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Diversity in views as a resource for learning? Student perspectives on the interconnectedness of sustainable development dimensions

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ABSTRACT

This study investigates the different arguments put forward by Swedish upper secondary students on the interconnectedness of the environmental, social and economic dimensions of sustainable development (SD). The aim is to study the diversity in views among students in order to find out whether this can be used as a resource in a holistic and pluralistic approach to ESD. The study design was based on a two-step process in which the first step was to identify students representing four different, broadly coherent, views on the interconnections between sustainability dimensions, with a specific focus on the role of the economy in SD. Thereafter, focus group interviews were undertaken with the selected groups of students representing the four different views. The findings indicate a diversity of arguments in discussions of SD and the potential that this plurality brings for perspective shifting. Moreover, the economic dimension appears as central to promoting discussions that aim to examine the overall interconnectedness of sustainability dimensions. A further conclusion is that omitting the economic dimension in ESD risks excluding the core of students' ideas of how SD may be realized.

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student views

Introduction

A holistic approach that incorporates environmental, social and economic factors into the teaching of sustainability has long been emphasized as essential to facilitate students' understanding of the complexity involved in various sustainability issues (UNESCO 2006, 2014, 2018; Gough 2002; Sterling 2010; Feng 2012). The importance of addressing not only the discrete environmental, social and economic dimensions, but also the interconnectedness and tensions between them has been asserted as important (Knutsson 2013; Öhman 2014).

Within the research field of ESD, critical interrogations of the meanings of SD have been called for (see e.g. Knutsson 2013; Boström et al. 2018), based on the view that SD is a contradictory concept that includes inherent tensions. It is urged that students be given opportunities to encounter not only visionary perspectives on SD, but also the conflicts that complicate solutions in reality (Herremans and Reid 2002; Öhman and Öhman 2012; Wals 2015). Wals (2011) emphasizes the potential of social learning, which implies the exchange of different views, perspectives and ideas among learners. In order to teach in a student-centered pluralistic way, it might be a good idea to first explore the range of views and possible tensions that may exist in the classroom. This is a prerequisite before planning for social learning (Wals 2011,

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2015), and a research gap that this study intends to fill. More particularly, the diversity of views on the environmental, social and economic dimensions of SD and their interconnectedness is investigated among upper secondary students (grade 12) in Sweden.

Research from the fields of sustainability science (Schoolman et al. 2012) and sustainability education research (Manni, Sporre, and Ottander 2013) indicates that economic perspectives are central for establishing interconnections between the other dimensions of SD. However, there are studies indicating that the economic dimension is sometimes left out in ESD, which implies a distinct disadvantage if holistic understanding and critical analysis is to be promoted (Dyment, Hill, and Emery 2015). Indeed, studies have indicated a deep uncertainty among teachers concerning how the economic perspective of SD could be incorporated in teaching (Borg et al. 2014; Stagell et al. 2014). We suggest that a possible way forward could be to teach in a pluralistic and learner-centered way. Thus, the aim of this study is to contribute knowledge on the potential of incorporating students' diverse views and arguments in ESD to promote a holistic and complex understanding and critical analysis among them.

In a previous quantitative generalizable study, we identified four distinctively different belief sets among grade 12 students regarding the interconnections between economic objectives and SD. More specifically, students' views on the role of economic growth and economic development in SD were investigated, and each of the four belief-groups was characterized by a specific way of viewing the interconnections between economic perspectives and SD (Berglund and Gericke 2018). In this study, we move on to investigate the diversity of views in depth by focusing on students' motivational arguments for the different views present within these four groups. Based on the findings, we discuss the implications for a learner-centered holistic and pluralistic approach in ESD.

Background

This section initially describes the different models that represent the concept of SD and different positions on SD, as identified in previous literature. We then focus on the views of teachers and students on SD and its environmental, social and economic dimensions, and end with an in-depth look at the holistic perspective in SD and how it may be approached in ESD in order to strengthen students' abilities to deal with complex sustainability issues.

Intellectual positions on sustainable development

Over the years, intellectual positions have been represented in different models to represent conceptualizations of SD: several of these illustrate the concept as consisting of environmental, social and economic dimensions, based on the notion that these dimensions need to be considered in any decisions related to SD. An often applied representation of the SD concept is the Venn diagram, which illustrates SD as three interconnected and overlapping rings, representing the environmental, social and economic dimensions (Figure 1a). This model has its advantages, but has also been criticized; for example, the representation of the rings as equal in size may imply that the dimensions should be weighted equally; another argument against it is that it may allow trade-offs between the three dimensions, i.e. that a loss in one dimension can be justified by a gain in another, often in favor of economic profit but costly for the environment and society (Giddings, Hopwood, and O'Brien 2002). This relates to the idea of weak and strong sustainability (Daly, Jacobs, and Skolimowski 1995; Neumayer 2003). According to the notion of weak sustainability, human and built capital can substitute for natural capital: it is the total amount of capital that is important and not the form it takes. Strong sustainability views human and natural capital as non-substitutable (Daly, Jacobs, and Skolimowski 1995; Neumayer 2003).

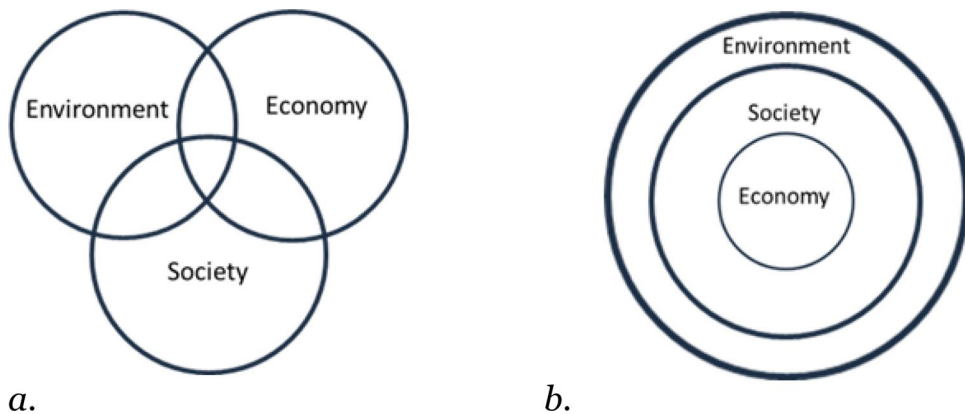


Figure 1. a. Venn diagram representation of SD by Berglund, T. CC BY-SA 3.0 (adapted from *Sustainable development* by Dréo 2019), and 1. b. Nested representation of SD by Berglund, T. CC BY-SA 3.0 (adapted from *Nested sustainability-v2.gif* by lacchus 2009).

Over time, nested models have also been developed, with the purpose of representing the interrelationships between the dimensions of SD more accurately (Figure 1b). Nested models place the economy within the boundaries of society, and society within the boundaries of the environment (e.g. Giddings, Hopwood, and O'Brien 2002; Costanza et al. 2013). The economy is placed at the center, as it is part of, and cannot exist without, society. The environment is the only one of the three that can exist without the others, and thus the environment constitutes the outermost ring – all human activities must take place within this in order to be sustainable over time.

Recent models focus on the environmental and social aspects that could sustain planetary and human wellbeing over time. The doughnut conceptualization by Raworth (2017) advocates a rethinking of the economy that promotes the regenerative and distributive social and environmental goals of sustainability. Historically, however, accelerating economic activities have caused the drastic depletion of natural resources (Costanza et al. 2014; Steffen et al. 2015). In wealthier countries, overconsumption and affluence drive excess use of energy and fuel, and in developing countries, soil erosion and incessant deforestation result from the punishingly hard conditions of life endured by the poor (Gillis 2005). The human imprint on the earth originates mostly from OECD countries, which despite embracing about one-fifth of the world's people account for three-quarters of global Gross Domestic Product (GDP) (Steffen et al. 2015, p. 91). Economic growth has resulted in fewer people living in extreme poverty (Olinto et al. 2013), yet huge inequalities have accelerated between as well as within many countries (Ahmed 2010), and a disproportionately small part of global growth has actually contributed to reduce poverty (Woodward and Simms 2006), implying that increased human wellbeing does not automatically follow from economic growth. The need to decouple economic growth from resource use is nowadays addressed in Sustainable Development Goals, as are the inequalities between countries and between genders (goal 12 and goal 8) (United Nations 2019).

The role of the economy in SD has been hotly debated for decades. Some consider unbounded economic *growth* possible within the limits of the planet's environment, while others consider continuous economic growth to be wholly incompatible with SD. If or how the process of economic *development* can occur in a sustainable way is a subject of discussion, with new ways of thinking suggested by many. Economic growth is a strictly quantitative measure that refers to growth in the productive output of the economy, commonly measured in terms of GDP. GDP has been used as a measure of a country's national success for many years; however, it says nothing about the state of the environment, nor about the extent of social inequality in the population (Costanza et al. 2014). The concept of economic development differs from economic

growth as it includes broader quantitative and qualitative indicators that embrace the technical and institutional arrangements by which output is produced and distributed (Barbier 1987, p. 101). Viewed retrospectively, economic development, economic growth and environmental degradation and depletion of resources have occurred as parallel processes in various places across the globe (Steffen et al. 2015).

There is a diversity of intellectual positions on SD and its operationalization, and there are also different ways of perceiving the interconnectedness between environmental, social and economic dimensions in sustainability-related contexts. Some regard the concept of SD as an oxymoron (e.g. Brown 2015) or an ethical paradox (Jabareen 2008), an assertion based on the apprehension that 'sustainable' and 'development' are impossible goals to unify. In this view, the process of development, which generally refers to changes in economic conditions, is dependent on profound environmental modifications that throughout human history so far have not occurred in a sustainable way. Others regard SD as an approach that implies no choice need be made between environmental and developmental goals: instead, the challenge is to integrate them into effective management and planning regimes (Jabareen 2008). Just as there are different opinions on what SD is, so there are also different opinions on how SD can or should be accomplished: Hopwood, Mellor, and O'Brien (2005) describe three thought categories of *status quo*, *reform* and *transformation*. According to the *status quo* view, changes are needed but can be made within current ways of organizing society. Reformers acknowledge problems but argue that the necessary changes will happen with time, and without fundamental alterations being made to current systems. (In this view, technological development has an important role.) Transformers, in contrast, advocate fundamental changes to current systems, aiming to reduce the exploitation of people and/or nature (*ibid.*).

Student' views on the economic dimension of sustainable development

In the above-mentioned previous study, we investigated how upper secondary students in Sweden view the interconnectedness of economic objectives and SD (Berglund and Gericke 2018). We focused specifically on the concepts of economic growth and economic development, and students' views of their interconnectedness to SD. We used survey responses from 638 students in grade 12 (age 18–19) to identify patterns of views. Four different categories of beliefs were ultimately identified, briefly described here:

The *un-differentiating positive* category: The largest group, representing 57 per cent of the sample. These students considered both economic growth and economic development to be necessary for SD. Economic growth is not regarded as a threat in any way to SD.

The *nuanced ambivalent* category: This group, representing 30 per cent of the sample, indicated a tendency to consider economic growth to be unnecessary for SD, whereas economic development was generally considered necessary. Economic growth was to some extent considered to be a threat to SD.

The *two-way convinced* category: This group, constituting 5 per cent of the sample, viewed economic growth as both necessary *and* a threat to SD. Economic development was considered to be necessary by the vast majority of students in this group.

The *critical* category: All students in this group, 8 per cent of the sample, considered economic growth and economic development to be unnecessary for SD, disagreeing most with the proposition that economic growth was necessary for SD. The majority of students considered economic growth to be a threat to SD, although their precise responses varied somewhat on this issue.

In a similar way, a study from Canada investigated public views on economic growth and the environment (Tomaselli et al. 2019). In this case, three groups of opinions were identified, one displaying optimistic views on economic growth, seeing technology and human ingenuity

as solutions to environmental challenges. The second group displayed vague positions on economic growth and the environment, while the third had strong ecological attitudes and disagreed with the notion of limitless economic growth, exhibiting a marked disbelief in technology and human ingenuity as solutions.

These four categories of beliefs constitute a point of departure for the present study. We aim for a deeper understanding of how the students representing these beliefs view SD, and what arguments they use to justify their view on the interconnectedness between economic objectives and SD. Previous studies have indicated a diversity of views connected to the perception of the economic dimension in SD (Berglund, Gericke, and Chang Rundgren 2014; Berglund and Gericke 2016). However, the economic dimension is sometimes missing from ESD (Dyment, Hill, and Emery 2015), and indeterminacy prevails among teachers on how to include it in teaching (Borg et al. 2014), which limits the possibilities of challenging the status quo of current systems. To make social learning possible, in which the students' own views, perspectives and ideas meet those of others, it is important to accurately identify the student perspective. The present study investigates the different beliefs as identified in Berglund and Gericke (2018), by focusing on the motivational arguments that the students representing the four beliefs use.

Holism and interconnectedness in ESD

A holistic approach in ESD is advocated in order to promote students' understanding of the complexity of SD issues (e.g. UNESCO 2014; Wals 2015; Boeve-de Pauw et al. 2015). The holistic approach implies that all three of the environmental, social and economic perspectives should be considered when dealing with sustainability issues. The nature of SD and its underpinning dimensions is interconnected and dynamic (Sterling 2010; Öhman 2014). Berglund and Gericke (2016) raise a similar argument in their investigation of separated and integrated approaches to the environmental, social and economic dimensions of SD. In their study, students' perspectives and priorities differed depending on if the students were asked to consider environmental, social and economic factors in relation to each other or in isolation. These discussions point to the difference between encountering environmental, social and economic aspects in the context of different subjects without any interconnections between them, and encountering them in a context where they are dealt with in relation to each other. Wals (2015, p. 9) argues that *'...despite the inevitable confusion, contestation and complexity that surround sustainability, there is quite a body of robust knowledge on each of these dimensions and, increasingly, how they are nested and how they influence each other. There is a lot we do know...'* Thus, an increased focus on the interconnectedness of SD dimensions seems to be needed in the teaching and learning of sustainability issues (Kagawa 2007; Borg et al. 2012; Ignell, Davies, and Lundholm 2013), especially if the transformative goals of ESD are to be reached.

The perspectives of teachers and students concerning the three-dimensional nature of SD have been investigated in previous research. A large-scale study from Sweden showed that upper secondary teachers perceive uncertainties in their own conceptual understanding of SD and tend to center on the environmental aspects (Borg et al. 2014). In fact, a substantial proportion of the teachers did not acknowledge all three dimensions and indicated uncertainties concerning the role of social and economic factors, leading Borg and colleagues to question the abilities of subject teachers to promote a holistic perspective on SD. Subject-bound differences and emphasis on the environmental dimension have also been identified among secondary teachers in Sweden, where science teachers had the strongest environmental focus among the groups being studied (Sund and Gericke 2020). Another study by Borg et al. (2012) found subject-bound differences in teachers' teaching practices: science teachers generally used teacher-centered approaches, focusing on the transmission of ecological scientific facts and showing low integration with other subjects. Social science teachers were more likely to teach

in a pluralistic way, utilizing different views and values to constitute a central part of work in the classroom.

The emphasis on the environmental dimension in the conceptual understanding of SD is also found among students in different international contexts (Kagawa 2007; Zeegers and Clark 2014). Kagawa (2007) found a lack of interconnectedness in British students' perceptions of SD in the form of weak linkages between environmental concerns and social, economic, cultural and inter-/intra-generational dimensions. Similar findings were identified in Australia by Wilks and Harris (2016). A study by Sternäng and Lundholm (2012) investigated how Chinese students reasoned about tensions between the economic and environmental dimensions of SD, and their findings indicated that economic priorities dominated students' decision-making. In a study from Sweden, students were asked to prioritize between environmental, social and economic arguments within a number of sustainability-related contexts (Berglund and Gericke 2016): the findings showed that students prioritized economic reasons if these were related to the personal level, and if they were not then environmental reasons were considered most important. Ignell, Davies, and Lundholm (2017) investigated students' understanding of how environmental issues and pricing interrelate. Their results indicated a need to clarify the interconnections between the economic system and the environment.

Based on previous research then, there seems to be a need to develop a more integrated view on the environmental, social and economic aspects of SD in the perspectives of both teachers and students. Öhman and Öhman (2012) argue that the concept of SD invites harmonious interpretations between environmental, social and economic dimensions if tensions are not explicitly addressed in the tasks that students are supposed to work through. Critical exploration and analysis of different perspectives constitutes an important component in ESD, as it may stimulate learning about the complexities involved in sustainability issues and promote democratic processes as a way to deal with the challenges posed (Öhman 2004).

Critical exploration of the diversity of viewpoints is suggested as one way to identify and discuss conditions and barriers for structural change (Wals 2015; Boström et al. 2018). To exchange different views, perspectives, ideas and values may stimulate an appreciation of the complexity involved in sustainability issues, and such an approach may contribute to developing critical thinking and holistic understanding among students. The role of dissonance and diversity in social learning processes has been discussed by Wals (2011; 2015), who argues that diversity can be a resource in ESD if learning takes place on the boundaries of people's comfort zones but not outside of them. In this study, we aim to identify how the diversity of views takes shape among students.

Aim of the study

This study aims to contribute to our stock of knowledge about the diversity in upper secondary students' views of the interconnectedness of the dimensions of SD and the possible potential this diversity brings for ESD, by investigating qualitatively different ways of viewing economic objectives in relation to SD and its environmental, social and economic interconnections.

We build on a previous article in which we identified four categories of beliefs among students of how economic objectives and SD are interconnected. The present study focuses on students' motivational arguments for these different beliefs.

The research questions are:

- What interconnections do students representing the four different belief categories express concerning economic objectives and SD?
- What interconnections between the environmental, social and economic dimensions of SD do they express?

Method

This study is based on focus group interviews with upper secondary students representing the four groups of beliefs on the interconnectedness between economic growth, economic development and SD. This method is used to deepen the findings from the previous survey; this approach has been described as a way to amplify and understand quantitative data (Robson 2011). Group interviews – rather than one-to-one encounters – were deemed preferable in order to make it easier for the participants to elaborate their ideas and thoughts, since they are able to reply to comments from others.

The collection of data followed a two-step procedure. The first step was to identify groups of students representing the four categories of beliefs that we identified in the previous quantitative study; the second step was to perform the group interviews with these students. The verbal interviews were transcribed, and a theory-driven thematic analysis was then performed to answer the research questions posed (see Braun and Clarke 2006).

Context and sample

The Swedish curriculum for upper secondary school highlights the aim that SD should permeate teaching in all subjects (The Swedish National Agency for Education 2013). SD is mentioned in the syllabi of a number of different subjects and is thus relevant to far more than the natural science subjects. In addition, it is an objective in many degree targets of the 18 national programs in upper secondary school (The Swedish National Agency for Education 2019).

Two upper secondary schools were contacted, one offering the science program and one offering the social science program; both programs are preparatory for tertiary studies. Upper secondary education in Sweden includes a number of core curricula (English, history, sports/health, mathematics, general science, religion, social science, Swedish/Swedish as second language) together with program-specific curricula, profile curricula and curricula of choice (The Swedish National Agency for Education 2013). In general, science program students do not study general science, but instead they take courses in specific science subjects.

The classes of interest comprised students in grade 12, 18–19 years of age. After the initial approval from the school leader, the teachers working with the classes were contacted. After the teachers' approval was secured, the researcher visited three classes per school to inform the students about the purpose of the study and the two-step process. The students completed a questionnaire about SD, which included the questions about connections between the economy and SD (see below, and also Berglund and Gericke 2018). When the researcher had identified students representing the four categories of beliefs, their teachers were contacted to help arrange an invitation to the selected students to participate in the study. With assistance from the teachers, 29 students were invited; in total, 19 students took part in the focus group interviews. A few students who had accepted were unavailable at the actual time of the interview, e.g. they were absent from school on the scheduled day or had other school tasks to attend to. The students in each group all knew each other, since they were part of the same class in school. The number of interviewees in each group is presented in Table 1.

Collection of data

Two sets of data were used to answer the research questions. The first dataset is composed of written responses that the students were asked to provide at the start of the interviews. Their written responses correspond to the first research question. The three statements that the students were asked to write motivational arguments for were their responses to the following survey items:

Table 1. Overview of the focus groups.

	Interview group	Gender	Program
Belief 1: <i>Un-different. positive</i>	Group1	1F, 1M	Soc Sci
	Group2	3F, 1M	Sci
Belief 2: <i>Nuanced ambivalent</i>	Group1	2F, 1M	Sci
	Group2	1F, 1M	Soc Sci
Belief 3: <i>Two-way convinced</i>	Group1	(1F ¹), 1M	Soc Sci
	Group2	1F, 1M	Sci
Belief 4: <i>Critical</i>	Group1	2F	Soc Sci
	Group2	1F, 1N/A	Sci
Total		18 (+1)	

Abbreviations: F=Female, M=Male, Soc Sci=Social science program, Sci=Science program.

¹When double-checking the survey responses it transpired that only one student in Group 1 of Belief 3 fully represented the category 3; only the utterances from the student *fully* representing Belief 3 are used in this study.

Q1: I think that economic growth is necessary for sustainable development

Q2: I think that economic growth is a threat to sustainable development

Q3: Economic development is necessary for sustainable development

The second dataset was used for answering the first and second research questions; this dataset consists of the transcribed interviews.

A semi-structured interview guide was prepared and thereafter piloted twice. The interview guide was developed in line with ideas of the phenomenographical interview approach, which means that the focus is on how the topic or theme appears to, or is experienced by, the person(s) being interviewed; the conversation develops to large extent from the interviewees' responses (Bruce 1994; Marton 1988). Due to time constraints and other practical reasons it was not possible to find representatives from the actual population the study was aimed at. The first pilot study included an interview with one adult not concerned with the field of SD/ESD; the second pilot study was an interview with three university students taking a course in environmental conservation. The purpose of the pilot interviews was to check that the questions were understood by the students, and targeted the topics and content the researchers were aiming for. The level of the questions was determined as appropriate by both authors (who have substantial teaching experience in upper secondary school). The individuals who participated in the two pilot interviews were considered to be less familiar with SD and ESD than the students that the interviews were actually targeting, and therefore, it was determined that this would not affect the results of the pilot study in any negative way. The interview guide and interviews consisted of three parts: a) the meaning of SD; b) aspects/dimensions of SD and their interconnections; and c) the separate concepts of economic growth and economic development, and their possible interconnectedness to SD. The results of this study are based on analysis of the first and last parts of the interview (a and c). The interview guide is found in Appendix 1.

According to Robson (2011), using focus groups allows for exploration of collective phenomena in terms of the nature and range of views among the participants. This approach was clearly advantageous as the participants seemed to enjoy taking part and were encouraged to give comments in their own words, stimulated by comments and thoughts from the others (Robson 2011). The students were told that they were put together into groups based on a similar pattern of responses to the survey items. The reason for this was to stimulate in depth-arguments on the specific belief and perspective that the group represented. Disadvantages that may occur in large group interviews – for example that some participants do not contribute to the discussion – did not occur in this case as the groups were small enough for all participants to take substantial part.

The interviews, two per belief and eight in total, lasted for 40–60min depending on how much the interviewees' had to say and on how many took part in each interview. At the start

of the interview, the researcher emphasized that there are different ways of viewing issues related to sustainability and that the purpose was not to look for the 'right' answers, but rather to discover more about how the students thought about the issues. After all eight interviews were completed the audio recordings were transcribed into the text documents which were used in the thematic analysis. When the analysis was finished, the excerpts were translated from Swedish into English.

Ethical guidelines were followed as recommended by The Swedish Research Council (2017). The students were informed about the two-step process by the first author, who first visited the classes to conduct the questionnaire, and second, for informing the selected groups of students about the interviews and setting up a time for them with those who were willing to participate. Since all students were 18 years or older, they could decide for themselves about whether they wanted to participate or not. About one week in advance of the researcher's second visit to the schools, a letter was sent to the selected groups of students that contained information about the study and its purpose. Furthermore, they were informed that their participation was voluntary and could be withdrawn at any point during the data collection process. Written consents were collected before the interviews started. The students were not informed in advance about any details on how the groups were put together, as it was regarded that this could have a potential impact on their responses. Instead, the researcher explained this after the interview. The participants were thereafter asked for renewed permission to use their answers.

Data analysis

The interview data were analyzed using a broad approach to thematic analysis as described by Braun and Clarke (2006); a thematic analysis is based on more than a single word or phrase as the unit of analysis (*ibid.*). After transcription of the verbal data, the data was read through a number of times in order to understand the depth and breadth of the data. Initial codes were then created which were focused around two pre-defined themes and thus, the thematic analysis approach was theory-driven. The themes concerned the environmental, social and economic dimensions of SD, which together constituted the main theme of DIMENSIONS. The sub-theme of INTERCONNECTEDNESS concerned the way the students reasoned about aspects of the three dimensions in relation to each other – thus establishing interconnections – or one at a time. This theme was based on the perspective of separated and integrated approaches to the SD dimensions as described by Berglund and Gericke (2016). When the students talked about aspects of different dimensions separately, treating them one at a time but without relating them to each other, this was coded as SEP (separated). If the students talked about aspects from different dimensions in relation to one another, this was coded as INTEG (integrated). An example of the coding procedure for the two themes of DIMENSIONS and INTERCONNECTEDNESS follows. The context of the discussion is resource waste. Interconnections are indicated in bold.

On the other hand, since people get a better and better life (Code: SOC), which is good, but it **leads to** more and more consumption (Code: ECO) (SOC-ECO-INTEG)

...they absolutely do not have the same opportunities or rights that we have (Code: SOC), and I think that is very important for sustainable development even without the environmental perspective (Code: ENV) on it (SOC-ENV-SEP)

Within the separated perspective students either: treated aspects of different dimensions one at a time; talked about them in the same sentence but treated them as different things and without establishing any interconnection between them (as in the example above); or alternatively, explicitly stated that they were not interconnected in any way.

The interview transcripts were read a couple of times to determine if the putative themes would indeed function adequately as themes. The coding was broadly based upon the UNESCO (2006, 18–21) definition of environmental, social and economic dimensions, which include a number of topics related to each:

- Social: Human rights, peace and human security, gender equality, cultural diversity and intercultural understanding, health, HIV/AIDS, governance.
- Environmental: Natural resources (water, energy, biodiversity, agriculture), climate change, rural development, sustainable urbanization, disaster prevention and mitigation.
- Economic: Poverty reduction, corporate responsibility and accountability, market economy.

Issues of human wellbeing were sometimes mentioned by the students; these were coded as topics belonging to the social dimension. After confirming that the theory-driven themes were indeed discernible in the empirical material, the thematic analysis started: all interviews were coded based on the pre-defined themes of DIMENSIONS and INTERCONNECTEDNESS. The coding focused on identifying specific features of the dataset while keeping context in mind, rather than coding the content of the entire dataset (Braun and Clarke 2006). Keeping the context in mind means to distinguish between different ways of how interconnections are made and between what dimensions or aspects, and what topics the particular discussion concerned. The coding in relation to the themes were then checked again so that important aspects of the data had not been missed in the coding process. Both authors took part in the coding process and a comparison was then made. In those places where the coding differed, a discussion was held to achieve consensus and joint understanding.

All interviews were anonymized before the start of the analysis in order to reduce the risk of preconceptions affecting the analysis (since the groups were based on a specific belief) (Cohen, Manion, and Morrison 2011). In the next step, every two groups representing the same belief were collected into two separate sections of a thematic analysis. The results of the two groups within each belief were compared by counting the number of times every code appeared in the text and examining how the sub-theme of INTERCONNECTEDNESS came into play in relation to the main theme of DIMENSIONS. When the whole analysis was completed, the results were transformed into the pertaining beliefs.

The written statements from the students on the interconnectedness of economic objectives and SD were short motivational arguments for their responses to the three survey items. Each results section for the four belief categories first reports the written statements; this is then followed by the analysis of the interview transcripts.

Results

This section is structured according to the four belief categories and reports the results in subsequent order: the motivational arguments for their view of the interconnectedness of economic objectives and SD, their view of SD and the interconnections made between environmental, social and economic dimensions. Each belief is analyzed based on two group interviews. Excerpts are marked with group (G) and respondent (R). At the end of the results section, a table summarizing the main interconnections that each category raised is provided (Table 6).

Belief 1: the un-differentiating positive

The economy and SD

In their survey responses the students considered both economic growth and economic development to be necessary for SD. Economic growth was not regarded as a threat in any way to SD. Table 2 gathers the arguments that the students used to justify their views of the interconnections of the economy and SD.

The main argument stated by the students is that achieving SD is something that costs financially, and technological development was regarded as the means and the way toward SD. This is essentially the basis for the positive view on both economic growth and economic development for SD. The argument for economic growth on a structural level was that more money in the economy would provide better opportunities for technological development and better research. The general point was that more money contributes positively to SD, not only at a societal but also at the individual level. However, one student raised a counter argument pointing out that the issue has two sides since people at the individual level might consume unnecessary goods:

It seems to be a fundamental pillar, I think, for sustainable development. You know, to move forward money is needed for some systems to develop something. (G1, R1)

...when environmentally friendly alternatives are more expensive, it's easier if there's more money in the wallet to choose these things [...]. If this is not something you are aware of before and then [when you have the means to choose] want to leave a better ecological footprint, you might not think of it at all, and then you'll put your money on other things instead. (G1, R2)

Concerning whether economic growth is a threat to SD, the proffered arguments indicate a prevailing view that the economy and the environment are unrelated, i.e. increasing the amount of money in a system does not affect the environment in any way. With regard to economic development, the students were aware that the economy is a part of SD, i.e. they seemed to have an understanding that the concept of SD includes economic factors. However, the connections to SD or the environment were viewed as either non-existent or related to how money can be used for improving the environment. According to the students, one of the hallmarks of a wealthier society is increased levels of awareness of various issues among its people: hence in this context, developing the economy correlates with more knowledge circulating among the people about how to act in a sustainable way.

View of SD: environmental, social and economic interconnections

While an environmental perspective on SD predominated in the reasoning of the first group, the second group immediately brought up aspects of all three dimensions. The discussion on the environment centered on our ecological footprint; the second group explicitly used the concept while the first group implicitly talked about how many planet Earths our lifestyle demands and discussed the over-use of 'resources'. The first group also raised the environmental issue of global warming/climate change:

And it's not sustainable at all if everyone should be like that, you know, it's better to live on one earth [one planet] or not even that, you know. You should have a community living in circumstances that mean you can survive [...], but also managing earth [...]. (G1, R1)

The second group mentioned aspects of all three dimensions in discussing the first question but without making any interconnections:

Table 2. The written motivational arguments for views on the interconnectedness of economic growth/ economic development with SD.

Economic growth	Economic development
More money leads to better research and development opportunities	Economics is part of reaching SD
Money cannot pose a threat to the environment	As the economy develops so does sustainable thinking
Growth is good if put to good use	The economy needs to develop in a more productive direction
	A fictive currency should be replaced by something with genuine value, such as seeds
SD requires resources and it will cost	SD requires resources and it will cost

Keeping something stable or improving it, sort of... To have in the future, over a longer period [...]. In principle it can be in any area, economic, social, the environment... It can be law, grades, anything. (G2, R2)

The first group discussed environmental/social interconnections in terms of equity among the peoples of the world by stating that we in the West live in affluence, in effect using the resources of several planets, while people in other parts use less than one planet – this iniquitous situation should be changed. The second group also brought up the issue of affluence but from an environmental perspective rather than in terms of distributive justice. In relation to this discussion, they highlighted the environment/economy interconnections by discussing how our consumption leads to higher production. The first group reasoned that the demand for fast profit leads to more pollution of the environment and criticized the short term-perspectives pervading society:

I think that the perspective on the world is very centered on oneself and that we don't really think about the impact of our actions on others in the world in other places. Many climate changes are caused by us in the Western world through a great deal with transportation and such things. [...]. This effect is more visible in other countries than what we see here [...]. (G1, R2)

The second group discussed whether lifestyle can affect economic sustainability:

Our lifestyle might not affect the economic factor, it can't really, it's not in our hands, it's the responsibility of the state, or companies. [...]. But when it comes to the environmental issue, it's clear that lifestyle has effects, driving less means less emissions and less impact, but if you eat, it doesn't affect that. It sort of... Economic sustainability. (G2, R1)

Another student stated that consumer choices certainly affect the profits of companies, which may result in unsustainability; the student used an integrated mode of reasoning that includes all three dimensions (the environmental aspects of meat consumption had just been discussed):

But if you eat a lot, if you consume giant amounts of food, it must affect the economy because all multi-billionaire companies they have incredible commercial campaigns, they earn so much money to produce and acquire.... It's also said that eating too much meat, now anything can cause cancer, but it's said that eating and consuming too much meat, red meat, for instance, contributes to people being sick and getting cancer, like smoking. But then if you check health pages, it says that you can eat meat in moderation, but it also says that it's sponsors like [mentions multinational fast food and beverage companies]... Everything revolves, so it's an economic thing that is not sustainable, because people who own that want to make more money all the time. (G2, R2)

The same student reasoned also that things that are negative for society might still enhance the economy:

Here the pharmaceutical companies, those who produce pharmaceuticals, earn very, very much money from those who consume medical drugs because they are ill. (G2, R2)

To summarize the view of the dimensions and their interconnections, the economy is considered a separate part of SD that needs to be sustainable in itself. There are different understandings of whether the profits of companies have something to do with economic sustainability and whether individuals can affect the profitability of companies. There is a negative effect on the environment in terms of pollution because of the companies' pursuit of short-term profits. The economy can benefit also from social factors that are clearly detrimental to society, such as increased economic gains due to deteriorating health among people, which is considered non-sustainable. There are interconnections between social and environmental aspects in terms of injustice, since resources are distributed unevenly between people in the world.

Belief 2: the nuanced ambivalent

The economy and SD

This group tended to agree that economic growth is not necessary for SD, whereas economic development was generally considered as a prerequisite. Economic growth was mostly considered as a threat to SD, but there were also those who disagreed or felt that economic growth is necessary. Students with neutral responses to all three propositions were also represented in this group. Table 3 indicates the arguments used to justify their views.

The views among these students point in two directions when it comes to environmental as well as social effects:

I don't think it's [economic growth] necessary because it involves [...] how we use money, [...] not how much money we have. (G2, R1)

The students discussed the interconnections between economic development and SD:

If you put money on the right things. But it can also hinder sustainable development [...] if you prioritize wrongly [...], not buying in a smart way but buying [mentions a cheap food brand],... (G2, R2)

Economic growth gives rise to increased production, which affects the environment negatively. Economic growth as a measure may hide unsustainability (presumably in social terms):

...growth measures the general... and you can lose areas that might be important for sustainable development, [...], it's not extremely individualized. (G2, R2)

However, there is also the view that a flourishing economy can induce SD, indicating the belief that developing solutions in line with SD requires economic resources. Concerning social aspects, economic growth per se can cause increased socio-economic gaps between people in society, yet the interconnections between economic development and SD are more beneficial, mainly for social reasons, if money is used wisely:

...economic development is mostly linked to sustainable development [more so than growth is], making the country's economy function in a good way for people's wellbeing. (G1, R2)

...in Sweden, for instance, we are really a rich country with a good infrastructure and welfare, and we don't need growth for good sustainable development. (G1, R2)

Economic development may, in contrast to economic growth, even out injustices in society and improve social welfare, infrastructure and gender equity. At the corporate level, SD may be achieved despite decreasing economic growth:

...certain industries might have to be reduced then, which can lead to no growth and yet sustainability, like we said about transporting food... (G1, R1)

Table 3. The written motivational arguments for views on the economic growth/economic development interconnectedness with SD.

Economic growth	Economic development
Economic growth increases production which impacts on the environment	How we use money is crucial
Important parts are easy to miss [see explanation above] when you look at the country as a whole and not at each individual	More profit is needed to continue running a business
Increased goods for sale are needed for competition and a free market, but not too much as that may create unfavorable price levels for established companies	Economic development can turn developing countries into industrial countries
An economic boom can induce SD; a recession can impose it	Economic development can create functioning welfare and infrastructure systems as well as increasing equality
Increasing economic growth is not necessary; it is okay as it is Money can blind you, and socio-economic gaps can increase	

At the global level, the transformation of developing to developed countries may occur because of economic development.

View of SD: environmental, social and economic interconnections

These two groups acknowledged all three dimensions of SD, but at first they spoke about them in a separate way, not connecting the various points they raised. The environmental aspects that the groups brought up generally had to do with global warming/climate change. Below is an example of the two groups talking about the social and environmental dimensions of SD:

I think primarily of the environment but it can also involve living in a sustainable way, and it's clear that if we destroy the earth we can't live at all, but also equality and things because that wouldn't have worked if it had been as it was... I mean, if all women had stayed at home taking care of children, and nothing had developed. That would not have functioned in a society then, so there are so many aspects of sustainable development. (G1, R1)

I think that sustainable development includes many different areas. Not just the climate but also the whole society and health and anything, so it's pretty complex and broad from my perspective, I think. (G2, R2)

The first group mentioned a sustainable economy, but admitted a lack of understanding of what that term actually means. The second group made a connection between the economy and the other dimensions of SD:

I think it depends a lot on economic resources and that money is sometimes used for wrong areas and is placed on the wrong things and should instead be invested in things that can be developed more. (G2, R2)

Eventually, both groups started establishing some interconnections; the first mainly between economic and environmental relationships, where they talked about subsidizing environmentally friendly goods and vehicles; the second between both economic/environmental and economic/social interconnections, which went in two directions – a strong economy helps us have good healthcare but, at the same time, it causes stress to the environment due to our (relatively speaking) extravagant lifestyles. Toward the end of the exercise, both groups established interconnections between all three dimensions:

...as for example regarding food that they should reshuffle prices so that it will be more expensive to eat meat and cheaper to eat vegetables, or tax sugar, as too much sugar is not good for us; it might not be directly relevant to the environment and sustainable development, but it is a health problem so it might be taxed more... What's it called when the state pays for things? (G1, R1)

We don't think so much about that either because we are not affected by it. What we do affects other countries, export and import, it's pretty safe in Sweden, you know, we have what we need every day, like, from an environmental perspective. But I think we need to think ahead and of others. (G2, R1)

To summarize the discussion, the economy is regarded as a separate entity that has to be sustainable in itself. Thus, a well-functioning economy is a discrete goal, but it is also a means to achieve other goals related to sustainability. The economy potentially affects environmental and social dimensions in both good and bad directions. Generally, economic growth is negative for the environment and society, as it increases pressure on the environment, and leads to increased socio-economic gaps between people. Economic development has a positive potential, mainly in social terms, depending on how money is used. It has the potential to increase welfare in terms of shared infrastructure and equity and turn developing countries into developed ones.

Belief 3: the two-way convinced

The economy and SD

In their responses to the survey, this group viewed economic growth as both necessary *and* a threat to SD. The majority considered economic development necessary for SD; however,

students who took a neutral view were also present in this group. Table 4 sets out the arguments used to justify their stance.

The arguments raised by the students in this group are two-sided. Generally, both economic growth and economic development could finance solutions that promote SD:

[Economic growth]...makes it so that a person or a state or supra level has the resources to contribute to more sustainable development in terms of the environment or human rights,... (G2, R2)

[Economic development]...persons can make money from their ideas, which leads to new ideas ...yes if we are talking about companies which can recycle, well such ideas... (G2, R2)

Economic growth provides potential to invest in environmentally friendly solutions to problems, but at the same time it gives rise to consumption-based societies:

... in a well-developed country it's always possible to make things more environmentally friendly with the money they have [...], you know, solar cells panels or water power. (G1, R1)

But at the same time with more money you can spend more on bad stuff, you know, it's about doing that right too. (G1, R1)

The two-sidedness of the students' view was expressed in their unsolicited discussion of globalization:

As globalization, for example, [...], it creates great emissions in the countries that go there if you think of the 19th-century industrial revolution, it was the kick-start for global warming. [Another student responds]: And yet globalization has affected people positively, sort of. (G2, R1)

From a social perspective, increased corruption and greed may follow from economic growth, while it may also be a foundation for the sustainable development of companies. However, industry and companies still make a profit from unsustainable practices.

There can be positive social and environmental consequences arising from economic development; more people, for example, can have better living conditions. On the other hand, working conditions may become worse:

...it could also be a company developing a new way of making money from their products or industry, but then it is negative to, well negative working conditions, bad for people who work in the industry. (G2, R2)

According to the students, economic development is environmentally sustainable if based on the idea of a circular economy. Circular economy as a concept was developed because the traditional linear model of material and energy flow that ends with dumping of extracted resources is unsustainable (Korhonen, Honkasalo, and Seppälä 2018, p. 37). Instead, the economic system should be based on a cyclical process in which products, materials and components are reused. Circular economy as a concept was initially created by practitioners, policy-makers and the business community (*Ibid.*, p. 45).

Table 4. The written motivational arguments for views on the economic growth/economic development interconnectedness to SD.

Economic growth	Economic development
It is possible to invest in modern environmentally friendly things	Economic development can provide better living conditions for more people
Economic growth can create corruption and greediness	Economic development is sustainable if a circular economy is developed
Economic growth creates a consumer society	
Companies can develop, but it is still easy to earn money from unsustainable solutions in commerce and industry	
Provides opportunities to finance sustainability	Provides opportunities to finance sustainability

View of SD: environmental, social and economic interconnections

In the first group, an environmental perspective was predominant; they brought up the issue of natural resources and global warming/climate change, stating that careful use of resources is important or else we will run out of resources such as oil (which we need for other things than just fuel) sooner rather than later:

There are a lot of junk products produced. I mean on the days when we get a thick bunch of commercial flyers, which we don't even read. It's totally unnecessary. There's no point at all. Waste of resources really, you know, a tree was felled, a forest cut down. (G1, R1)

The second group put more emphasis on social and economic arguments:

The difficulty I think is that so many get a better life and then more resources are exploited. We are very picky with food for instance in Sweden really, and we have never had so much food before and now we are still complaining that elderly care homes don't serve varied meals, but really they get food at least or how to put it. (G1, R1)

The second group also emphasized how actions taken within the economic sphere have the potential to affect other sustainability dimensions in both good and bad directions, ending with a contradiction:

...the economic thinking and how we can manage our economy still affect things, and how we have managed our economy is a problem discussed now and that it isn't sustainable, that the economy still affects things, it affects working conditions and the country's incomes, it still affects things that in turn can contribute other things, for instance regarding the environment and other things. A rich country may be able to invest in environmental efforts and then maybe... [...]. How should we be able to counteract the present consumer society is also something important I think. (G2, R2)

I think it applies to the environment as well as working conditions. So, when I think of sustainable development, I think more of the economy and industry etc. but it could be that we who create a system, both economic systems and laws and things, make everything more sustainable, for instance making the environment last longer, working conditions too, sort of. Human rights, focus on that, I think. (G2, R2)

The second group raised the holistic perspective, adopting a position of strong sustainability by asserting that favoring one dimension over the others will not be sustainable over time. They discussed the possibility of creating an overarching sustainability goal, and in connection to this they concluded that this is not possible since the sustainability challenge is too complex:

What do you want to be sustainable? Sustainable in what way? You can make an industrial revolution and economically speaking kick-start a country, but people will work themselves to death, industries don't primarily think of how workers feel because they have more workers if the others complain. (G2, R1)

So that can be sustainable, if you think 'Yes, but it's economically sustainable' but then it's absolutely not sustainable in any other sector sort of? (G2, R2)

This particular discussion went on in an interesting way, focusing on different perspectives and demonstrating perspective shifts. Below, we see how the perspectives of time and economic/social trade-offs are raised:

Yes, but because they made it sustainable in the workplace for a short time, so after two generations they will have a higher GDP [Gross Domestic Product] increasing standard of living and in this way it's sustainable now. So it all boils down to perspectives... (G2, R1)

To summarize the discussion, the economy affects the social and environmental dimensions in both good and bad directions. From an environmental perspective, investments can be made in environmentally friendly solutions. However, the emergence of a consumer society must be avoided and a circular economy promoted. From a social perspective, more people can have better living conditions, but at the same time greed and corruption might grow.

Belief 4: the critical**The economy and SD**

The students in this group regarded economic growth and economic development as not necessary for SD. Indeed, economic growth was considered a threat to SD. Table 5 lists the arguments used to justify their views.

According to the written statements of the group, neither economic growth nor economic development is positively related to SD: rather, both processes cause higher consumption, which results in higher production. The consequence of this is the depletion of natural resources, environmental degradation and a nagging feeling among people of never being satisfied:

...the more economic growth we have, the richer a country is, the more money the inhabitants have in their pockets, and then they consume more and then we produce more, which means that we exploit resources more and then we end up wanting more and more. (G1, R2)

At the same time, there may be positive aspects as well, as ecological awareness and the possibilities of technological development increase. However, they argued that this is not necessary for SD:

...at the same time if you have more money, you perhaps have a better chance to reflect on these things, that is, attaining sustainable development. (G1, R2)

A country does not have to become wealthier and society does not have to be developed to achieve SD; countries can have economic growth but still not develop sustainably. Consequences were described also in social terms:

...it's the poor countries which pay the penalty for what we have done. (G1, R2)

They advocated a simpler lifestyle as a way toward environmental and social sustainability, with improved health as one consequence:

...If you are a farmer growing plants, which is not so developed, but it's still environmentally friendly and you can still feel good. (G1, R1)

The students argued that economic development means different things for developing and developed countries, and considered the radical suggestion that in wealthy countries there is no need for economic growth and economic development:

...I don't think we share the same picture as in developing countries, [...]. They could perhaps see economic development as a possibility not to live on less than [SEK] 7 crowns per day while seeing development as, well, it depends on if we see it as growth or circular development, [...] and are careful with our resources or if we see it as being able to consume more [...] bigger houses, more cars, more shoes. (G2, R2)

The arguments indicate that the students view many consequences of economic growth in environmental terms. It is possible that they consider environmental sustainability as a pre-condition for social and economic sustainability:

Table 5. The written motivational arguments for views on the economic growth/economic development interconnectedness to SD.

Economic growth	Economic development
A country does not have to be richer to develop in a more sustainable way	Society does not need to be developed to attain sustainable development
A country can have economic growth without attaining sustainable development	Economic development leads to higher consumption, which increases production
Economic growth creates more consumption, which creates more production, which impoverishes the resources of the earth	

...when so many people start driving cars, for instance, the way we do now, it won't work. Then we need to change what it is we want. (G2, R1)

However, they also conceded that people living in poverty are likely to give priority to things other than the environment.

View of SD: environmental, social and economic interconnections

An environmental perspective primarily shaped the reasoning of these students, although the second group proffered several arguments related to the social and economic dimensions. The first group made few connections between the environment and the other dimensions – they generally talked about sustaining natural resources:

Society should develop in a direction that benefits the environment and people and in the long term, that is, benefitting future generations so we can't take all natural resources because then they won't last into the future. (G1, R1)

Now we pay for plastic bags in shops and... I really think that has helped because we may not want pay for it or we don't need it. (G1, R2)

The second group connected the dimensions much more frequently, and included social and economic interconnections in addition to environmental ones. Their logic indicates an emphasis on how consumption affects the environment:

We live in a better society today in the sense that we have more shoes than the Joneses had a few years ago, [...]. We still know that we must take care of the environment and not waste resources, but we still consume more. (G2, R1)

In the Western world individualism reigns and it's difficult to break the pattern and learn to help other people if we only see ourselves, and I'll be best and have a lot of money. (G2, R1)

The students talked about consumption of services as one solution for economic and environmental sustainability, as the amount of waste could be reduced. They saw the need to shift responsibility from the individual, as this is not sufficient, to the societal level, which needs to be radically restructured if SD is to be achieved. They reasoned about how environmentally friendly behavior could be stimulated at a societal level, but perceived problems from a democratic viewpoint in regulating people's behavior. Instead, society as a whole should agree on what actions to take:

But then we need to invest in other ways to attain it, like if we instead of a purchase pause have ... I mean, the clothes we discard are not really worn out, we just don't want them anymore or they don't fit because we have gained or lost weight, and I feel that they can be turned into something else, and then you invest in such services, or if we're back there again, or traveling... That we put money into research to find more environmentally friendly ways to travel and transport ourselves. (G2, R1)

To summarize the discussion: economic objectives affect the environment negatively since higher consumption implies higher production, with the depletion of natural resources as the inevitable consequence. Consumption and affluent lifestyles impose negative consequences on people in developing countries. To develop in a sustainable way does not cost, the students argue; however, it is a good thing that unsustainable actions are made costly. The students advocate a simpler lifestyle, akin to the way things were in the past: this would improve the environment as well as people's health and wellbeing simultaneously, they think.

Summary of findings

The arguments of the four groups illuminate distinct differences in how the interconnectedness of environmental, social and economic dimensions are viewed. [Table 6](#) presents an overview of

the arguments on the role of economic growth and economic development for SD raised by students representing all four beliefs. Regarding the environment, some groups think that economic growth and/or development is required to accomplish environmental sustainability, while others see these as drivers of environmental unsustainability. In relation to the environmental dimension, all groups raise the issue of consumption and production; whereas some focus on the consumption of ecologically friendly goods, others focus on the decreased consumption of goods. In relation to the social dimension, some groups consider economic growth to be a driver for increasing gaps between the populace, while others argue that it may have the opposite effect and actually close gaps between people. In society as a whole, economic growth may lead to greed, corruption and a feeling of innate dissatisfaction with what one has.

Discussion

This study set out to investigate the arguments students use to justify different views on the interconnectedness of economic objectives and SD. The specific aim was to study the evident diversity in students' views and discuss this as a possible resource for a learner-centered holistic and pluralistic approach in ESD. Our departure point was the four previously identified belief sets concerning the interconnectedness of economic objectives and SD, described in Berglund and Gericke (2018). The findings reveal qualitatively distinct differences between the groups concerning their views of how the environmental, social and economic dimensions of SD are interconnected.

The four beliefs and their positions on SD

Students who represent the un-differentiating positive belief consider technology to be a way forward toward the sustainability goal, in line with the status quo view as described by Hopwood, Mellor, and O'Brien (2005). They are aware of the economy as a part of SD, but they see no direct connection between economic growth and environmental aspects. The main line of argumentation is that approaching SD is something that costs, so increased economic output generally benefits SD. They see consumer power and lifestyle choices as the way forward, promoted by informed citizens who are able to make the right choices, again in line with the status quo view delineated by Hopwood, Mellor, and O'Brien (2005). However, they do not demonstrate the weak concern for environmental and social dimensions that is indicative of the genuine status quo view. The students raise, for instance, arguments about the unsustainability of uneven distribution of resources between different parts of the world, and note the adverse environmental consequences of the demand for fast profit in terms of pollution and a deep ecological footprint (see Wackernagel and Rees 1998). That said, our previous study does show weaker environmental attitudes among students representing the un-differentiating positive belief compared to students representing the critical belief (Berglund and Gericke 2018).

Students who represent the nuanced ambivalent belief consider that the environment is affected negatively by economic growth since production increases. This view is mostly related to our lifestyle affecting the environment. Their main point is that the way money is used is the critical issue: they see the potential for economic structures to steer society in a more sustainable direction by making sustainable actions and choices cheaper and unsustainable actions and choices expensive. Suitable incentives at political and institutional levels should be created, they argue, if change is going to happen. Those arguments are in line with a reformist view of SD (Hopwood, Mellor, and O'Brien 2005), but there are also arguments raised concerning the social aspects of economic growth and economic development, such as justice and distributive arguments. Economic growth is negative for society since it can lead to increased socio-economic gaps between people. It seems that the students are aware of GDP as a measure

of economic growth, and understand its limitations as a measure that can provide information about (income) gaps between people (see e.g. Costanza et al. 2014). In contrast, the students display a different view of economic development, which can entail positive social consequences as it may turn developing countries into developed ones and lead to better welfare systems, infrastructure that is beneficial for all and increased gender equity. The students consider a shift of perspectives among people in society as necessary, with less focus on oneself and more focus on the collective good; change is also seen as possible within the current ways of structuring society – these are arguments corresponding with the reformist view as described by Hopwood, Mellor, and O'Brien (2005).

The two-way convinced group acknowledges a two-sidedness in the interconnections between the economy and SD. Their main line of argumentation corresponds to the ethical paradox conceptualization as described by Jabareen (2008), as the students seemingly consider it difficult to unify environmental sustainability and socio-economic objectives. Economic growth provides opportunities for investments in sustainable solutions, which are costly. *However*, it also creates a society based upon consumption, which is bad for environmental reasons. Companies benefit from economic growth so that they can be further developed, *however*, greed and corruption may grow within society. Economic development can provide better living conditions for people in need; *however*, it is only environmentally sustainable if it is based upon a circular economy. Running out of natural resources and global warming are consequences of globalization and current ways of living. The two-sidedness is most clearly visible in their discussion of globalization: there are negative effects for the environment and positive social effects for people simultaneously. Technological development is one solution among others, but the economic system should promote environmental and social sustainability. The transformation view as defined by Hopwood, Mellor, and O'Brien (2005) acknowledges the need for changes in the current structures in society, which accords with the reasoning of the students in this group. Moreover, a strong sustainability perspective in which some forms of capital are not substitutable by other forms (e.g. Daly, Jacobs, and Skolimowski 1995; Neumayer 2003) is discernible in the group, as they do not consider the trade-off perspective to be sustainable over time.

Students representing the critical belief consider returning to a simpler lifestyle as a way of achieving SD, their arguments falling in line with the transformation view (Hopwood, Mellor, and O'Brien 2005). The main thrust of the argument focuses on the benefits of a simple lifestyle for the environment as well as for people's wellbeing. According to the students, a country does not have to increase its wealth to create SD, and its society does not have to be developed to be sustainable. Indeed, despite growth in their economies, the students argue, many countries have not managed to accomplish SD. According to Berglund and Gericke (2018), environmental attitudes are stronger among students representing this belief compared to the un-differentiating positive and the two-way convinced groups. Economic growth and economic development increase consumption and production, with the depletion of natural resources as an inevitable consequence. The students consider the creation of an environmentally friendly society to be a collective matter for society as a whole; the individual as an agent for accomplishing a change of this magnitude is considered insufficient. In line with the reformist view as described by Hopwood, Mellor, and O'Brien (2005), the students argue that technology can facilitate environmental sustainability by reducing the pressure on nature's resources. A social perspective is touched on when the students argue that there are some parts of the world that may *have* to focus on other priorities first, because of serious human challenges – truly extreme poverty, for example – that are absent in wealthier countries.

To summarize then, the results of this study show a rich diversity of voices concerning the interconnectedness of environmental, social and economic dimensions in the upper secondary ESD classroom in Sweden. The findings may not be applicable to all contexts, but similar variation is likely to be found in classrooms in many other countries, due to similarities in the discourse surrounding SD all over the world. Our results show that the students responded

according to the dominant view which they had at the time of the questionnaire and subsequent interview. However, we recognize that these views to some extent might be variable due to situation and context, as has been shown in previous studies (Berglund and Gericke 2016).

Holism and interconnectedness in ESD

The findings of this study indicate that most students are aware of the interconnections that exist between environmental and social factors and economics in the context of SD. Between some of these, however, they acknowledge interconnections in different ways. In line with the findings by Schoolman et al. (2012) and Manni, Sporre, and Ottander (2013), the results clearly indicate that the economic perspective is essential if interconnectedness is to be part of effective teaching and learning in ESD. A crucial question for ESD is how to incorporate the economic dimension into an integrated approach in teaching, especially as economic perspectives are often currently omitted completely or dealt with in a cursory fashion in ESD teaching (Dyment, Hill, and Emery 2015; Borg et al. 2014), and as teachers feel uncertain of how to include them (e.g. Borg et al. 2014; Stagell et al. 2014). Our results suggest that economic perspectives are needed to accomplish transformative social learning experiences that are open for critical exploration and discussion of current systems and ways of living (see e.g. Boström et al. 2018; Wals 2011, 2015). When different perspectives on the interconnections between economic objectives, human social conditions and interests and environmental consequences are allowed to meet and mix freely, students' understanding of the complexity of SD increases and their critical thinking skills develop. Clearly, students view the individual as consumer and the development of societal structures as central for accomplishing SD: hence, teaching that omits those aspects will likely not be able to address the core of students' ideas of how SD can or should be realized. If an integrated perspective is not dealt with in teaching, there is a risk that students will feel that the core of the problems, their causes and possible solutions have not been covered in class. Moreover, leaving out the interconnections between the dimensions means teaching has less potential to promote a holistic perspective that supports students' systems thinking and understanding of the complexity of SD issues, something which is central within the domains of SD (e.g. Wiek, Withycombe, and Redman 2011) and ESD (e.g. Wals 2015; UNESCO 2018).

Students may encounter issues related to SD in many subjects such as the sciences, social sciences and economics (Sund and Gericke 2020). An important question, therefore, is: how often are the issues being linked to include perspectives dealt with in other disciplines? We agree with Ignell, Davies, and Lundholm (2013, pp. 993–994), who argue that issues at the intersection of subject domains risk being neglected, duplicated or fragmented, and therefore they require particular attention both in relation to curriculum design and teaching practice. The findings of Berglund and Gericke (2016) indicate that there are different outcomes at student level depending on whether environmental, social and economic issues are dealt with one at a time or in an integrated framework. We consider the development of integrated approaches a central issue for schools aiming to develop their ESD pedagogy, and in this respect this study has shown that the inclusion of economic perspectives has great potential to contribute to social and transformative learning in ESD by facilitating integrated synthesis.

Diversity in views as a resource in ESD?

Many scholars have discussed the need to open up for debate, controversy and dissonance, in order to address the complexity of the relevant issues and create more favorable conditions for the development of students' critical thinking skills and democratic competence (Öhman and Öhman 2012; Knutsson 2013; Wals 2015). To facilitate this, a pluralistic way of teaching, in which different views and perspectives on SD are encountered, explored and critically examined,

is often advocated (e.g. Öhman 2004; Wals 2015). Pluralism has been shown to promote students' own sustainability actions, despite its non-normative character (Boeve-de Pauw et al. 2015). However, simply arguing for the what- and the why-questions is a lot easier than transforming it into classroom practice, and teachers are often left with little guidance of how to solve this complex task (Gericke, Manni, and Stagell 2020). Some studies have focused on actions that teachers undertake to stimulate plural voices in teaching and learning contexts (Rudsberg and Öhman 2010; Van Poeck and Östman 2018), but few studies have looked at how teaching can open up the diversity of perspectives among students themselves, and how these may be used as a resource in ESD. Moreover, students are often hesitant to oppose the perceived perspective of the teacher (Lundholm, Hopwood, and Rickinson 2013). Therefore, using their own diverse views as a deep resource to explore tensions or perspectives may affect their engagement in a positive way. Our findings certainly indicate that the students' own views can be used to stimulate perspective shifts if sufficient intellectual space is created in class. From this study, it is clear that students think in very different ways about who is responsible for change; about whether technical development is a solution or the opposite; about whether SD is something that costs in financial terms or whether more money actually leads to increased unsustainability; about whether society, its structures and/or norms need to change or not; and about whether there are environmental or social (or both) arguments for these views.

For example, an interesting discussion may arise in class on whether increased economic growth leads to better opportunities for environmentally friendly consumption (as stated by representatives of belief 1 and 3) or, to a consumption society that affects the environment negatively (as stated by representatives of belief 3 and 4). Insights among students concerning the complexity of sustainability issues can be promoted by such a discussion that may help to highlight that there may be consequences that point in different directions simultaneously. The complexity increases as arguments are added that focus on the social dimension, such as how growing or developing economies affect health and wellbeing. While representatives of belief 2 consider a developing economy to improve general welfare systems and equality, representatives of belief 4 express that a consequence of economic growth is degrading health, wellbeing and increased dissatisfaction. In this discussion, the students have the possibility to explore that there may be different implications depending on the context where growth or development takes place, thus including the important part of a holistic approach that add the *geographical dimension* (Öhman 2008; Boeve-de Pauw et al. 2015), in order to deepen and nuance the students' views.

Another interesting discussion that could be held in class is to contrast technological solutions (as discussed by representatives of belief 1 and 4) and the return to a simpler lifestyle (as discussed by representatives of belief 4), both raised as a way towards sustainability. This discussion concerns another important aspect of holism, namely the *dimension of time* (Öhman 2008; Boeve-de Pauw et al. 2015), which may help deepening and nuancing the students perspectives. In a historical perspective, technological development has caused problems for SD as well as improvements. When it comes to lifestyle in a historical perspective, some people had good living conditions and health, some did not. For this type of classroom discussions, there are no simple answers that can be provided by the teacher and this should not at all be the aim. There is a difference between the aim for consensus and simple answers, and the aim of illuminating and exploring complexity. The type of classroom discussions that is advocated in this paper would be fruitful for the second aim, i.e. understanding the complexity of sustainability issues. The role of the teacher then becomes to provide good preconditions for the discussions, as well as to challenge, problematize and perhaps add missing perspectives to what is being expressed by the students themselves. A precondition for the teacher to be able to lead such a discussion is the awareness of the different aspects of holism in ESD, i.e. the inclusion of environmental, economic and social dimensions, together with the dimensions of time and space (that is, the geographical perspective) (Öhman 2008; Boeve-de Pauw et al. 2015).

The results of the present study bring additional knowledge into the discussion on the role of diversity in relation to pluralism by adding the voice(s) of the students. The earlier studies by Sternäng and Lundholm (2012) and Lundegård and Wickman (2007) are among the few that have focused on such issues, by investigating the interconnectedness and conflicts of interests in relation to sustainability from a student perspective. In turn, the results of this study provide an indication of the different classroom voices teachers will encounter when using pluralistic approaches in ESD, and shed light on the potential of the students to bring complexity through a diversity of arguments into discussions that concern SD.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix 1

Interview questions

Part 1: meaning/interpretation of the concept sustainable development

I: This interview involves exploring your personal way of viewing and thinking about sustainable development in society, in the world today and in the future.

Hand out their completed questionnaires

I: As a start, I would like you to write down some sentences in which you explain and give reasons for your answers to these questions. You can write on the questionnaire sheets. Before you do this, please write down what the concepts economic growth and economic development are/mean/refer to. I won't be assessing your answers: simply write what you think each might be.

I: What is sustainable development? What does it mean?

I: Tell us if you think there is sustainable development today (in society; in Sweden; elsewhere in the world). Explain why you think this.

I: What do you think the overall/major problems are?

I: What do you think the main causes of these problems are?

Part 3: Interpretation of the concepts economic growth and economic development, and their interconnectedness to sustainable development

I: So far, we have discussed your views on how issues involved in sustainable development are interrelated. Now I would like to know what you think about the two concepts sometimes referred to in public debate: economic growth and economic development.

Ask them to focus on what they wrote on the first page of the questionnaire

I: Let us start with economic growth. What does it mean? Tell us how you interpret it.

I: What about economic development, then? What does it mean? Tell us how you interpret it.

I: Are these two things the same or do they differ in any way?

I: Has economic growth anything to do with sustainable development? Tell us what you think about that.

I: Has economic development anything to do with sustainable development? Tell us what you think about that.