. While the reasoning behind these choices is given in the chapters above, it is necessary to elaborate on some of the decisions that shaped the thesis as a whole. First, there is the decision to directly link the school organisational characteristics to the student outcomes. While there is evidence for the importance of other aspects in the school when it comes to student outcomes (both within as well as outside of ESD), our research does not include these aspects of the school, such as classroom factors, teacher traits or didactical approaches. The rationale for this decision is

our desire to focus on those characteristics at the level of the school organisation that may or may not facilitate the outcomes at the student level. This decision allowed for a broad description of the school as an organisation and offers many entry points for researching how the school as an organisation can shape ESD. Secondly, while the conceptual framework acknowledges the involvement of students in the school organisation (e.g. pluralistic communication and democratic decision-making), they were not actively involved in mapping the school organisation in the empirical studies. As students are in fact active and important stakeholders of a school, their viewpoints on its organisational functioning would be something to consider in future research.

Towards a fuller picture of an ESD-effective school: Suggestions for further research

The findings of this thesis show that the school as an organisation is indeed connected to ESD-effectiveness, with the outcomes of ESD, namely the students' Action Competence, as a proxy for this effectiveness: we found which school characteristics according to the literature and teachers and school leaders with expertise in ESD can contribute to ESD effectiveness. This was further substantiated by our quantitative findings that highlighted the importance of, for example, pluralistic communication, adaptability, democratic decision-making and sustainable leadership. Yet there is still much to be investigated, as indicated in the limitations of this thesis. A first suggestion for further investigation relates to the interconnectedness of the different organisational characteristics. While there is evidence for the interconnectivity between school leadership and different characteristics of the school organisation (e.g.: Harris et al., 2013; Leithwood & Jantzi, 2006; Sinden et al., 2004; Spillane, 2004), there is still a call for more research that integrates leadership within a model that also allows for the interaction between leadership and other school characteristics (Reynolds et al., 2014; Reynolds et al., 2015).

While our conceptual framework describes the reciprocal relationship between the two subcontextual characteristics and the interconnectivity within the framework as a whole, the studies in this dissertation were not able to map these complex relationships. Nevertheless, in our qualitative study, several respondents indicated that there is something to be said for the special role pluralistic communication plays within the school organisation. Therefore, we would call for more research that focuses on the interrelationships between the different characteristics of an ESD-effective school. For example, it can be hypothesized that two characteristics on their own do not lead to ESD effectiveness but the specific configuration of the same characteristics does. For example, shared vision and supportive relations on their own might not affect the students' AC, but a school where the team is internally motivated to support colleagues in their ESD practices and shares a common understanding of ESD does achieve higher AC with their students. Knowing how the school organisation itself functions could provide a first step in the striving towards an understanding of the full picture of an ESD-effective school. Inspiration for this can certainly be found in the area of school effectiveness research, which includes a long research tradition on the effects of different organisational characteristics, with examples such as Witziers et al. (2003) and Leithwood and Jantzi (2006), who already found evidence for the role of school leadership. Nevertheless, the specificity of ESD, with its holistic, pluralistic and action-oriented principles, requires a specific way of looking at school effectiveness: a perspective that acknowledges a holistic view of what can be expected from an effective school in which there can be room for different value judgments and which leaves opportunities for action. Investigating whether certain configurations or types of ESD schools can be found on the basis of the eight organisational characteristics described in this thesis could be a possible route for future research aiming to unravel the complexity of the interrelatedness of the characteristics.

As the school organisation plays a facilitating or mediating role, it will be necessary to combine the organisational level with the different aspects of the school. Within the VALIES project, there were five research lines concerned with ESD, its implementation and its outcomes. Combining these perspectives will allow for a much more comprehensive

understanding of the underlying processes of ESD effectiveness. During the course of this PhD trajectory, the question arose as to how the school organisation connects to classroom practices. The complexity of sustainable development (SD) and the abundance of different views and perspectives in ESD (Gyberg & Löfgren, 2016; Kopnina & Meijers, 2014) lead to the fact that implementing ESD in the classroom practices can be challenging for teachers (Sinakou et al., 2019). Arguably, one could hypothesize that a school that exhibits the characteristics of an ESD-effective school will be able to enhance and facilitate the teachers' integrated holistic, pluralistic and action-orientated teaching practices. Deriving how the organisational characteristics can be facilitative for what happens within the classroom would greatly contribute to our understanding of ESD effectiveness and the role of the school organisation within this. We would argue that a school that is identified as effective, based on the characteristics of an ESD-effective school organisation, will be able to support teachers in their ESD classroom practice. Nevertheless, school effectiveness is a complex equation. The school organisation will be one of the factors facilitating ESD effectiveness, but other features on other levels, such as pupil and teacher traits (e.g. pedagogical approach, attitudes) will also play their part and can therefore not be overlooked. The call for more research on this relationship between the school organisation and other levels of the school, such as the classroom, goes wider than solely ESD effectiveness research (Reynolds et al., 2015). A multidisciplinary perspective on this will be key.

Finally, we want to add to the call for more empirical research into the school as an organisation within ESD research. While we found indications of the importance of the school organisation in enabling effective outcomes for ESD, our research had a broad perspective. Further research can provide a more detailed description of specific organisational characteristics and their interconnectivity. A multidisciplinary perspective, combining school effectiveness research, ESD research and a variety of research methods, is needed to further investigate what makes a school organisation ESD-effective. With this thesis we opened the door for school effectiveness research in ESD and for ESD in school effectiveness research: the outcomes used in this research span a variety of cognitive, attitudinal and motivational student traits, which are also advocated for in effectiveness

research (Sammons et al., 2015). On the other hand, this thesis showed that effectiveness research allows for a different perspective in ESD that can indeed further expand our knowledge of the processes behind ESD. Moreover, applying the conceptual framework for an ESD-effective school organisation within several cultural and geographical contexts was not included in the scope of this thesis. Nevertheless, applying, comparing and (where needed) adapting the framework within and between different contexts would enrich the framework itself and our understanding of both ESD school effectiveness and potentially school effectiveness in general (Reynolds et al., 2015).

Implications for ESD practice

While the focus of this thesis was mainly on gathering scientific insights into ESD school effectiveness, the results and conclusions of this thesis and the different studies do allow for suggestions oriented at the practice within the school.

For school organisations, the availability of appropriate systems, services and tools for self-evaluation would ensure that schools that want to invest in ESD understand how this can be implemented and developed within their own specific context. The ESD SOQ (Chapter 4) was initially developed as a scientific tool but also offers many possibilities to be used as a self-evaluation tool for the school organisation. As an example within the VALIES project, participating schools received a feedback report (based on the data gathered via the ESD SOQ) which gave the school insight into its own organisational functioning and offered several suggestions for the further development of the school as an organisation. Mogren (2019) recommended that feedback and self-evaluation tools for school organisations are needed to set the compass for ESD implementation within a specific school. By offering guidance in setting expectations, schools will be able to map their own trajectory towards ESD effectiveness. In general, the conceptual framework acts as a reference for school leaders, pedagogical counsellors, NGOs and others working with and for ESD at the school organisation level.

Alongside tools the schools can use autonomously, professionalization programmes for school organisations can bring a number of benefits to ESD within those schools. As noted in the introduction, the professionalization programme of VALIES focused more on the teacher and classroom than on the school organisation. Nevertheless, the cross-fertilization between the schools that participated in this certainly led to more valuable exchanges between school organisations (i.e. supportive relationships between schools). The availability of professionalization programmes for this level of a school would be beneficial for schools working with ESD, regardless of how far they are in their ESD trajectory. However, as VALIES was limited in time, we would call upon educational partners, umbrella organisations and other organisations that assist schools with ESD and invite them to draw inspiration from the findings and insights that emerge from this research.

Concluding statement: Is school effectiveness indeed effective for ESD?

To conclude, this dissertation sought an answer to the question of what makes a school organisation ESD-effective. In this effort, the key characteristics of a school organisation contributing to effective ESD were conceptualized, operationalized and linked to a set of desired outcomes of ESD: action competence. Sustainable leadership, school resources, pluralistic communication, adaptability, democratic decision-making, collective efficacy, shared vision and supportive relations as organisational characteristics for ESD effectiveness all had conceptual foundations, empirical support and – in the case of sustainable leadership, pluralistic communication, adaptability and democratic decision-making – statistical grounding. Nevertheless, modesty about the results of this doctoral research is deemed a necessity. Although a stone has been lifted and we now have a deeper understanding on the role of certain school characteristics, there is still a whole riverbed to discover. Notwithstanding the limitedness of the claims that can be made on the basis of a single piece of doctoral research, it has to be noted that the findings link up and even add

to evidence from the field of school effectiveness. For instance, leadership in school effectiveness research has received an abundance of scholarly interest leading to a solid knowledge base on the role school leadership plays in the school organisation (e.g.: Hallinger & Heck, 1998; Leithwood & Jantzi, 2006). The fact that sustainable leadership also seems to enable positive learning outcomes for ESD suggests that an educational approach such as ESD, with its holistic, pluralistic and action-oriented principles, also follows the same propositions as school effectiveness in general. Moreover, the configuration of sustainable leadership within the framework for an ESD-effective school takes into account the potential interactions between school leadership and other organisational characteristics, a perspective that is called for in school effectiveness research (Reynolds et al., 2015).

This thesis intended to open up perspectives and allow for a holistic view on the school organisation, not only via the conceptualisation of the framework and the different characteristics but also by exploring the potential of a school effectiveness approach to ESD. With this venture, it is hoped that the insights and findings do not mean an end-point for ESD research or for school effectiveness research; rather, it is hoped that this thesis provides inspiration for connecting the fields and inducing follow-up research.

Author contributions

Study 1: Building a conceptual framework for an ESD-effective school organisation

Verhelst, D.: Study conceptualization, discussion of research ideas, setup of the method, drafting and revising of the manuscripts, article reviewing and editing.

Vanhoof, J.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Boeve-de Pauw, J.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Van Petegem, P.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Study 2: School effectiveness for ESD: What characterizes an ESD-effective school organisation?

Verhelst, D.: Study conceptualization, discussion of research ideas, setup of the method, data collection, data analysis, drafting and revising of the manuscripts, article reviewing and editing.

Vanhoof, J.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Van Petegem, P.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Study 3: Development and Validation of the Education for Sustainable Development School Organisation Questionnaire

Verhelst, D.: Study conceptualization, discussion of research ideas, instrument development, setup of the method, data collection, data analysis, drafting and revising of the manuscripts, article reviewing and editing.

Vanhoof, J.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Van Petegem, P.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Study 4: Enabling effective ESD: investigating the influence of the school organisation on student's action competence

Verhelst, D.: Study conceptualization, discussion of research ideas, instrument development, setup of the method, data collection, data analysis, drafting and revising of the manuscripts, article reviewing and editing.

Vanhoof, J.: Feedback on the study, setup of the method, feedback on the manuscript, discussion of research ideas, article reviewing and editing.

De Maeyer, S.: Setup of the analysis, feedback on the method, feedback on the manuscript.

Sass, W.: Data collection for student data, feedback on the manuscript.

Van Petegem, P.: Feedback on the study and method, feedback on the manuscript, discussion of research ideas, article reviewing and editing before and after journal submission.

Nederlandstalige samenvatting

Educatie voor duurzame ontwikkeling

Onze samenleving heeft al een lange weg afgelegd in de richting van een stabiele toekomst voor iedereen. Extreme armoede is in verschillende regio's van de wereld verminderd en veel mensen hebben in hun leven nog nooit oorlog gekend (Moatsos, 2021; Pinker, 2011). Toch zijn er nog een aantal oude én nieuwe uitdagingen die actie vereisen (Verenigde Naties, 2020). Wereldwijde klimaatverandering breekt records, de welvaarts kloof wordt groter en *fake news* verspreidt zich sneller dan ooit (Alvaredo et al., 2018; IPCC, 2014; UNESCO, 2021). Deze uitdagingen vereisen actie om onze niet-duurzame gewoontes om te buigen naar een duurzame toekomst waarin toekomstige generaties genoeg zullen hebben, zonder de grenzen van onze planeet en haar mensen te overschrijden. Het verzekeren van een duurzame toekomst voor iedereen vereist een herziening van de manier van handelen op veel gebieden van ons leven en onze samenleving (Wals et al., 2017). Met het VN-decennium van onderwijs voor duurzame ontwikkeling (UNESCO, 2014) heeft onderwijs voor duurzame ontwikkeling (EDO) een cruciale rol in de wereldwijde inspanningen voor duurzaamheid gekregen. EDO is een educatieve benadering die leerlingen in staat stelt om *“verantwoorde acties te ondernemen voor ecologische integriteit, economische levensvatbaarheid en een rechtvaardige samenleving”* en hen hiervoor de uitrust met de nodige *“kennis, vaardigheden, waarden en attitudes om weloverwogen beslissingen te nemen”* (UNESCO, 2020, p. 8).

Focus van dit proefschrift: EDO en de schoolorganisatie

EDO als een educatieve benadering kan binnen de klas een concrete uitwerking krijgen, maar het wordt pas echt krachtig als je er als school in slaagt om een efficiënt, duurzaam en bovenal effectief schoolbeleid uit te tekenen voor EDO. De schoolorganisatie creëert

immers de setting waarin leerkrachten en leerlingen samen aan de slag gaan met EDO. De vraag die in dit proefschrift dan ook centraal staat is de volgende: “Wat maakt een schoolorganisatie EDO-effectief?”. De focus leggen we zo op de schoolorganisatie: dit omvat alle processen, eigenschappen en kenmerken van de school die het klasgebeuren en het niveau van de individuele leerkrachten en leerlingen overstijgen. Daarnaast gaat die vraag ook uit van een effectiviteitsvraagstuk: wat betekent het om een EDO-effectieve school te zijn? In dit proefschrift wordt uitgegaan van effectiviteit als de mate waarin de schoolorganisatie in staat is processen te faciliteren die de doelstellingen met betrekking tot EDO op de verschillende niveaus van de school positief te beïnvloeden. De doelstellingen of onderwijsuitkomsten van een EDO-effectieve school worden in dit proefschrift opgevat als Actiecompetentie in Duurzame Ontwikkeling (ACiSD) (Sass et al., 2020). ACiSD houdt in dat een leerling de toewijding, passie en vertrouwen heeft om een maatschappelijk (of duurzaamheidsgerelateerd) probleem op te lossen en hiervoor de relevante kennis van het onderwerp en de achterliggende processen heeft. Concreet bestaat ACiSD als uit vier componenten: kennis, bereidheid, vertrouwen in het eigen kunnen en vertrouwen in de impact van de actie (Sass et al., 2020). Samenvattend is een EDO-effectieve schoolorganisatie dus een schoolorganisatie die in staat is om die processen te faciliteren die ertoe leiden dat EDO bijdraagt aan actiecompetente leerlingen. Hierbij focussen we dus op die aspecten van de schoolorganisatie die hier een rol in kunnen spelen.

Onderzoeksdoelen en structuur van het onderzoek.

Om een antwoord te vinden op “wat maakt een schoolorganisatie EDO-effectief” werden drie onderzoeksdoelen naar voren geschoven. Een eerste onderzoeksdoel focuste op de ontwikkeling en validatie van een conceptueel kader dat de verschillende organisatiekenmerken van zo een EDO-effectieve school omvat. Een tweede onderzoeksdoel werkte toe naar het meetbaar maken van dit conceptueel kader via een gevalideerd en betrouwbaar meetinstrument. Het derde onderzoeksdoel bouwt verder op de eerste twee en was erop gericht om de relatie tussen de schoolorganisatie en op EDO-effectiviteit en de uitkomsten van EDO in kaart te brengen.

Om deze drie onderzoeksdoelen te bereiken, werden in totaal vier studies uitgezet. Studie 1 (hoofdstuk 2) richt zich op het ontwikkelen van een conceptueel kader voor een EDO-effectieve school. Met behulp van een doelgerichte methodologie, namelijk een kritische review (Grant & Booth, 2009), werd de synthese gemaakt tussen het brede veld van onderwijsmanagement en schooleffectiviteit en EDO-onderzoek. Studie 2 (hoofdstuk 3) voegde een empirische en kwalitatieve onderbouwing toe aan het conceptuele kader. Hiervoor werden negentien leraren en schoolleiders geïnterviewd over hun perceptie van een EDO-effectieve school. Studie 3 (hoofdstuk 4) had als doel de *Education for Sustainable Development School Organizational Questionnaire* (kortweg ESD-SOQ) te ontwikkelen en te valideren om zo het tweede onderzoeksdoel te realiseren. Tenslotte werd in de vierde en laatste studie in dit proefschrift (hoofdstuk 5), het verband tussen de kenmerken van de schoolorganisatie en de uitkomsten van EDO (i.e. ACiSD) onderzocht via een *multilevel* analyse.

Conceptuele basis: de kenmerken van een EDO-effectieve school

In de eerste studie (hoofdstuk 2) wordt het kader van een EDO-effectieve school vastgelegd via een literatuurstudie. Dit conceptueel kader vormt de basis voor de drie andere studies en is als conceptueel kader zelf ook één van de bevindingen van dit proefschrift. Het conceptueel kader voor een EDO-effectieve schoolorganisatie bestaat uit acht kenmerken: duurzaam leiderschap, schoolhulpmiddelen, pluralistische communicatie, ondersteunende relaties, collectieve effectiviteit, aanpassingsvermogen, democratische besluitvorming en gedeelde visie. Deze kenmerken zijn op te delen op twee niveaus. Ten eerste is er het *subcontextuele niveau*, dat de context binnen de schoolorganisatie mee schept. Op dit niveau bevinden zich twee organisatiekenmerken, duurzaam leiderschap en de middelen van de school. Deze twee kenmerken scheppen de context voor de zes andere kenmerken en zo dus ook de context binnen de schoolorganisatie. Duurzaam leiderschap is een vorm van leiding geven die, vanuit een holistische kijk, een evenwicht tracht te zoeken tussen wat vroeger goed ging, vandaag beter kan en waar het beleid over pakweg vijf jaar wil staan. Hiermee draagt het bij tot een langetermijnstrategie over EDO binnen de

schoolorganisatie. Essentieel bij duurzaam leiderschap is dat dit geen “*one (wo)man’s show*” is: duurzaam leiderschap weet zich te verspreiden doorheen de school en misschien zelfs daarbuiten. Duurzaam leiderschap kan verschillende stijlen hanteren om middelen én mensen verder te ontwikkelen waardoor ook andere kenmerken van het beleid sterker kunnen worden. Zo’n duurzaam leiderschap leidt tot initiatieven en projecten die een langdurig en blijvend karakter hebben binnen de school. Het tweede kenmerk van een EDO-effectieve school op het subcontextuele niveau, zijn de middelen van de school. Deze vallen uiteen in drie groepen: *time management*, de *professionele structuren* en de *fysieke structuren*. Time management omvat de beschikbare tijd van de schoolorganisatie en hoe deze aangewend wordt om EDO te faciliteren. De professionele structuren gaan over de mensen en talenten die binnen de schoolorganisatie aanwezig zijn. Een EDO-effectieve school zal een beleid uitzetten dat mensen laat ontwikkelen en hun talenten groeperen en organiseren zodat deze faciliterend zijn voor EDO binnen de school. Tenslotte zijn er nog fysieke structuren van de school, zoals de schoolinfrastructuur, lesmaterialen, (subsidie)gelden,... Ook deze fysieke structuren worden binnen een EDO-effectieve school zo ingezet dat EDO gefaciliteerd kan worden.

Binnen de context die uitgezet wordt door duurzaam leiderschap en de middelen van de school op het subcontextuele niveau, krijgen de zes centrale kenmerken van de EDO-effectieve schoolorganisatie vorm. Ten eerste is er *pluralistische communicatie*, een manier van communiceren binnen de schoolorganisatie die ruimte maakt voor verschillende meningen en standpunten en dat er kritisch gereflecteerd kan worden over zowel de standpunten van de andere als over de eigen standpunten. Ten tweede kent een EDO-effectieve school *ondersteunende relaties* en wel op verschillende niveaus: binnen het schoolteam, tussen de school en externe partners (zoals bijvoorbeeld de ouders, de buurt, andere scholen, de lokale overheid,...) en tussen schoolleiders van verschillende scholen. Die ondersteunende partnerschappen zorgen ervoor dat een EDO-effectieve school andere perspectieven kan ontdekken, ermee in dialoog treden en deze binnenbrengen in de schoolorganisatie. Een derde centraal kenmerk van de EDO-effectieve schoolorganisatie, is de *aanpasbaarheid*. Een EDO-effectieve schoolorganisatie weet op een effectieve manier

veranderingen door te voeren en kan deze verankeren in de visie. Hierbij dient opgemerkt te worden dat niet ingaan op een kans tot verandering ook een mogelijke strategie is van een EDO-effectieve schoolorganisatie. Het vierde centrale kenmerk van een EDO-effectieve school is de *democratische besluitvorming*. Dit gaat uit van een besluitvormingsproces dat mensen meeneemt, informeert, hun mening laat geven en actief betreft bij beslissingen over EDO op school. Als voorlaatste kenmerk is er de *gedeelde visie* van een EDO-effectieve schoolorganisatie. Dit organisatiekenmerk handelt over de opvatting van de schoolorganisatie over EDO (wat betekent EDO voor ons als school?) en over de motivatie van de schoolorganisatie ten opzichte van EDO (waarom willen we inzetten op EDO?). Voor een EDO-effectieve schoolorganisatie is het duidelijk wat EDO betekent en waarom men hier werk van wil maken. Tenslotte kent een EDO-effectieve schoolorganisatie een hoge mate van *collectieve effectiviteit*. Een EDO-effectieve school is ervan overtuigd dat alle capaciteiten in huis zijn om een effectief beleid rond EDO uit te werken en dat ze de vooropgestelde doelstellingen kan bereiken. Zo een positieve perceptie van de schoolorganisatie versterkt het geloof dat de leerlingen in staat zijn om te leren over en voor duurzame ontwikkeling en is dat de schoolorganisatie hier positief aan kan bijdragen.

Bevindingen

Het conceptueel kader zoals hierboven toegelicht liet toe om de drie onderzoeksdoelen te bereiken en gaf richting aan een antwoord op de centrale vraag over wat een schoolorganisatie EDO-effectief maakt. Onderzoeksdoel 1 werd bereikt door de combinatie van het kader voor de EDO-effectieve schoolorganisatie en empirische bevindingen uit studie 2 conceptuele beschrijving van het kader en de verschillende kenmerken onderbouwen. Toch bleek de specifieke configuratie van de kenmerken een onderwerp van discussie voor verschillende respondenten. Zo werd *pluralistische communicatie* een eerder katalyserende functie aangeschreven door verschillende respondenten. De ontwikkeling van de *Education for Sustainable Development School Organization Questionnaire* (ESD SOQ) als een gevalideerd en betrouwbaar instrument voor de verschillende kenmerken van de EDO-effectieve schoolorganisatie, leidde tot het bereiken

van het tweede onderzoeksdoel. Bovendien opende dit instrument de mogelijkheid om een kwantitatief perspectief op de EDO-effectieve schoolorganisatie binnen te brengen door de verschillende kenmerken meetbaar te maken. Tenslotte draagt de ontwikkeling van de ESD-SOQ ook indirect bij aan onderzoeksdoelstelling 1. De confirmatorische factoranalyse die in deze studie werd gebruikt toonde immers aan dat de verschillende kenmerken van de EDO-effectieve school als afzonderlijke kenmerken kunnen worden gezien en gemeten worden, wat de validiteit van het conceptuele raamwerk voor een ESD-effectieve school verder onderbouwt. Tenslotte wordt ook aan onderzoeksdoel 3 tegemoetgekomen in de vierde en laatste studie (hoofdstuk 5). In die studie wordt de relatie tussen de schoolorganisatie en op EDO-effectiviteit en de uitkomsten van EDO in kaart gebracht. Voor verschillende kenmerken van de EDO-effectieve school werd een positieve relatie vastgesteld tussen de schoolorganisatie en de uitkomsten van EDO. Voor duurzaam leiderschap, pluralistische communicatie, aanpasbaarheid en democratische besluitvorming: al deze organisatiekenmerken bleken samen te hangen met actiecompetentie bij de leerlingen. Alles bij elkaar geven de resultaten van en overheen de vier studies weer wat een schoolorganisatie EDO-effectief maakt en welke organisatiekenmerken hierbij van tel zijn. Toch is er meer onderzoek nodig is om een sluitend antwoord te voorzien op wat en hoe een schoolorganisatie een EDO-effectieve schoolorganisatie kan worden.

Conclusie

Dit proefschrift verdiept ons begrip van de organisatiekenmerken van een school in relatie tot EDO. De bevindingen geven aan dat de schoolorganisatie en de kenmerken gedefinieerd in dit proefschrift van belang zijn als het gaat om EDO-effectiviteit. Daarnaast biedt het verschillende perspectieven voor vervolgonderzoek naar de effectiviteit van schoolorganisaties bij EDO waarbij elk van de acht kenmerken of een combinatie ervan een mogelijke inrijpoort kan zijn. Daarmee brengt dit proefschrift een eenvoudige, doch krachtige boodschap: schoolorganisaties kunnen een positieve impact hebben op de resultaten van educatie voor duurzame ontwikkeling.

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Appendices

Appendix 1: overview of the consulted sources

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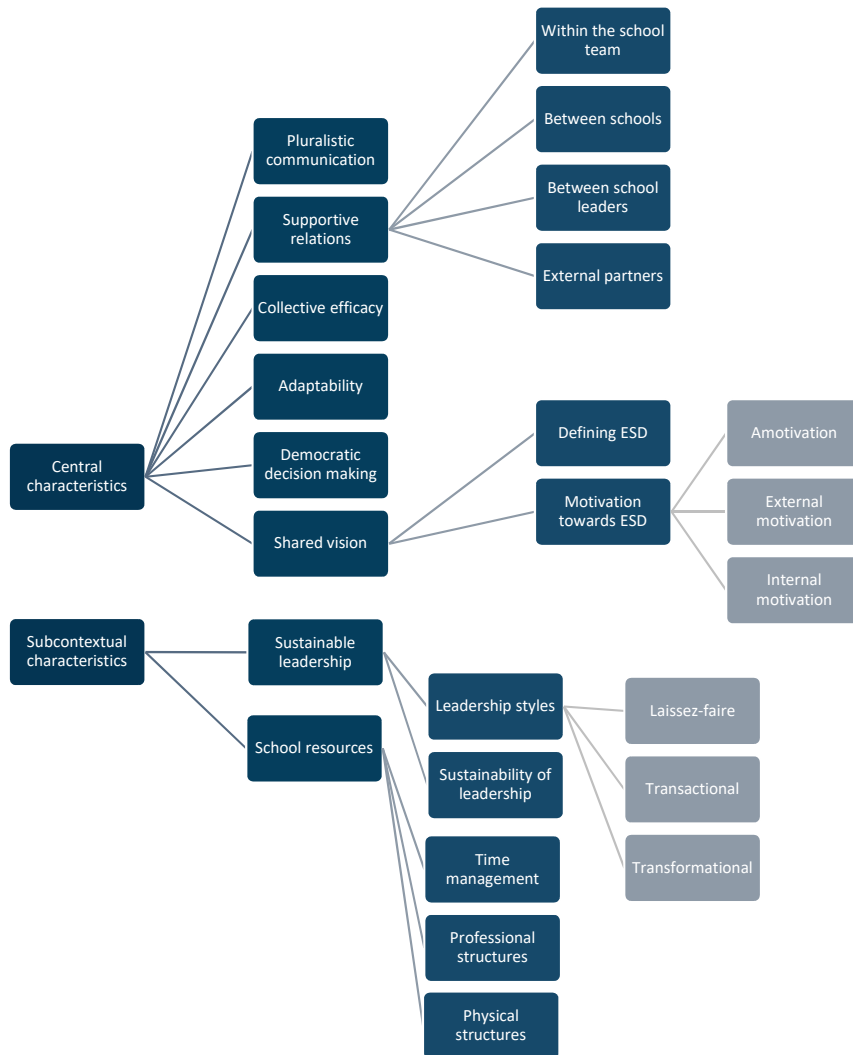
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Appendix 2: Examples of text fragments attributed to each of the characteristics

Characteristic	Text fragment	source
Sustainable leadership	“Sustainable educational leadership and improvement preserves and develops deep learning for all that spreads and lasts, in ways that do no harm to and indeed create positive benefit for others around us, now and in the future.” –p.17	(Hargreaves and Fink, 2006)
School resources	“Without exception, the teachers regarded this as a duty that increased their workload.” –p.294-295	(Gyberg & Löfgren, 2016)
Pluralistic communication	One conclusion is that principals need to be more aware of the ways that communication can improve, and the need for on-going dialogue aimed at defining key concepts such that the staff can engage in in-depth discussions about sustainable development.” –p.414	(Leo & Wickenberg, 2013)
Supportive relations	“This criterion states that it is important for school leaders to help, support and exchange ideas with other school leaders in order to understand different ways of implementing ESD.” –p.983	(Mogren & Gericke, 2017a)
Collective efficacy	“Efficacy is a key variable in better understanding effects in most organizations.” –p.497	(Leithwood & Jantzi, 2008)
Adaptability	“A school organisation with a transmissive perspective aims to transfer knowledge or values from one person to another. Conversely, a school organisation with a transformative perspective adopts an approach whereby both the learner and the organisation itself must change (i.e. undergo transformation) in response to changes in the outside world.” –p.995	(Mogren & Gericke, 2017b)
Democratic decision making	“Political dimension of sustainability in this school has been practiced by developing a dialogical and democratic decision making processes among the administration and staff members. Each teacher has a voice in deciding upon the best ways of transforming the culture of school towards a more sustainable.” –p.43	(Iliško & Badyanova, 2014)
Shared vision	“However, critics have pointed to that environmental or ESD distinction programs can be ineffective because educators responsible for the programs differ greatly in their understanding of ESD. The definition of and understanding of ESD differs not only between countries but also within a country.” –p.14	(Cars & West, 2015)

Appendix 3: coding tree, description of nodes and coding examples



Node	Description	Example quote
Adaptability	Adaptability of the school. Deals with how a school adapts to internal or external demands and how it learns from these.	<p>“If we experience things as too much of a burden because of a number of reasons, then we as a school have the right to say that we aren’t going to do it. We put it on hold or call it off.”</p> <p>“Everything is evaluated every so often in a cycle. Do we keep it like this, do we need to adjust,... How can we get it more lively, stronger? That happens at our school.”</p>
Collective efficacy	Collective efficacy - the combined perception of every member of the school organisation that their efforts positively influence the student outcomes	<p>“When we see our pupils leave to a secondary school, I feel like they do take things that we thought them with them.”</p> <p>“Yes I think that we have an effect. For example, sometimes you can really say ‘wow, do you remember how this pupil was when she arrived at our school?’. And if you see them now, you really think, ok, we did it.”</p>
Democratic decision making	A way of decision making whereby every relevant stakeholder (students, teacher, other) has a chance to participate.	“Sometimes you overlook something. And if you involve different stakeholders in a decision, you can also see different perspectives.”
Shared vision	Shared vision of the school when it comes to ESD. Comprises of the meaning the school gives to ESD and how they are motivated for ESD.	Parent node: see child nodes for coding examples
Defining ESD	Relates to how a school defines and sees ESD. Is developed through communication.	“I think that the majority of the colleagues will still refer to the environmental aspect, environment, climate,... But at the staff meeting we showed that it is much more than that, that it’s really about sustainable development as a whole. That’s much more

		than only the environmental aspect. We even organized a 'baby shower' to mark the transition."
Motivation towards ESD	Motivation of the school for ESD. Consists of 3 categories/types: amotivation/external motivation/internal motivation	"It goes from the head to the heart I think. That's one of the main challenges for the story of ESD. But I do see that many of my colleagues already are intrinsically motivated."
amotivation	Lack of motivation for ESD	"It's really hard to work with someone when they are really not into ESD. You can't always change it if they don't want to."
External motivation	Motivation for ESD comes from an external source.	"I mean, if I have to do something because I have to, and I don't like it, I'll do the bare minimum. But it's ought to be more than that I think."
Internal motivation	Motivation for ESD comes internally from within the people working in the school.	"It's important that people really want to go for it! Everyone volunteered for it." "If you do something from your own motivation, you will do it with more dedication and it will even be easier to do it. And children will feel this!"
Supportive relations	Supportive relations the school experiences when working with ESD. Can be grouped in 4 different categories	Parent node: see child nodes for coding examples
External partners	External partners - persons and organisations who are not directly linked to the school. For example neighbours, community members, external experts, organisations providing guidance,...	"My network is super important. It doesn't have to be a hundred different people, but its handy to know the right people."
Relations between schools	Supportive relations between schools, both regional, national or international.	"Recently I went to an inspiration day and I came back with loads of ideas! If we could exchange ideas and ways of working

			between our school and other schools, it would be much more than only exchange ideas. It would open up opportunities to get different viewpoints from outside our school into our organization. Someone with a fresh perspective could be very interesting!"
Relations within the school team	Supportive relations between member of the school team.		<p>"There's a lot of talking in the teacher room, and not only about education. There are moments when other things have to be discussed. 'Are you better from the flu' to 'how was the visit at the oncologist?' Everyone here is involved in each other's wellbeing."</p> <p>"Each other's talents... We had something like a talent coach and that way you really get to know each other. And that's important because that way you get to know each other. I think that it is of great importance that you know what to expect from each other and how other people feel."</p>
Relations between school leaders	Supportive relations between school leaders of different schools.		"Those three other school leaders are my references that are a real help to me. That works much better than a formal and obligated get together of school leaders of the school group."
Pluralistic communication	Communication within the school. Pluralism implies communication where there is room for different viewpoints and critical thinking and self-reflection.		"That's something we try to do with a lot of things in our school. You are ought to be respectful for other opinions and you don't try to force your own opinion on each other. If the kids feel that that's the way to communicate, really interesting discussions can happen."

Leadership	Leadership within the school.	Parent node: see child nodes for coding examples
Leadership style		Parent node: see child nodes for coding examples
Laissez-faire	Leadership style in which the leadership is absent	"We can decide a lot within our teams actually. If we have an idea, we can just pursue it because we have self-regulating teams. We have a lot of freedom."
Transactional	Leadership working via the exchange of rewards.	"As a school leader I see it as my task to thank people who invest in our school. That can be as easy as saying 'good job', shaking some hands or offering a cup of coffee."
Transformational	Leadership based on idealized influence, inspirational motivation, intellectual stimulation and individualized consideration.	"I think it is important that a leader is able to induce other people and that it is not a one-man-show, because that doesn't work. It has to be backed up by the team."
Sustainability of leadership	The idea that leadership should be sustainable. Holistic layer implies acknowledging the past-present-future	<p>"If a good initiative gets abandoned is a twofold. First, the fact that people want to do something else and that people who are steering and leading an initiative leave it to be. Second, if backing up initiative and getting enough support for it isn't done extensively enough. Sometimes people will only do something because they have to."</p> <p>"Making things sustainable, ensuring that it is preserved, that's important"</p>
School resources	The resources the school has at its disposal	Parent node: see child nodes for coding examples
Physical structures	All physical attributes of the school (financial means and infrastructure)	"If you look at our playground, it has an indispensable function at our school. We have made it green, it collects the rainwater that we use for our toilets and it has an important social function"

Professional structures	The human resources of the school organisation.	“I always try to bring teachers with complementary profiles together. It does not work if you put all the same types of people together. For example, in the dual-classes I always make sure that the traits of the teachers are enriching for each other. So one of them will be really good at mathematics and the other one in ESD, for example.”
Time management	The planning and organisation of the available time and the timeslots of teachers.	“Setting up the schedule so that teachers can be free to do ESD or follow a relevant professionalization course, making sure that the necessary means are available, that sort of things. Ensuring that the support and means the teachers need to work with ESD is available.”

Appendix 4: Dutch version of ESD-SOQ

Pluralistische communicatie (Pluralistic communication)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
worden andere meningen over EDO gerespecteerd.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
durven we onze eigen mening over EDO te geven.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
mogen we ons kritisch uiten over EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
kan er op een open manier over EDO gesproken worden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wordt mijn mening over EDO gerespecteerd.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Duurzaam leiderschap (Sustainable leadership)

De directie...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
maakt ruimte om het EDO-beleid vanuit verschillende invalshoeken (ecologisch, sociaal, economisch,...) vorm te geven.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
trekt lessen uit het verleden bij het uitzetten van het EDO-beleid.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
geeft aan dat EDO een blijvend karakter heeft op onze school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Op deze school...						
werken we aan een duidelijk uitgestippeld beleidsplan om EDO vorm te geven.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zet de directie in op het verankeren van EDO initiatieven op de lange termijn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Democratische besluitvorming (Democratic decision-making)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
worden leerkrachten betrokken in het besluitvormingsproces rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
worden de leerlingen betrokken in het besluitvormingsproces rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
worden verschillende standpunten meegenomen bij het nemen van beslissingen rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zorgt het samen nemen van beslissingen ervoor dat we beter aan EDO kunnen doen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
worden de beslissingen rond EDO genomen in overleg met alle betrokken partijen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
vraagt de directie naar de mening van leerkrachten alvorens een beslissing over EDO te nemen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Time management

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
zijn de lessen zo ingeroosterd dat er vakoverschrijdend rond EDO gewerkt kan worden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is er in verschillende lessen ruimte om aandacht te geven aan EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hebben we voldoende tijd om op een onderzoekende wijze te werken rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hebben we voldoende tijd om binnen EDO te werken rond reële zaken uit de leefwereld van de leerlingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zorgt werken rond EDO ervoor dat er vakoverschrijdend gewerkt wordt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is er voldoende tijd voorzien om vakoverschrijdend aan EDO te werken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Professionele structuren (Professional structures)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
zijn er werkgroepen die werken aan EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
werken leerkrachten van verschillende vakken of klassen samen rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wordt er veel aandacht geschonken aan wie met wie samenwerkt om zo beter aan EDO te kunnen doen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

maakt EDO deel uit van wat verwacht wordt van de leerkrachten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zetten verschillende collega's zich in voor EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zijn er collega's die zich gespecialiseerd hebben in EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Fysieke structuren (Physical structures)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
hebben we voldoende financiële middelen om in te zetten op EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
leent de infrastructuur zich er goed toe om aan EDO te doen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
toont de schoolinfrastructuur dat we met EDO bezig zijn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
geven we met de schoolgebouwen het goede voorbeeld op vlak van duurzaamheid.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Aanpasbaarheid (Adaptability)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
staan we open voor suggesties over EDO die van binnen de school komen (leerlingen, leerkrachten, personeel).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
staan we open voor suggesties over EDO die van buiten de school komen (ouders, buurt, bedrijven, onderwijskoepels).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
kijken we kritisch naar de manier waarop we rond EDO werken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

staan we open om bestaande manieren van werken rond EDO aan te passen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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Ondersteunende relaties binnen het schoolteam (Supportive relations within the school team)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
zijn de leerkrachten betrokken bij elkaars projecten en taken rond EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is er een aangename sfeer tussen de collega's wanneer er rond EDO wordt gewerkt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is er een sfeer van samenwerking binnen het lerarenteam op vlak van EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zoeken de leerkrachten steun bij elkaar wanneer ze moeilijkheden ervaren op vlak van EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zijn de leerkrachten op de hoogte van de EDO-activiteiten en projecten van de collega's.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ondersteunende relaties met externe partners (Supportive relations with external partners)

1. Met welke externe partners werkt uw school samen rond EDO? (meerdere antwoorden mogelijk)

- Organisaties die werken rond EDO
- Lokale handelaars of bedrijven
- Overheden (gemeente, provincie,...)
- Ouders
- Andere scholen
- Andere:

- deze school werkt niet samen met externe partners rond EDO

Deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
gaat actief op zoek naar externe partners om rond EDO te werken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
wordt ondersteund door de contacten met externe partners op vlak van EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
betreft geschikte externe partners bij EDO-projecten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
haalt inspiratie voor EDO uit samenwerking met externe partners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
staat dankzij de samenwerking met externe partners sterker op vlak van EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
gaat voldoende samenwerkingen aan rond EDO met externe partners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Collectieve effectiviteit (Collective efficacy)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
kunnen we zelfs de moeilijkste leerlingen de nodige EDO-competenties bij brengen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zijn we ervan overtuigd dat we de leerlingen goed EDO-onderwijs kunnen bieden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
geloven de leerkrachten dat elke leerling kan leren over duurzame ontwikkeling.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zijn de meeste leerlingen gemotiveerd om te leren over duurzame ontwikkeling.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zorgt de sfeer op school ervoor dat de leerlingen vlot leren over duurzame ontwikkeling.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Gedeelde visie (Shared vision)

Op deze school...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
is het voor de meeste collega's duidelijk wat er bedoeld wordt met EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
spreken we met collega's over wat EDO betekent voor de school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
zijn er verschillende leerkrachten voor wie het nog niet duidelijk is wat EDO betekent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
werken we rond EDO omdat we het als school belangrijk vinden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ondersteunende relaties tussen schoolleiders (Supportive relations between school leaders) (not included in the analysis)

Ik...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
heb behoefte aan overleg met andere directies over EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
spreek met andere directies over EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ervaar de samenwerking met andere directies als een meerwaarde voor EDO.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
geef advies aan andere directies die rond EDO willen werken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Samenwerking met andere directies rond EDO...	Helemaal oneens	Eerder oneens	Noch eens, noch oneens	Eerder eens	Helemaal eens	n.v.t.
heeft weinig voordelen voor mij als directie van deze school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix 5: English translation of the ESD-SOQ

Pluralistic communication

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
differing opinions about ESD are respected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we can speak our mind about ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we are allowed to offer criticism about ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we can discuss ESD frankly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
my opinion about ESD is respected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Sustainable leadership

The school leadership...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
enables the development of an ESD policy that is shaped by different perspectives (ecologic, social, economic,...).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
learns from the past when shaping an ESD policy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
makes clear that ESD has a lasting role in our school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.

we are working on a well-defined ESD policy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the school leadership makes efforts towards making ESD initiatives lasting the long run.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Democratic decision-making						
At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
teachers are involved in the ESD decision-making process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
students are involved in the ESD decision-making process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
different perspectives are taken into account in the ESD decision-making process.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
joint decision-making leads to a better ESD practice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD decisions are made jointly by all stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the school leadership asks the teachers' opinion before making a decision regarding ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Time management

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
the way lessons are scheduled facilitates cross-curricular ESD-activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is enough time for ESD in different classes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is enough time to work on ESD in an inquiring way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is enough time to integrate examples from the students' reality into ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD leads to cross-curricular work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is plenty of time for cross-curricular ESD-activities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Professional structures

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
there are ESD work groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
teachers from different subjects and grades collaborate regarding ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

we devote a lot of attention to who collaborates with whom in order to facilitate ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ESD is part of the teachers' tasks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
various colleagues are committed to ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
some colleagues have specialized in ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Physical structures

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
financial means for ESD are adequate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
infrastructure is fitting for ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the infrastructure demonstrates that we are working on ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the school buildings set a good example regarding sustainability.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Adaptability

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
we are open to suggestions related to ESD that come from inside our school (e.g., teachers, students, staff,...).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we are open to suggestions related to ESD that come from outside our school (e.g., parents, community, businesses, educational networks, government,...).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we are critical of how we work on ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we are open to adapting our existing ESD practices	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supportive relations within the school team

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
teachers are involved in each other's ESD tasks and projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is a pleasant atmosphere among colleagues when working on ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there is a collaborative atmosphere among teachers for working on ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
teachers turn to each other for support when	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

encountering ESD related challenges.						
teachers know about each other's ESD activities and projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supportive relations within external partners

3. With which of the following external partners does your school collaborate? (Multiple answers possible)

- Organisations working on ESD
- Local commerce and/or businesses
- Government (town, city, state,...)
- Parents
- Other schools
- Others:

- This school does not collaborate with external partners for ESD.

This school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
actively looks for external partners to collaborate with for ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is supported by external partners for ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
involves suitable external partners in ESD projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
draws inspiration for ESD from collaboration with external partners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
is stronger when it comes to ESD thanks to the collaboration with external partners.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
engages in sufficient collaborations with external partners for ESD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Collective efficacy

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
we can teach even the most difficult students the necessary ESD competences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
we are convinced that we can provide good ESD to our students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the teachers believe that every student can learn about sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
most students are motivated to learn about sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
the atmosphere at school facilitates student learning about sustainable development.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Shared vision

At this school...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
it is clear to most colleagues what ESD means.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
colleagues discuss what ESD means for the school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
there are several teachers for whom it is not yet clear what ESD means.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

we work on ESD because we as a school find it important.	○	○	○	○	○	○
Supportive relations between school leaders (not included in the analysis)						
I...	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
feel a need to consult with other school leaders about ESD.	○	○	○	○	○	○
talk to other school leaders about ESD.	○	○	○	○	○	○
find that collaborating with other school leaders enhances ESD?	○	○	○	○	○	○
give advice to other school leaders who want to work on ESD.	○	○	○	○	○	○
	Completely disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Completely agree	N.a.
collaborating with other school leaders has little advantages for me as a leader at this school.	○	○	○	○	○	○

Appendix 6: addendum with Study 1

This addendum was published together with the article on which Chapter 2 was based.

Given the incredibly rich correspondence between JEE reviewers and the authors of “Building a Conceptual Framework for the ESD-Effective School,” Paul Hart (from the University of Regina and at the time JEE’s Executive Editor) suggested to publish this ‘dialogue in action’ as an addendum to the article. This is a decision we rarely adopt in JEE, but on this occasion the exchange between authors and reviewers was so stimulating that it warranted its own entry. I want to thank Paul for this wonderful idea, and for being the lead editor of this article, in addition to the article’s two insightful and committed (originally blind) reviewers: Anna Mogren, from Karlstads Universitet, and Tom Marcinkowski, from Florida Institute of Technology. We also decided to keep the exchange as ‘raw’ and ‘authentic’ as possible; the only edits we made to the original text sought to improve clarity. We believe that researchers, both novice and veteran, will benefit from this exchange.

Alberto Arenas
Editor-in-Chief, *Journal of Environmental Education*

Executive editor

Having read this paper prior to my reading the reviews, I formed a certain view which corresponds to a number of comments by each reviewer/consulting editor. I learned that Reviewer 1 previously reviewed this paper for another journal and, given the content of this study, believe that it very well be more effective within a more ESD-based or administration-based journal. However, I also agree with each reviewer that the paper is integral into EE/ESD as well. Reviewer 1, coincidentally, has a second reading of a revised manuscript which seems to have addressed some of the major issues. The author should now address further suggestions, some of which are related to care in terminology, such as school versus organization. I also had issues with terminology which the authors should consider when submitting to a primarily EE-based rather than ESD-based journal.

We acknowledge that our study is more focused on ESD than that is on EE. However, given the similarities between the fields, we find it very important to keep a good rapport between the fields. With this in mind and by submitting this study to a EE focused journal, we want to open up the discussion about ESD-effectiveness to the broader field of EE and ESD and provide opportunities for academic communities to actively ‘look over the wall’.

We completely agree with the editors that, in order to do so, it is of utmost importance to get the terminology straight. In the revised manuscript we consequently refer to the school organization and we devoted attention in the conclusion to the link between the fields of ESD and EE.

“Moreover, given the connection between the field of ESD and other educational areas such as EE, we argue that the proposed framework for the ESD-effective school organization can be

inspirational for effectiveness research in the area of EE. While the identified school characteristics are linked to ESD, the similarities between educational areas as EE and ESD make that schools working with ESD will have notion of at least some aspects of EE.” (p.26)

Reviewer 2 – Comments here are substantive and coming from the more traditional EE rather than ESD base, and yes there are differences and the differences are substantial and warrant serious response if the paper is to be published in an EE-based journal. The reviewer seems to support the EE-ESD connection yet keeps coming back to this disjunction as an issue of an historical nature in “questions and concerns,” section of the comments. Please pay close attention to this reviewer’s detailed points of concern, address them carefully and the generous minor revisions recommendation, which I see as moderate or even major, knowing this reviewer. The paper may then well be published in the JEE. I agree with this reviewer’s concerns and need to be convinced that the Questions and Concerns, for example each of the four concerns in Section 1: Summary of Delimitations/Limitations, particularly the coding decisions and the interpretation issue; consistency in ID of sources and ground-truthing following the options/suggestions and the issue of effectiveness. Knowing the reviewer as one of our best, and most generous in terms of feedback, I would venture that if the authors attend seriously to each of the precise points made, there is a very good possibility for publication in the JEE.

All feedback of both consulting editors is taken to heart. The extensive feedback provided by consulting editor 2 indeed shows relevant points for improvement, such as the ambiguities in the methodology. We addressed all of the concerns to the best of our ability in the revised manuscript.

Consulting Editor 1

As earlier said, I find it a valuable contribution to the research field and welcome more knowledge to be raised in how the organization of schools could be better used in practical implementation of ESD. I find that the need of an effective framework is now better argued for in comparison to reading the paper half a year ago. It explain the relevance of the paper to an international audience. Although there are still small matters that I would recommend authors to consider or revise.

We are happy to read that the consulting editor sees improvement compared to the last version of the manuscript. We found the feedback from the consulting editor already very valuable half a year ago. We are therefore very happy to read that all of the editors at the Journal of Environmental Education see merit in this paper. Below we address the editor’s remaining concerns.

Still traces of what can be studied in school improvement is how this framework is presented. I do understand and read that you find these frameworks important in relation to each other, but try to be even more clear to how an effective framework can pinpoint targets of ESD implementation and study outcomes of specific ESD characteristics in a more closed model or

this framework. This could probably be done by giving some very concrete examples from earlier research.

In the revised manuscript we have more clearly described the relation between school effectiveness and improvement, and the discussion between these perspectives in the field of ESD.

“ESD literature has often presented ESD as an educational ideal wherein there is a predisposition towards school improvement. In this paradigm, it is argued that ESD does not have a final destination to reach and that there is no need for measurement and effectiveness thinking. Opponents of effectiveness research in ESD even argue that collecting empirical evidence is inherently normative, which could hinder the further implementation and organic development of ESD (Block et al., 2018). ESD by them is seen as an educational ideal that implies qualitative education, which leads to sustainable development as an effect of this education. Hereby, quality is seen as a commitment of the school to continuously improve to attain this ideal (Mogren & Gericke, 2017a, 2017b; Vare & Scott, 2007). This school improvement perspective, wherein educational practitioners and researchers aim at continuous improvement towards an ideal, can arguably lead to a situation in which the processes are seen as more important than the actual learning outcomes. (p.6)

In line with educational effectiveness researchers, such as Teddlie and Reynolds (2006) and Mortimore and MacBeath (2001), we argue that the gap between the school improvement perspective and the educational effectiveness perspective should be bridged. We contend that an educational effectiveness perspective, that does not put the guiding educational ideal aside but rather measures the extent to which extent this ideal is met, will provide the school improvement perspective with evidence on what works (Creemers & Reezigt, 1997). By providing this evidence, school effectiveness supports the educational ideal of ESD as this effectiveness is orientated at mapping the extent the ideal is met, without stating that this course of action is the only valid course for the school organisation (Nikel & Lowe, 2010). In order to do so, it is necessary to describe the goals for the school organisation and measure the characteristics and learning outcomes of a school so that it is able to set goals in improving its effectiveness (Teddlie & Reynolds, 2006).” (p.6-7)

Thank you for adding a line of the use quantitative research of ESD implementation, it could if you like, be argued for with more power as there is a real lack within the ESD research field of such studies.

The revised manuscript highlights the lack of empirical research on ESD in a more substantiated way.

“With a number of scholars addressing the lack of a systematic and empirical perspective in ESD research, recent years have steadily seen a shift towards a more empirical way of looking at ESD (Boeve-de Pauw et al., 2015; Bormann & Nikel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). Such an empirical and effectiveness focused perspective, in combination with the need for research on the school organisation, requires a framework that incorporates the characteristics of a school organisation linked to ESD effectiveness.” (p.7)

“Though ESD has been a research theme in recent decades, insufficient evidence has restricted claims on schools’ ESD effectiveness. However, recently, research has shifting towards the idea that the effects and impact of ESD should be measured in a more empirical way (Boeve-de Pauw et al., 2015; Bormann & Nickel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). The framework presented in this study supports this shift towards a more empirical way of examining at ESD.” (p.24)

In the title and subtitles you use “school”, but the text is about school organization. I would prefer that you rephrase school to school organization or defined ‘school ‘.

“It is therefore desirable to pay more attention to the school as a key facilitator for achieving educational effectiveness in relation to ESD.” In this sentence I think you mean school organization. “Please go through the text and make sure school and school organization are used correctly throughout the text.

As I understand your paper, school refers to all the levels that you mention, students, teachers and school organization, whilst the school organization is defined as (Page 2 line 54) “To investigate this topic, it is important to understand the school as an organization. In broad terms, the main task of a school organization, is to ensure the learning of its students. Within this organization, there are different levels: the student level, the classroom level and the organizational level. This study focuses on the third level: the school organizational level. The school organization includes all the processes and entities within the school that transcend the classroom, individual student and individual teacher levels and refer to all the organizational traits of the school. The main goal of this study is the identification of organizational characteristics of a school in relation to ESD effectiveness.”

In relation to the text above, it is confusing that you define school as an organization and define the organization to three levels and then say that only the organizational level is studied. It becomes tautology to me. Do you mean school consist of three levels and that you study the organizational level?

In order to use a consistent terminology throughout the text, we refer to ‘school organization’ in the revised manuscript.

The paragraph defining a school was revised in order to clarify the school organisational level as the focus of this study. We defined the school on the three levels, of which the organizational level is one. Throughout the text, we now consistently refer to the school organization.

“To investigate this topic, it is important to understand what is meant by a school. Within a school we define three different levels: the student level, the classroom level and the organisational level. This study focuses on the third level: the school organisational level. The school organisation includes all the processes and entities within the school that transcend the classroom, individual student and individual teacher levels and refers to all the organisational traits of the school. The main goal of this study is the identification of organisational characteristics of a school organization in relation to ESD effectiveness.” (p.3)

The identification of characteristics for ESD effective schools answer the RQ well although the building of a conceptual framework needs to be presented in a humbler way without so fixed

or normative ideas, I recommend to change phrases like:

“An effective school is one that allows students to reach outcomes that lay beyond what was to be expected considering the intake of the school (Mortimore, 1991). “

I do not fully agree with this definition. I interpret Mortimore as the effective school that reach beyond expected student outcomes is strongly related to improving school cultures. Effectiveness is a way to reach expected goals in the most effective way. Later in the text you define “ESD from the educational effectiveness perspective, one should not put the guiding educational ideal aside but rather measure the extent to which extent this ideal is met.”(Page 5, line 21). This sentence states that it is the expected outcome that is studied by effect studies and not what “is beyond” expected as you argue by Mortimore.

The Mortimore 1991- reference is made to an anthology, please be more precise to which part of this book that you use as a reference for the argument (since the main purpose of the whole book is to link effectiveness and improvement intentions in education). The highlighted sentence is important since it defines what is meant with an effective school, the main focus of the study. Please consider more references to make the argument of an effective school more reliable OR be clearer about hoe an effective school could reach ‘beyond ‘expected outcomes.

Firstly, concerning the rather normative presentation of the proposed framework: whilst we believe that goals as to where education (ESD, EE,...) should lead to are necessary, we agree that an exclusively normative perspective is not desirable and we do not seek to present our framework in such a way. Our intention was to develop a framework, based on the existing literature, and use this as a starting point for (our) future research and to foster the debate about school effectiveness in the field of ESD. Therefore, in order to present the framework in a more nuanced fashion, we made several changes:

- “The proposed framework could also provide practitioners with the necessary tools to achieve desired learning outcomes of ESD.”
- “Need for further validation of the proposed framework”
- “As it stands, the newly proposed framework for an ESD-effective school can provide a reference for school leaders, pedagogical counsellors and others working with and for ESD at the school level.”

Secondly, while reconsidering the way in which we referred to Mortimore in defining school effectiveness in the previous manuscript, we agree with the consulting editor that a more thorough explanation of what school effectiveness means is needed. The Mortimore definition can indeed be strictly interpreted and we want to avoid this. As Scheerens (2000) states, the concept of school effectiveness is indiscriminate to the way the actual performance of the school is measured. In our description on p. 5, line 21 of the previous manuscript, we do not define the ‘guiding educational ideal’ as an expected outcome but as a goal to strive for. Thus, with Mortimore’s definition implying a strict interpretation of what school effectiveness means, we follow the suggestion of the consulting editor to revise our description of an effective school. To address this issue, we made the necessary adjustments to the paragraph. Specifically, we made

a more nuanced description of school effectiveness, focussing on the goals of ESD and how school effectiveness can aid in striving towards these goals.

“When it comes to defining school effectiveness, it can be assumed that organizations strive towards certain goals and the degree to which school organizations are able to achieve these goals, gives an indication of the effectiveness of the school organization (Nikel & Lowe, 2010; Scheerens, 2011). Critics to school effectiveness see this “goal attainment” as a normative assumption as if there is only one preferred goal. But this does not have to be the case, as (Nikel & Lowe, 2010) state that “there is nothing within this understanding of ‘effective’ that demands that the actual nature of the aims or the process that has led to their selection become the focus” (p. 596). In order to measure the extent in which school organizations are able to achieve the goals, student outcomes play a key role (Frederick, 1987). The essence of school effectiveness research is thus looking for those (organisational) conditions that are facilitating output measures demonstrating the effectiveness of a school (Scheerens, 2016).” (p.4)

“Placing this in the context of ESD, an ESD-effective school organisation is, via a facilitating role, able to achieve the goals related to ESD. For example, sustainability competencies of the students might be facilitated via a classroom practices that are holistic, pluralistic and action-oriented (Sinakou et al., 2019). These practices can in turn be facilitated by given traits of the school organisation. An ESD-effective school organisation will be able to achieve their goals further extent compared to a not so effective school but otherwise similar school. Notably, these learning outcomes should consist of more than knowledge on sustainability issues; possible outcomes can also take competencies, attitudes and other traits into account.”(p.5.)

At book references, only the first author has the initials after the surname, the following before, for example:

Cohen, L., S. Martin, G. McCulloch, C. O'Sullivan, L. Manion, K. Morrison, & R. Bell. (2011). Data Analysis: Coding and Content Analysis. In Research Methods in Education (7 ed., pp. 559-573). Abingdon: Routledge.

At the instructions for authors page on the journals' website, we found the following link to reference guidelines: https://www.tandf.co.uk/journals/authors/style/reference/tf_APA.pdf

In this document the proposed reference format for books (APA 7th) is the following: **Author, A. A., Author, B. B., & Author, C. C. (yyyy). Title of the book: Subtitle. Publisher Name.**

We will check with the executive editor which reference style is to be used and amend the reference list if needed.

The figure text could be revised to “A model of the effective school “

Is the figure really a framework or can it be called a representation of or model of framework, unsure myself, please consider and discuss...

We follow the consulting editor's concerns and gave more thought labelling figure 1. The figure is indeed more a representation of the different characteristics within the framework. Moreover, since we do not want to make claims to how the different characteristics in the framework are exactly interrelated, we changed the figure text.

The revised in text reference to the figure: *"Figure 1 gives a representation of the different characteristics in our proposed framework for an ESD-effective school organisation"* (p.11)

The revised figure text: *"Figure 1: A representation of the identified school characteristics"*

Consulting Editor 2

From a substantive perspective, the authors attempted to integrate two bodies of related or overlapping areas of theory, research, and practice: EDS and school effectiveness. Given the relative recent emergence of ESD (ca. 1990s), it is an informative and useful exercise to review the relevance of broader and longer-standing areas of theory, research, and practice for ESD. Thus, I applaud the authors for this effort, whether it be seen from a cross-fertilization perspective or simply ESD attempting to take advantage of prior work in a related field.

From a methodological perspective, this does not fit the classification of qualitative, qualitative, or mixed, because it is a more purpose driven methodology. It might be classified as theoretical research, with the expressed purpose of developing a framework for EDS-effective schools. It is not easy to undertake this kind of an effort using disciplined research procedures, but I think the authors have done a reasonably good job articulating this in their goal(s), methods, and results.

On page two, they recognize that there are different levels of analysis and application inherent in this (p. 2: student, classroom, and organizational), although outside of the EU, it could be argued that there can be four or more (e.g., in public schooling in the U.S.: student, classroom, grade level team or subject area department, school, district, and state). As the authors point out, it would be "necessary to determine how the framework will hold its ground in different cultural settings," which would include attention to the number of extant and appropriate levels.

We are happy to read that the consulting editor supports the goals and methods of our study. The description as a purpose driven methodology or theoretical research is, in our opinion, fitting for this study. The feedback and critical thoughts of the consulting editor on our methodology are fair and aided us in further developing the manuscript. Also, the consulting editor familiarity with the US context allowed for a welcome perspective on our research. We would like to thank the consulting editor for the time and effort invested into reviewing our manuscript.

As to the scope of analysis and application of this study, the focus lies with school organisations on the level of formal education. We can understand that the different levels we have identified within the school could be interpreted differently by readers from other educational systems, e.g. the United States. However, with the sentence *"The school organisation includes all the*

processes and entities within the school that transcend the classroom, individual student and individual teacher levels and refers to all the organisational traits of the school.”, we demarcated the school organisational level. By doing so we intend that for example the grade level team or the subject area department also fit under the school organisational level. Moreover, the grade level team or the subject area department are actually striking examples for professional structures within the school. To avoid misapprehension, we included the latter two as examples in the description of the professional structures within the school.

“It is closely related to Hoy et al. (2013) description of ‘structure’ and practical examples can be found in for example grade level teams or subject area departments within the school organisation.” (p.14)

With the focus of our study on the school organisation, the district, state or federal policy level fall out of the intended scope of this study. Nevertheless, we acknowledge the influence these levels can have on the school organisation via for example the characteristic of supportive relations of the school or the context created on the district, state or national level. To make the distinction between the school organisational characteristics and the district, state or national context clearer, we changed the name of the contextual characteristics to ‘subcontextual characteristics’, indicating that these make up for the context within the school organisation and not the general context in which the school organisation is situated.

“Drawing on the literature review, we identified eight characteristics that are assumed to contribute to the ESD effectiveness of a school and incorporated them into a framework. On the subcontextual level, referring to the school organisation’s internal context and not the larger educational context (e.g. national level) in which the school as a whole is situated, two characteristics set the field for six central characteristics. On the subcontextual level, school resources and sustainable leadership were identified as important characteristics. The six characteristics on the central level are pluralistic communication, supportive relations, collective efficacy, adaptability, democratic decision making and shared vision.” (p.12)

Need: On p. 4, the authors cite “the lack of scientific evidence on schools’ influence on ESD” as the basis for this effort. It is not clear if the authors ran searches to identify any extensive or near-exhaustive review of the K-12 EDS research literature, whether those be narrative, vote count, or meta-analytic reviews. However, is also is unclear whether this claim about lack of scientific evidence is more of a statement about (a) the absence of such reviews, (b) the limited number of research studies that could be included in such a review (check JESD, as well as JEE and EER), (c) a descriptive or critical statement that reflects their impressions about the quality of existing research studies, and/or (d) more of a position statement by the authors about the need for greater attention to (studies of) the “effectiveness” of schools with ESD programming. With respect to (a), if there are no such reviews in the published or fugitive literature, this should be stated by the authors. With respect to (b), certainly it may well be beyond the scope of this study to undertake such a review, although it would be appropriate for the authors to note the relative size of this body of research. Thus, regardless of which of these may fit, I think it is incumbent on the authors to unpack this simple statement of need by more fully speaking to these four considerations.

The starting point and necessity for this study can indeed be found in the lack of research that focuses on and allows for empirical monitoring of school effectiveness towards ESD. Although this statement reflects our perception of the state of the art, it is based on the call for more research expressed by several other authors in the field of ESD. As indicated by the other consulting editor, there is indeed a lack of this type of research in the field of ESD. In the revised manuscript, we made this statement stronger by rewriting the paragraph and including more references of authors indicating the need for a more empirical way of researching ESD.

“With a number of scholars addressing the lack of a systematic and empirical perspective in ESD research, recent years have steadily seen a shift towards a more empirical way of looking at ESD (Boeve-de Pauw et al., 2015; Bormann & Nikel, 2017; Singer-Brodowski et al., 2019; Waltner et al., 2018). Such an empirical and effectiveness focused perspective, in combination with the need for research on the school organisation, requires a framework that incorporates the characteristics of a school organisation linked to ESD effectiveness.” (p.7)

As to the existing body of research involved in this topic prior to this study: the calls for more research by several authors in the field in combination with the limited number of sources identified using our selection criteria show that there is indeed a very limited number of studies that fit in with the scope of this study when the search and selection process was carried out. At the same time, we do acknowledge the vast body of research in the field of school effectiveness and educational management and the benefits this research base can provide for ESD.

Delimitations. The authors do state that they delimited this to only the published literature on school effectiveness since 2000, and eventually to 46 documents ... which met their selection criteria. What the authors did not pose as a delimitation of their study is the relative breadth and depth of this first attempt to develop a framework for ESD-effective schools. They identified and described six major elements (pp. 9-12 and final figure). There are steps their did not plan or intend to take, which are therefore delimitations of this study, even though several are identified as “next steps” (p. 22). It would be worth summarizing all of the major study delimitations in a prominent place, such as in the opening paragraph of the Conclusions and Implications section (pp. 21-22).

We agree with the consulting editor that it is needed to clearly state the delimitations inherent to the research design. In order to do so, we revised the paragraph concerning the further validation of the proposed framework and devoted more attention to the delimitations of the study. In the revised paragraph the limitations of the study received a more noticeable position.

“Limitations of the study and need for further validation of the proposed framework

Although this study achieved its goal by identifying the characteristics of a school organization argued to influence ESD effectiveness, it is also relevant to note the confinements and limitations of the study and research design.

“An important delimitation to this study, is the fact that it mainly focused on the conceptual development of the framework. A way forward from this delimitation, could be found in checking

how schools that are already actively engaged in ESD see the different characteristics of the ESD-effective school organization. By adding an empirical layer to the framework, its validity could be further substantiated. The focus of this study on the identification of the different characteristics makes that the specific relationships between the different identified characteristics was not the main subject of investigation. Nevertheless, there is reason to believe that the different characteristics are interacting and interfering with each other in a more dynamic manner than is shown in Figure 1. Further empirical and quantitative research is needed to unravel these relationships. A better understanding of the characteristics' dynamic relations could greatly affect the ESD effectiveness of a school. Another delimitation can be found in the fact that the search and selection criteria were focused on formal education. Other (educational) areas might provide valuable insights in ESD-effectiveness of school organizations, but these fell outside of the scope of the current study. Furthermore, since most of the studies were situated in a Western European and Anglo-Saxon context, further research is also necessary to determine how this new framework will hold its ground in a different cultural setting. Comparing the framework to literature that has featured different contexts can achieve this, but we argue that empirical validation in a different cultural setting will provide deeper insight into how generalizable the framework is. . ." (p.25)

Limitations. The authors attempt to reassure readers that "this study was conducted in rigorous way whereby all necessary steps to ensure its reliability and validity were taken" (p. 22). This leaves the reader with the impression that no stone was left unturned. It is rare that any study, regardless of paradigm and/or purpose, encountered or experienced no such limitations. For example, in the first and second steps (pp. 7-8), did the authors identify sources that appeared to fit study sources, but find that they were unable to locate and access a print or electronic copy for review purposes? Similarly, under "Methods of Analysis" (pp. 8-9), did two or more 'coders' read and review each document, then compare notes, and eventually discuss and reconcile differences in perspective for each source? Further, during the categorization of text fragments, was this done strictly using key words and phrases, was there some manner of interpretation involved, or was it a combination of these procedures? If interpretation was involved, the same question above applies: was this undertaken independently so that results could be compared and discussed, or was this done as a team? If there were not multiple readers/coders and if categorization was done jointly, what steps did the authors take to account for differences in perspective? As with study delimitations, for the sake of transparency, I think it important for the authors to acknowledge any study limitations, and to summarize them in a prominent place, such as in the second paragraph of the Conclusions and Implications section.

We agree with the consulting editor that more transparency on how the sources were found and on how the analysis was conducted is in order.

For when looking for sources, we did not come across major difficulties locating or accessing copies, therefore we did not report this in the manuscript.

In the revised manuscript we devoted more attention to this in the methodology section and gave a more detailed description of how the analysis was conducted and how the different

authors were involved in this process. It is to be noted that the factors identified by Sammons et al. (1995) guided this categorisation and thus provided guidance in the analysis of the sources.

“After the screening of the abstracts, all of the selected studies were thoroughly read by the first author. During this first read, different school organisational aspects related to ESD-effectiveness that came forth in the literature were highlighted and categorised with similar aspects. Initially, the factors identified by Sammons et al. (1995) guided this process of categorising. Of these 11 factors, the following eight factors could be linked to the school organisation and were therefore of great value when categorising the different aspects found in the literature: professional leadership, a shared vision and goals, high expectations, positive reinforcement, monitoring progress, pupil rights and responsibilities, home-school partnership and a learning organisation. Additionally, via a process of reading, rereading and critical reflection by all authors, a table containing 16 initial categories was developed (Cohen et al., 2011a).” (p.10)

“The different text fragments taken from the sources were placed under the best fitting category. If needed, one text fragment was attributed to two or more categories. This categorisation of the text fragments initially took place on the basis of the wording of the text fragment, taking into account synonyms, field-specific vocabulary and the context and origin of the source consulted.” (p.11)

“By analysing the text fragments attributed to different categories, similar or related categories were combined. Throughout this process, one researcher did the initial coding, the other researchers provided critical feedback. The quality of the coding work was evaluated by the entire team of researchers during various consultation moments. This process resulted in the identification of eight characteristics of an ESD-effective school organisation.” (p.11)

In the concluding section we provided more information concerning the limitations of the methodology.

“While steps were taken to conduct the study in a rigorous way, ensuring its reliability and validity to the best of our ability, there is still a need for further validation of the framework. Firstly, as it is implausible to guarantee that all possible relevant sources were retrieved, it remains possible that during the search, we failed to identify other relevant sources. Secondly, as the categorization of the text fragments involved some level of interpretation, researcher bias might have an influence on this process. By actively looking for critical feedback and continuous examination of our analyses, we strived to limit this.”(p. 26)

In describing the 46 sources that served as their “data set,” the authors are not consistent in how they identify those sources. In some instances, they are identified as “sources” and in others they are referred to as “studies.” At very least, this inconsistency needs to be addressed. Beyond this, although I accept the fact that devotees of different research paradigms will differ on the question of “what counts as research?”, a cursory review of titles in Annex 1 would suggest that not all of those sources could or should be referred to as studies. Given this, I think the safer path would be refer to these 46 consistently as sources throughout the manuscript.

As is indeed the case, our search and selection criteria allowed for other sources than just journal articles. Therefore, we consistently refer to 'sources' in the revised manuscript.

A prominent concern has to do with the authors' description of the need for further validation of the framework" (pp. 22-23). There are a number of ways of ground-truthing a proposed framework. One would be to solicit nominations (from credible sources) of a diverse sample of "K-12 schools with exemplary and highly effective EDS programs" and then compare the practices in those schools to this framework: to what extent do those schools exhibit those characteristics, and are there any additional characteristics common to those should which are not accounted for in this framework. A second way would be to select K-12 studies of schools with ESD programming in an attempt to identify schools which, on the basis of research findings, appear to be effective, and then run a similar comparison to the one described above. A third way would be to develop a rubric based on the description of each characteristic, and apply that rubric to a wider range of K-12 schools with ESD programming, (possibly gather additional evidence of each school's effectiveness). There are two iterative questions inherent in this: (1) can the rubric and these effectiveness characteristics differentiate between schools with a high and low degree of ESD effectiveness?, and (2) does that classification of schools resonated with insiders' and observers' perceptions of the relative effectiveness of those schools? None of this was done as part the "framework development" stage of this initiative, which can be construed either a study delimitation or a study limitation. Attention to all of this is crucial as part of "further validation," particularly if some schools are to be identified, awarded, and/or rewarded based on the application of these framework characteristics and/or support policy decisions by administrators at the school, district, or state levels.

The need for further validation of the framework is now linked to the delimitations of the present study:

"An important delimitation to this study, is the fact that it mainly focused on the conceptual development of the framework. A way forward from this delimitation, could be found in checking how schools that are already actively engaged in ESD see the different characteristics of the ESD-effective school organization. By adding an empirical layer to the framework, its validity could be further substantiated. The focus of this study on the identification of the different characteristics makes that the specific relationships between the different identified characteristics was not the main subject of investigation. Nevertheless, there is reason to believe that the different characteristics are interacting and interfering with each other in a more dynamic manner than is shown in Figure 1. Further empirical and quantitative research is needed to unravel these relationships. A better understanding of the characteristics' dynamic relations could greatly affect the ESD effectiveness of a school." (p.25)

As a matter of fact, for the reviewers' information, our follow-up study (which was recently submitted for review) consisted of a qualitative inquiry about the conceptual framework. For this follow-up study we interviewed 19 teachers and school leaders about their conceptions of ESD-effective schools and compared this to the conceptual framework. All of the respondents were experienced staff members of schools that were identified by ECO-schools Flanders as being

highly active when it comes to ESD. The findings of this follow-up study will be reported in a separate contribution which is, as said, currently under review for publication.

Lastly, by identifying those six school effectiveness criteria for ESD, the authors avoided a very challenging question. By the authors' own admission, those six characteristics are not matched to classroom strategies and student-level learning outcomes. This raises additional questions: (a) Would it be possible for a school with ESD programming to be identified as effective, perhaps even highly effective, on the basis of these six characteristics, but for learning outcomes to be relatively weak in comparison?; and (b) Would it be possible for a school with ESD programming to be identified as effective, perhaps even highly effective, on the basis of these six characteristics, but for classroom practices to be very inconsistent from one teacher to another? In other words, although the authors delimited this work to ESD effective schools (i.e., the school level), are school level characteristics sufficient to determine whether or not a school is effective, or are criteria at all levels needed to do so?

These questions raised by the consulting editor are valid and are interesting topics for thought. We believe that operationalization of the framework and quantitative measurement of the school characteristics is in order to adequately provide an answer. In our ongoing (and until now unpublished) research we look for answers to these questions by operationalizing the framework and developing a questionnaire that can quantitatively map the characteristics identified in this study. Subsequently we will attempt to link these to the teacher/classroom level (e.g. teacher conceptions concerning ESD or classroom practices) and student outcomes (e.g. students' action competence). As the questions are also linking to some of the delimitations of our study, we incorporated them in the discussion of the revised manuscript. We would like to inform the readership that we are planning and conducting follow-up studies that are looking into these topics. Nevertheless, as indicated above, the present study, with its theoretical focus, is limited to the conceptual development of the framework.

(a) Would it be possible for a school with ESD programming to be identified as effective, perhaps even highly effective, on the basis of these six characteristics, but for learning outcomes to be relatively weak in comparison?

If this would be the case, then one could argue that the identified characteristics are not fit to identify ESD effectiveness within the school. Further empirical research linking the identified characteristics with outcomes of ESD is therefore needed. In the discussion of the revised manuscript, we highlighted the need for further research linking the identified characteristics to learning outcomes.

"The framework presented in this study provides a basis for school effectiveness research in the field of ESD. Since school effectiveness research has shown that schools play an important part in determining learning outcomes (Scheerens, 1990), a framework such as presented in this study offers valuable insight into school ESD effectiveness. We hypothesise that schools that perform well on the different characteristics will be more effective when it comes to ESD. Nevertheless, future research, linking the school organisational characteristics to educational outcomes remains needed to gain insight in how the characteristics facilitate those outcomes." (p. 26)

(b) Would it be possible for a school with ESD programming to be identified as effective, perhaps even highly effective, on the basis of these six characteristics, but for classroom practices to be very inconsistent from one teacher to another? In other words, although the authors delimited this work to ESD effective schools (i.e., the school level), are school level characteristics sufficient to determine whether or not a school is effective, or are criteria at all levels needed to do so?

Looking at evidence from school effectiveness research, we argue that the school organisation will facilitate school effectiveness towards ESD. This is also our argumentation in the current study:

“Moreover, there is considerable documentation in school effectiveness literature on the important facilitating role of the school organisation (Creemers & Kyriakides, 2008; Scheerens, 1990; Teddlie & Reynolds, 2006)” (p.3)

As data in school effectiveness research is nested, it is reasonable to believe that data from a specific school will be similar. At the same time, exceptions are always possible and a case wherein a specific teacher in a specific classroom has a very different perspective on ESD in comparison to the average teacher in that school organisation is always a possibility.

In our hypothesis, the school organisation will be one of the factors facilitating student outcomes related to ESD. Other features on other levels, such as pupil traits, classroom practices, home situation, etc. will also play their part. We would like to refer to the multidimensional model of school effectiveness, by Creemers and Kyriakides (2008), which gives a good overview of how different levels influence educational effectiveness.

“The identification and incorporation of the different characteristics of the ESD-effective school organisation paves the path for further research on ESD effectiveness and the key role of a school, as an organisation, in this. By adding the perspective of the school as an organisation to the ESD field, the important catalyst function of the school towards ESD effectiveness is highlighted. However, as the dynamic model of educational effectiveness by Creemers and Kyriakides (2008) shows, other levels are also of importance in determining educational outcomes and effectiveness and must be taken into account in future research.” (p. 26)