A Case Study on the Incorporation of Sustainability into the Curriculum of a Primary School connected to Eco-Schools

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RESEARCH REPORT

A Case Study on the Incorporation of Sustainability into the Curriculum of a Primary School connected to Eco-Schools

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Abstract

Pupils in the Netherlands have difficulty making sustainable considerations, probably because not a lot of time is spent on the issue at school. It is expected that pupils will gain the skills to make such considerations, when sustainability education is implemented more into the curriculum. Eco-Schools implement sustainability into their curriculum, and have pupils participate actively in the sustainability processes at school. It is therefore expected that pupils of Eco-Schools are able to make sustainable considerations. The aim of this study is to research whether the ability of pupils (9-12 years) to make sustainable considerations is influenced by the school's curriculum and how sustainability is integrated into the curriculum of an Eco-School. For this, a case study was done on a primary school on Goerree-Overflakkee in the Netherlands. Interviews, observations and document analysis were used to establish the intended and implemented curriculum on sustainability education of the school. The results were analyzed with an instrument based on the curricular Spider Web. The pupils were asked to make a poster of a solution to a sustainability issue. In a short interview they were asked to elaborate on their solutions. These results were analyzed by viewing whether the pupils considered the 3 P's of the Triple bottom line theory on sustainability; People, Planet and Profit. This study shows that it is difficult for the school to implement sustainability fully into the curriculum. Even so, the school's pupils showed some skill in making a sustainable consideration.

keywords: sustainable consideration, Eco-School, primary education, curriculum, sustainability, curricular Spider Web, triple bottom line, people, planet, profit

Introduction

Sustainability is currently a well-known concept. Society attaches more value to sustainable development and is reflecting on various environmental and climate issues (Bron, Haandrikman & Langberg, 2009). For instance, there is more consciousness about the impact of greenhouse gasses, like carbon dioxide and CFC's, on the environment, and how a sustainable way-of-life diminishes energy consumption and pollution (Omer, 2008). The topic sustainability is also discussed in primary education in the Netherlands (Thijssen, van der Schoot & Hemker, 2011; Notté, van der Schoot & Hemker, 2010; Eco-Schools, 2013), however in most schools it is discussed only occasionally (Hovinga, 2007).

UNESCO already stated in 1978 that education has an important role in environmental education, and schools should integrate environmental education into their system so pupils would be provided with the knowledge, skills and attitudes that are needed to find solutions to environmental questions (UNESCO-UNEP, 1978). Even more, 'primary school is partly responsible for the realization of a sustainable society' by doing so (Remmers, 2007, p. 13). Eco-Schools is a programme, controlled by the Foundation for Environmental Education (FEE) and partner of UNEP and UNESCO, that stimulates schools to implement sustainability in their entire curriculum. An objective of the intended curriculum is to improve learning outcomes and local environment; according to Eco-Schools a commitment to the programme would lead to these outcomes (Eco-Schools, 2013).

However, research that has been done in different countries is inconclusive on this issue. Several researchers found some (slight) improvement in knowledge (the attained curriculum), but no environmental affect (Boeve-de Pauw & Van Petegem, 2011) or awareness (Krnel & Naglič, 2009), while others did obtain results that indicate that pupils were motivated to improve the local environment (Conde & Sánchez, 2010). Whether the pupils are able to make sustainable considerations, however, is not clear.

In this case study the possible effect of implementing sustainability into the intended and implemented curriculum of an Eco-School on the ability of children to make sustainable considerations (the attained curriculum) is researched. First, the term sustainability and why it is important to learn to make sustainable considerations is discussed. Then, the role of education in learning about sustainability is examined. Next, a description is given of aspects that need to be considered for the incorporation of sustainability into the curriculum of a school. Also, the factors that influence student learning, that will be taken into account in this research, are discussed. Then, the research goal and questions will be given and the research

method is explained in detail. Next, an overview of the most important or indicative results is given, followed by the answering of the research questions. Finally, the results and implications are discussed.

Theoretical Framework

Sustainability

Sustainability is not solely a biological issue; there are many aspects to consider when thinking of sustainability. UNESCO declared in the 1970s that a holistic approach to the study of environmental problems should be advocated (UNESCO-UNEP, 1978). As was written in that same report, 'the environment embraces social and cultural, as well as physical, environment and analyses therefore must take into account interrelations between the natural environment, its biological components and social and cultural factors as well' (p. 11). These aspects should also be taken into consideration when schools decide to integrate sustainability into their intended curriculum (UNESCO-UNEP, 1978).

Triple Bottom Line. A theory about sustainability, the Triple Bottom Line (TBL), underlines three pillars of sustainability. The pillars are named *Profit* (economy), *People* (socio-cultural) and *Planet* (ecology) (see figure 1). The TBL was initially developed for businesses to measure performance, not only on a profit level, but also on environmental and social dimensions (Slaper & Hall, 2011). The theory is now often used by businesses, non-profit organizations and governments (Slaper & Hall, 2011), and for educational purposes (Bron et al., 2009).

Figure 1. The three pillars of sustainability are Profit, Planet and People (the 3P's). *Profit* stands for the financial aspects of society (e.g. income), *People* for the social aspects (e.g. health) and *Planet* for the environment/ecology (e.g. pollution) (Slaper & Hall, 2011).

According to the TBL you can only make a real sustainable consideration when the three dimensions, *People, Planet* and *Profit*, are considered, now and for the future (Bron et al., 2009). A *sustainable consideration* is therefore defined as a consideration in which a simultaneous improvement is aimed at ecological, economic and socio-cultural specific aspects, with taking others into account, elsewhere and in the future (Hovinga, 2007). Therefore, the ability to make a sustainable consideration, gives pupils the tools to get insight into consequences and alternatives of choices they made (Bron et al., 2009). Several questions

should be answered when making a sustainable consideration: ‘What are the consequences of my decision here and there, now and later? What role do socio-cultural, ecological and economic arguments play? Are there alternatives?’ (Bron et al., 2009, p. 11).

Primary education and sustainability

Nowadays, most pupils in the Netherlands acquire only factual knowledge about the environment and sustainability, and are not able to properly make connections (Thijssen et al., 2011; Notté et al., 2010) or sustainable considerations by themselves (Hovinga, 2007). The topic of sustainability is discussed in primary education in the Netherlands, mainly in courses like biology and geography (Thijssen et al., 2011; Notté et al., 2010). Teachers, however, respectively only spend on average about 45 minutes and 60 minutes per week on the subjects biology and geography (Thijssen et al., 2011; Notté et al., 2010), while it is expected that more time is needed for children to gain more knowledge and skills on this topic (Boersma, 2012).

Hovinga (2007) indicated that, among other reasons, because of the complexity of the subject and the occasional and limited time invested at school, pupils are not able to make these connections. To teach pupils more complex concepts and enable them to be critical and ask questions, it is necessary to structurally invest more time on Environmental Studies courses (Boersma, 2012). The amount of time that is spent during instruction and independent studying on a topic has effect on learning outcomes (Leithwood, Anderson, Mascall, & Strauss, 2010).

Also, teachers should engage pupils with a topic such as sustainability by connecting it to the life world of pupils and real-life problems, since this tends to stimulate the intrinsic motivation of pupils (Warburton, 2003). When a topic like sustainability is taught top-down in a moralistic manner it will not stimulate children to think for themselves (Hovinga, 2007;

Table 1

The various representations of a curriculum.

Intended	*Ideal*	Vision (rationale or basic philosophy underlying a curriculum)
	Formal/Written	Intentions as specified in curriculum documents and/or materials
Implemented	*Perceived*	Curriculum as interpreted by its users (especially teachers)
	Operational	Actual process of teaching and learning (also: curriculum-in-action)
Attained	*Experiential*	Learning experiences as perceived by learners
	Learned	Resulting learning outcomes of learners

Spiropoulou, D., Antonakaki, T., Kontaxaki, S., & Bouras, S., 2007). When pupils are taught about sustainability, and they can participate actively with the topic, it will most likely create more consciousness for the environment, the pupils will handle it with more care (Conde & Sánchez, 2010), and they will be taught how to make sustainable considerations independently (Hovinga, 2007).

Implementing sustainability into the curriculum

When a school wants to implement sustainability into the curriculum it will have to take into account the various curriculum representations: the intended, implemented and attained curriculum (table 1) (Kuiper, Folmer & Ottevanger, 2013). The three curriculum layers have to cohere with each other for it to be effective (Kuiper et al., 2013). It is however not easy to have the various curricula representations to cohere. Stichting Leerplanontwikkeling (SLO, 2009), Netherlands Institute for Curriculum Development, indicates that the intended curriculum is the vision of a school, but has to appeal to the teacher as well, since it is the teacher who has to implement it in his lessons. It is therefore important that teachers are involved with the implementation process (SLO, 2009). If so, there is a better chance for the intended curriculum to cohere with the implemented curriculum, and also the attained curriculum. Because, when the implemented curriculum does not cohere with the intended curriculum, it will not yield the expected outcomes in the attained curriculum (Van den Akker, Kuiper & Nieveen, 2012).

UNESCO already declared in 1978 that schools should integrate environmental education into their intended curriculum (UNESCO-UNEP, 1978). A structural incorporation of ‘learning about the multiform relation of humans with nature’ in the operational curricula of primary schools may improve pupils’ ability to make connections and sustainable considerations since the subject is then connected to learning goals of a school’s everyday practise, to the life world of pupils (Hovinga, 2007, p. 166). It will therefore give pupils the possibility to experience and research the connection between the environment and our influence on it (Hovinga, 2007).

Curricular Spider Web. All components of a curriculum and the connections between the components should be considered when a school wants to successfully implement sustainability into the various curriculum representations (SLO, 2009; Van den Akker, 2003). The curricular Spider Web of Van den Akker (2003) demonstrates the various components that are of importance to consider in curriculum development, and also how they are linked (see figure 2).

The ten components of the Spider Web are all linked with each other, with the rationale as the central link, which leading to consistency and coherence (SLO, 2009). The focus may differ in the various representation of a curriculum, but 'attention to balance and linkages between all ten components' is of importance (Kuiper et al., 2013, p. 102). The Spider Web demonstrates that there is some flexibility between the components, but too much emphasis on one component may lead to the rupture of the web (SLO, 2009). So, a school should not only invest more time, but should also set aims, consider what the role of the teacher is, think about how to assess the pupils on sustainability (the content), where, how, with whom and with what they are learning, all considering the rationale and the other components.

Eco-Schools

Eco-Schools is an international programme that wants to enable schools to integrate sustainability in the various curriculum representations of the school for pupils to develop improved knowledge, skills on and attitudes towards sustainability (UNESCO-UNEP, 1978; Eco-Schools, 2013). Schools can join the programme, after which they have to run through

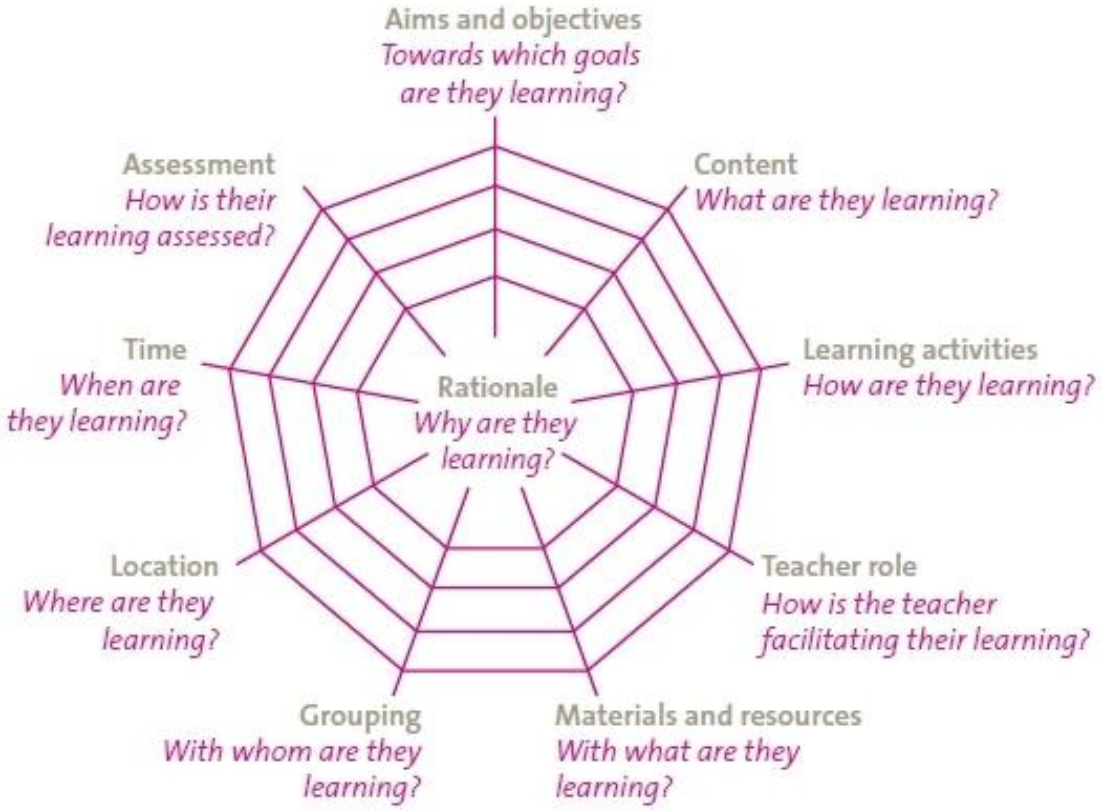

Figure 2. Curricular Spider Web (Van den Akker, 2003). The different components of a curriculum are of equal importance and should be linked to each other to create balance and coherence.

several steps demonstrating commitment to and proof of an active involvement with sustainability (Eco-Schools, 2013). Several schools in the Netherlands, and many schools worldwide, have joined this programme.

Eco-Schools (2013) points out on their website that they aim ‘to empower students to be the change our sustainable world needs by engaging them in fun, action-orientated learning’, among others by setting up an Eco Committee with pupils, teachers and volunteers (Eco-Schools, 2014). The Committee should make decisions on projects and policies and connects other pupils to the Eco-School Programme (Eco-Schools, 2014). Also, sustainability topics should be implemented into the intended, implemented and attained curriculum; how and where is suggested by the organisation (Eco-Schools, 2014). And, all members of the school (principal, teachers, students, etc.) and the wider community should be actively involved (Eco-Schools, 2014). This way the pupils would not be confined to learning about sustainability at school, but also at home and other parts of the community (Eco-Schools, 2014).

According to Eco-Schools a commitment to the programme will lead to improved learning outcomes and an improved local environment (Eco-Schools, 2013). However, research that has been done in different countries in schools of the Eco-School programme is inconclusive on this issue. Belgian and Slovenian researchers found some (slight) improvement in knowledge, but no environmental affect (an emotional bond with nature, which would be expected when pupils learn more about nature) (Boeve-de Pauw & Van Petegem, 2011) or awareness (Krnel & Naglič, 2009), while Spanish researchers did find results that indicate that pupils were motivated to improve the local environment (Conde & Sánchez, 2010). The studies did not indicate whether the pupils were able to make sustainable considerations.

There were some considerable differences between the schools that were researched in the different countries. For example, the Slovenian Eco-Schools showed that it was difficult to shift the enthusiasm and involvement of a few teachers to the whole group, and the aims of teaching pupils skills of making their own decisions were transformed into learning of predetermined behaviour (Krnel & Naglič, 2009). Also, the research indicated that many schools joined the programme for the prestige, not to be active in teaching about sustainability. This would indicate that many of the schools did not embed sustainability into the implemented curriculum; however, the research mainly assessed mainly the attained curriculum, so a clear view of the implemented curriculum has not been given.

On the other hand, the Spanish researchers, Conde and Sánchez (2010), carried out a participatory action research, in which they worked together with teachers, advisors and the community. All the participants were trained and involved in the process. Results of the study of Conde and Sánchez (2010) showed that a complete implementation into the various curriculum representations did develop the capacity of children to act sustainably. In their research the teachers indicated being motivated to teach about sustainability, and being aware that it is central in the operational curriculum. According to Conde and Sánchez (2010, p. 487) pupils' capacity to act is developed because 'it is the entire educational community which identifies problems and generates proposals, which analyzes and evaluates them, which makes decisions and applies them, i.e., which learns'. This could indicate that devotion to the project and a complete implementation of sustainability into the intended and implemented curriculum could lead to improved outcomes.

Research goal and question

The aim of this research is to investigate how sustainability is incorporated in the intended curriculum of a primary school (connected to Eco-Schools) and how this affects the implemented curriculum, and pupils, in their ability to make sustainable considerations (the attained curriculum). The focus on only one instance, the various curriculum representations of one school, makes this research very suitable for an in-depth case study (Denscombe, 2007, p. 36). The following question and sub-questions are asked in this case study:

How do the intended curriculum and the implemented curriculum of the researched primary school (connected to Eco-Schools) influence the pupils' (9-12 years) ability to make sustainable considerations (attained curriculum)?

(1) What is the vision of environmental/sustainability education according to Eco-Schools (the intended-ideal)?
(2) How is sustainability incorporated in the intended (formal) curriculum of the researched primary school (connected to Eco-Schools)?
(3) What is the implemented (perceived and operational) curriculum in the classroom of the researched primary school (connected to Eco-Schools)?
(4) To what extent are pupils of the researched primary school (connected to Eco-Schools) able to make sustainable considerations (attained curriculum) due to the intended and implemented curriculum of the school?

Methods and materials

A single-case study was done to describe and explore relationships between the curriculum representations in a class of an Eco-School. With this method it is possible 'to retain the holistic and meaningful characteristics of real-life events' of the classroom (Yin, 2009, p. 4).

Setting

The case study was performed at a small school (in total less than 50 pupils) in a village on the island Goerree-Overflakkee in the Netherlands. The school has an average CITO-score (national test for pupils in their final year of primary school) between 525 and 534 over the last five years (average in the Netherlands in that period was between 535 and 536). It is a school with mainly children with Caucasian ethnicity from very different social backgrounds.

The school received a Green Flag of the Eco-Schools programme in 2007, which indicates that they have integrated sustainability into the intended and implemented curriculum. The school was sampled based on their possession of this Flag and availability. Because the school has years of experience with the implementation of the programme into the curriculum of the school it is a critical case for this specific research. The investigation of this critical case indicates that it is appropriate to use a single-case design, given that the conditions for testing the impact of the Eco-Schools programme on the various curricula of the school with the curricular Spider Web are present (Yin, 2009, p. 47).

The class where the case study was done was a mixture of grade (groep) 6, 7 and 8 (9-12 years of age); four pupils of grade 6, three pupils of grade 7 and nine pupils of grade 8. And had a total of nine girls and seven boys. The teacher has seven years of experience with teaching, of which five at this school. The Eco Committee of the school consisted of four pupils from class 8 (three girls and 1 boy), the principal and a volunteer from the village.

Methods

Multiple sources of evidence were used for answering the research question and sub-questions, and to enhance the validity of the research (Yin, 2009, p. 18). To answer the sub-questions, one or more sources were used to gather data.

It is indicated below which methods were applied per sub-question. The gathered data were used in the final analysis. This final analysis was done by pattern matching, which

strengthens the internal validity if the predicted pattern corresponds with the observed pattern (Yin, 2009, p. 136). The predicted pattern was established from the theoretical framework and will be compared with the empirical data.

Sub-question (1): What is environmental/sustainability education according to Eco-Schools (the intended-ideal)?

This was established by literature research from previous research on Eco-schools in the Netherlands and other countries and publications on Environmental Education by UNESCO-UNEP (1978; UNEP, 2005). The view on environmental/sustainability education that is used by UNESCO-UNEP and Eco-Schools was used in this research. Namely, it provided the vision of the Spider Web and the intended curriculum (the ideal curriculum).

Sub-question (2): How is sustainability incorporated in the intended (formal) curriculum of the researched primary school (connected to Eco-Schools)?

A document analysis on the 'Eco-School Plan' of the school was done to establish characteristics of sustainability in the intended (formal) curriculum of the school. This analysis gave exact data of what the school wishes to accomplish (Yin, 2009, p. 102) and indicated which sustainability topics the school wants to focus on, its intended (formal) curriculum.

A semi-structured interview was also done with the principal to check the components in the intended curriculum and to obtain a more in-depth view of what the school intends to do in the classroom. The data of the document analysis and the interview were then triangulated to enhance the validity of the data (Denscombe, 2007, p. 135).

Sub-question (3): What is the implemented (perceived and operational) curriculum in the classroom of the researched primary school (connected to Eco-Schools)?

Video observations were done on four schooldays to establish the implemented (operational) curriculum, with a focus solely on sustainability topics. The observations gave insight in real-life situations in the context of the classroom (Yin, 2009, p. 102). The dates of observations were chosen based on accessibility for both the school and the researcher, and whether there was a chance on viewing sustainability implemented in the curriculum.

The teacher and pupils may be influenced by the presence of a researcher in the classroom, which would cause bias (Yin, 2009, p. 102). Therefore, one day of observations was done before the actual observations for the research started. This way the teacher and

pupils may have gotten used to the presence of the researcher, and may have been less influenced during the actual observations. After the observations it was checked with the teacher, whether the pupils demonstrated normal behaviour during the lessons. The teacher indicated that the pupils were a bit intimidated by the camera on the first day, but behaved normally on the following days.

With an extensive semi-structured interview, it was established how the teacher intends to use the curriculum (implemented-perceived curriculum) in the classroom and also how she perceived the actual enacted curriculum. The interview provided 'perceived causal inferences and explanations', since it gives more insight in events that happened in the classroom (Yin, 2009, p. 102). In addition, audio data was gathered from an Eco-meeting. This was a meeting with three pupils from the Eco Committee, a volunteer and the principal of the school. It acquired data for the analysis of the implemented (operational) curriculum. The audio data of the interview and the Eco-meeting were triangulated to provide a fuller picture and to enhance the validity (Denscombe, 2007, p. 135).

Sub-question (4): To what extent are pupils of the researched primary school (connected to Eco-Schools) able to make sustainable considerations (attained curriculum) due to the intended and implemented curriculum of the school?

The pupils were given an assignment to identify whether the pupils are able to make sustainable considerations. The assignment was first tested in a pilot for functionality and comprehensibility; it was not necessary to adapt the assignment after the pilot. The assignment was to make a poster on which they had to indicate a solution to the 'plastic soup', a real-life problem that had been on the news frequently in the period of the research. Plastic soup refers to the growing accumulation of plastic waste (ranging from plastic bags to microscopic fragments) in the oceans that is dangerous to wildlife (Thompson et al., 2004). The groups were made by the teacher; pupils from one grade were placed in one group (table 2). One girl of grade 8 did not do the assignment.

In the analysis it was checked whether they were able to answer the three questions drafted by Bron et al. (2009) that are necessary for making a sustainable consideration. Pupils were asked to participate in a short interview to elaborate on the answers they had given and to find out how they knew certain aspects (was it learned at home or at school?). This way a more in-depth picture was formed on how good pupils are in making a sustainable consideration and whether this ability was influenced by the schools curriculum. Only one group (Group 2) did not participate in an interview, because of lack of time.

Table 2

Composition of the groups for the assignment

Group	Grade	Boy/Girl	Eco Committee
Group 1	8	3 boys	
Group 2	8	1 boy, 1 girl	Both
Group 3	7	2 girls, 1 boy	
Group 4	8	1 boy, 1 girl	The girl
Group 5	8	1 girl	The girl
Group 6-1	6	1 girl	
Group 6-2	6	1 girl	
Group 7-1	6	1 boy	
Group 7-2	6	1 girl	

The exercise was scored on whether the pupils were able to make a sustainable consideration or not. The questions of Bron et al. (2009) were used to determine this. Since it is not realistic to expect that they will find the perfect solution to the exercise (Gayford, 2010), the emphasis therefore lies on whether they demonstrated thinking about the different aspects of sustainability. Then, the actual answers of the pupils were analysed to determine to what extent they are able to answer the questions; how many questions of Bron et al (2009) did they answer? Lastly, the answers were compared to the aims that were found with the analysis instrument in the intended and implemented curriculum, to establish whether there is coherence between the various curriculum representations.

Interviews

The various interviews were set up in such a way that basic and clear questions were asked at the beginning and more profound questions were asked later. This way the interview could develop naturally (Wengraf, 2001). Also, a variety of open and closed questions were used, and when necessary the interviewer probed or asked for examples. This way the interviewee could answer for themselves with aspects that were important to him/her, which were checked with direct questions on those aspects (Wengraf, 2001). The questions were constructed as neutral as possible, so no direction was given to the interviewee (Wengraf, 2001). The questions were set-up with the ten components of the Spider Web of Van den Akker (2003) in mind and edited after member checking.

Instruments for analysis

An instrument (see Appendix A) based on the curricular Spider Web of Van den Akker (2003) was used in the analysis as a tool to determine the various curricula of the

school (figure 2). The instrument was also set up based on the aims for learning about sustainable development of Bron et al. (2009). The instrument was member checked on functionality and suitability for the research. The collected data for the intended and implemented curriculum were all analyzed with this instrument. Fragments in the data were identified and labelled with the different components and (sub-)specifications. All components of the Web were researched to determine whether sustainability is incorporated in the components and to verify whether the curriculum is in balance.

All interviews, the Eco-School Plan and the Eco Committee meeting were scored by a second rater. The two independent raters agreed on 127 categories in the scoring system with three options (none, implicit, explicit) (56.4%; Cohen's kappa = .31). This indicates that there is a low interrater reliability for this scoring system. This is not uncommon for case study research, because of the creativity of the researcher to find new patterns (Yin, 2009, p. 95). Though, the interrater reliability was also checked for a scoring system with two options (none, indicated) to enhance the reliability. Here, the raters agreed on 160 categories, with a kappa of .44 (71.1%). This would suggest a moderate interrater reliability. After deliberation there was a kappa of .57 (78.2%) on the scoring system with two options, and the two raters agreed on 176 categories. The two-option scoring system was further used in the analysis.

The second rater also scored the posters and mini-interviews with the method described at sub-question (4). A discussion was necessary to clarify the scoring system used for this analysis. After discussion there was a kappa of .62 (85.0%). This indicates that there was substantial agreement between the two raters.

Results

Overall, the results presented here indicate that there is attention for all components of the curricular Spider Web in the intended and implemented curriculum. However, there is more emphasis on some components than on others. The results will be discussed below per curriculum representation to indicate on what component there is a focus. This is done with five indicative links between components. In the final section, the results of the coherence between the curricula will be presented.

Sustainability education

As already indicated, Eco-Schools wants to give pupils the tools to be involved in a sustainable world (Eco-Schools, 2013). The partner of Eco-Schools, UNEP, envisions sustainability education to be implemented in the curriculum of schools, so pupils will gain knowledge on sustainability, improved attitudes, and skills to find solutions to environmental questions (UNESCO-UNEP, 1978). Sustainability will have to be implemented in other courses, where environmental issues (local and global) are discussed and solutions to the problems are considered, while taking others into account, now and for the future (Krnel & Naglič, 2009; Boeve-de Pauw & Van Petegem, 2011).

Intended

In figure 3 and 4 the Spider Webs are given that have been developed for the intended curriculum of the school. The webs demonstrate the qualitative results from the interview with the principal and the document analysis of the Eco School Plan. When the school

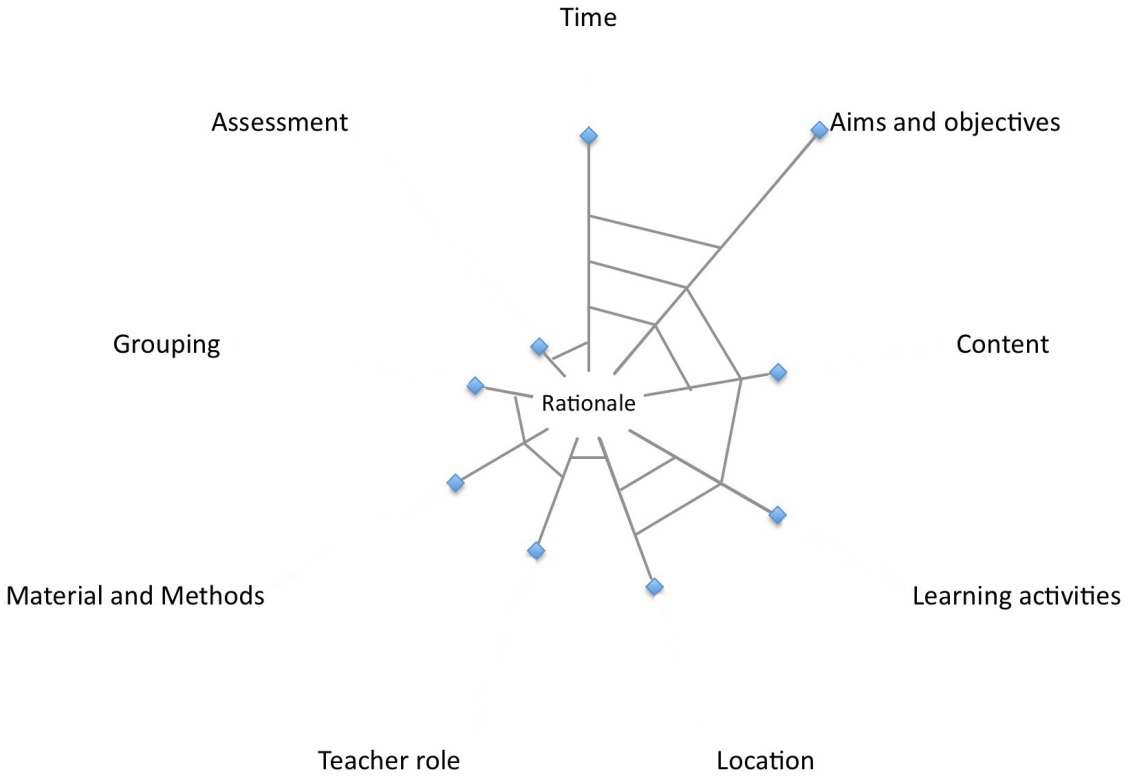

Figure 3. Spider Web of the intended curriculum, only showing qualitative results from the interview with the principal and the document analysis of the Eco School Plan. A long line in the web indicates more emphasis of the school on a component. The linkages between the components indicate whether the school mentions a link between the components. The more linkages, the more often the school demonstrated the intention of focussing on a link between the components.

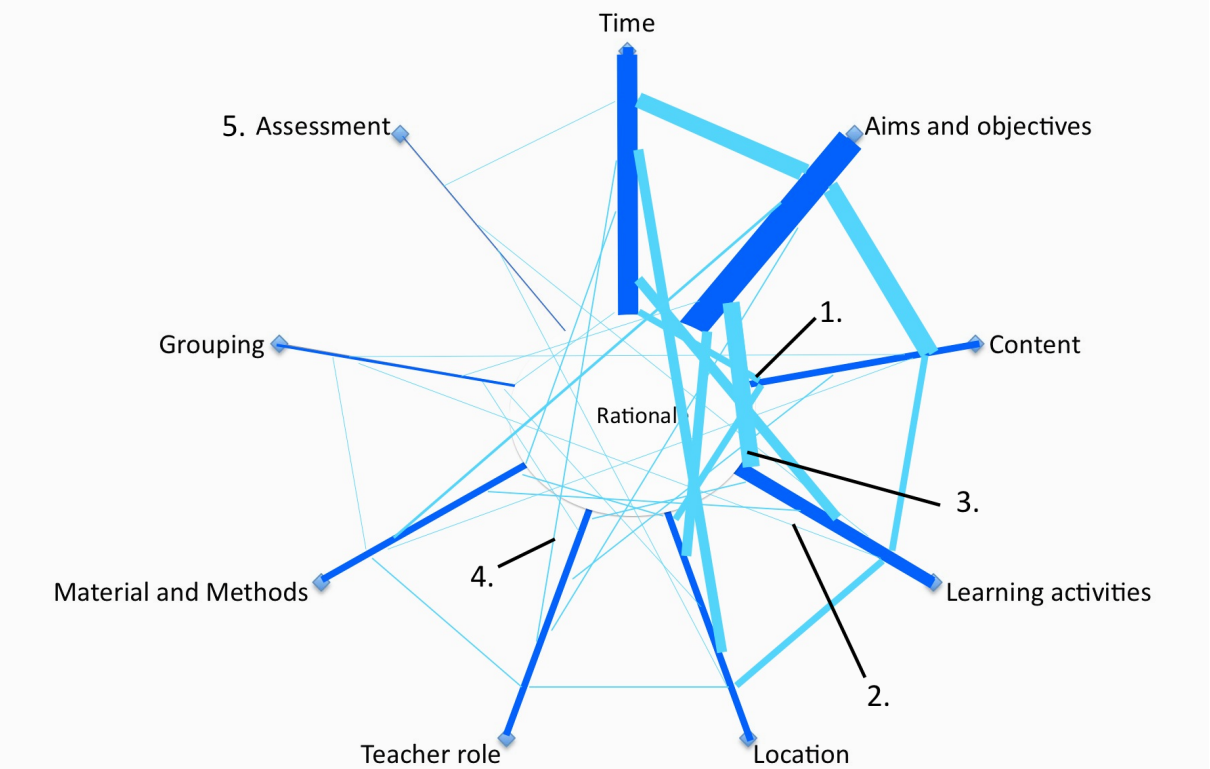

Figure 4. A complete overview of all the linkages between the components of the Spider Web of the intended curriculum. Only qualitative results from the methods, interview with the principal and the document analysis of the Eco School Plan are demonstrated. A thick dark blue line in the web indicates more emphasis of the school on a component. The light blue linkages between the components indicate whether the school mentions a link between the components. The thicker the linkages, the more often the school demonstrated the intention of focussing on a link between the components. The numbers 1-5 indicate the discussed components.

places emphasis on a component it is indicated with a long line in figure 3 and a thick dark blue line in figure 4. The linkages between the components indicate whether the school mentions a link between the components. The more often the school demonstrated the intention of focussing on a link between the components it is indicated with more linkages in figure 3 and a thicker light blue line in figure 4.

Interestingly, the school demonstrates a focus on only a few components and several components are not or hardly linked with other components, while the theoretical Spider Web indicates that attention to all the components and their connections is important (Kuiper et al., 2013).

In figure 5 the Spider Web is given for the intended curriculum including the text- and workbooks they use for biology (Naut, 1st edition) and geography (Meander, 1st edition). The longer the lines of the components and the more linkages are demonstrated in the web of figure 5, the more emphasis was placed on the component and its linkages. This Spider Web indicates that all components and their linkages are considered in the curriculum, with an

emphasis on aims and objectives. This Web, however, is mostly an indication of the schoolbooks that are used at the school. The schoolbooks consider the various components and their connections more or less like the theoretical Spider Web of Van den Akker (2003) does. This indicates that the biology and geography lessons have quite a balanced intended curriculum. Biology and geography are, however, taught for a maximum of 50 minutes a week (as indicated in the methods), and sustainability is only occasionally a topic in these subjects. To illustrate, in Grade 6 it is discussed briefly in 3 of the 10 chapters, in Grade 7 it is discussed briefly in 5 of the 10 chapters, and in Grade 8 it is discussed in 5 of the 10 chapters.

Below, the results of five indicative connections/components are showed excluding the schoolbooks that are used at the school. This is done to demonstrate what the intended curriculum of the school itself is, viewing beyond books. The five connections and components demonstrate how sustainability is or sometimes is not implemented into the intended curriculum. The following components and/or connections are discussed: Time – Content (1), Grouping – Learning activities (2), Aims – Learning activities (3), Teacher role – Time (4), and Assessment (5) (figure 4).

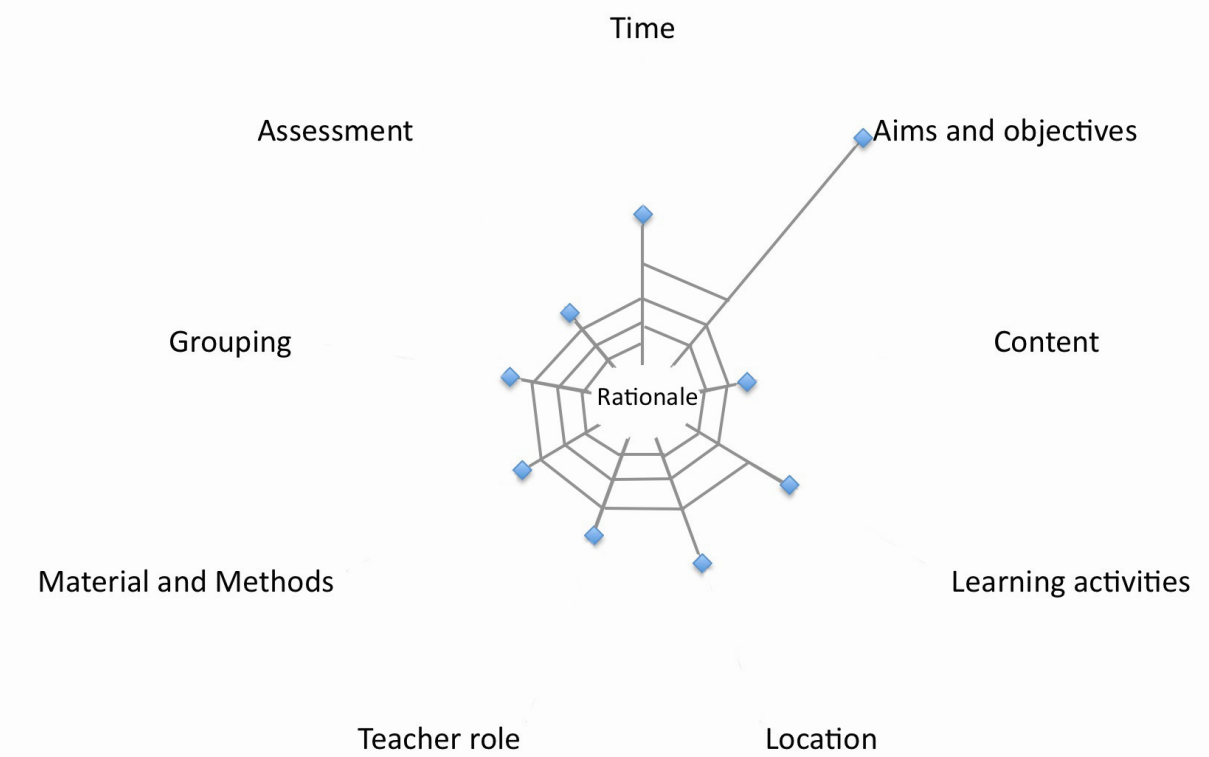

Figure 5. Spider Web of the intended curriculum, only showing qualitative results from the methods, interview with the principal and the document analysis of the Eco School Plan. A long line in the web indicates more emphasis of the school on a component. The linkages between the components indicate whether the school mentions a link between the components. The more linkages, the more often the school demonstrated the intention of focussing on a link between the components.

1. Time - Content (see figure 4)

The Eco-School plan did not demonstrate a connection between the intended time investment and the content, the Eco-School themes water, waste and energy. The data of the interview with the principal did indicate this link. The school intends to implement sustainability mostly with projects that are not connected to regular classes and daily routines, specifications of the component time (see for all specifications of the various components Appendix I). For example, the school has drafted rules of conduct for daily routines (figure 6), which have to be respected by all pupils and teachers. Moreover, teachers are supposed to be a role model and address pupils on their behaviour. The principal indicated that pupils are supposed to be 'addressed when they leave on the lights or when they throw a banana peel in the regular trash can'. This way the school intends to spend time on the Eco School themes waste and energy on a daily basis, just by following the rules of conduct.

We are an Eco-School and that's why:

- we do not leave the lights on
- we do not leave devices on
- we use as little water as possible
- we try to keep the heat indoors
- we recycle our trash
- we respect nature

and we will do that at home as well!

Figure 6. Rules of conduct of the school

The projects that are started by the school, that are not connected to regular classes, are done several times a year and mostly connected to one of the themes of Eco-Schools. For example, they intend to participate every year with 'Opschoondag' [time: all-school activities], a national action day to clean up your own neighbourhood, and have a large continuous water and energy project at their school that can be considered a project that is not connected to a regular class. For this project they have already built a system to harvest rainwater to flush their toilets, and are now working on a windmill to provide energy for the pump of the system. With these projects they wish to reduce water and energy consumption and reduce waste. At the same time they try to connect them to regular classes. As the principal indicates for the rainwater project: 'the water, that is an accidental project … which we gratefully seized to develop … in any case in relation with mathematics, environmental education, geography and technology education. Yes, it was a grateful subject for integrating all disciplines in such a project.'

2. Grouping – Learning activities (see figure 4)

The principal indicates briefly what is mostly done in classes with grouping; it is left up mainly to the teacher for regular classes. But it is mostly teacher-centred instruction 'so

everyone can benefit from it', as the principal indicated. Also, in the interview an indication is given of the link between the component grouping and learning activities in connection to the Eco Committee. Learning activities can be found in how the Committee is supposed to inform other pupils on the rules of conduct and teach them, for example, how to recycle their waste. The pupils are given the responsibility to learn by themselves and with other pupils, which is seen as the component grouping as it indicates with whom the pupils are learning.

The Eco-School Plan also mentions the formation of the Eco Committee; pupils, a teacher and a parent grouped together and intended to work together in this Committee. And it explains the type of activities the committee could set up for the school: 'The pupils from the Committee decide which types of actions will take place and how they will be executed … they are the intermediary towards the other pupils.' So, from the Eco-School Plan it becomes clear that they will have to prepare the actions together, get acquainted with the content and also motivate or inform other pupils.

Both the interview and Eco-School Plan indicate that the Eco Committee is a way of learning for the pupils of the Eco Committee, but also fulfils a teacher role towards the other pupils. There are no other connections made in the Eco-School plan between grouping and learning activities. The intended curriculum only focuses on the grouping of the Eco Committee in connection with other components of the Spider Web. However, no indication is made on the link of grouping with other components in regular classes and other projects.

3. Aims – Learning activities (see figure 4)

The learning activities for sustainability education at the school are often intended to link to People, Planet and sometimes Profit. The focus in the learning activities is mostly on the 'interaction between human and nature', which is a goal for both People and Planet. But, also the also school wishes to have the pupils 'participate' (People) and take 'responsibility' (People) in sustainability projects and day-to-day life: 'One of the rules of conduct is that you turn off the lights and that you try to conserve energy … we compared all of the energy consumption to the neighbouring school, even entered a competition'. Here you see that the school wants pupils to take responsibility to reduce energy consumption (Planet) with a learning activity that asks pupils to participate.

There was only one learning activity mentioned in the interview with the principal that aims to focus on all three P's of the Triple Bottom Line Theory. This is a learning activity, recommended by Eco-Schools, where pupils have to start-up a well functioning company that

is sustainable and eco-friendly. A People goal can be found in aiming for the pupils to perform well in the development of a company, while focussing on nature and environment (Planet) and earning enough for it to be economically sustainable. The school wishes to play the game every couple of years, so all pupils will come in contact with the game, but not on a yearly basis.

The Eco-School Plan also indicates that the school wants to connect their sustainability learning activities to different aims. In the Plan, however, only aims for People and Planet are mentioned/suggested. As the principal states in the interview, the Eco-School Plan also indicates that they wish to motivate the students to participate in daily activities to be more sustainable.

4. Teacher role – Time (see figure 4)

The linkage between teacher role and time is hardly seen in the data of the intended curriculum. From the data of the intended curriculum it does not become clear what is expected from the teacher on a daily basis, nor in the classroom. It is only indicated that they have a role, but not how this role has to be fulfilled. The principal indicated that it is mostly left up to the teacher. The role of a volunteer in the rainwater project, which is a project that is not connected to normal classes and a specification of 'time', is mentioned on one occasion in the interview with the principal. The volunteer has put forward the rainwater project and is still actively involved with the project. He, therefore, can be considered to have a teacher role with a lot of knowledge of the project.

As described earlier, the Eco Committee is intended to have a teacher role towards other pupils, according to the data from both the interview and the Eco-School Plan. The Committee has to take control and guide all other pupils in all-school activities and daily routines, both specified as 'time', by demonstrating how and what to recycle.

5. Assessment (see figure 4)

The school sets up projects with aims and objectives for the students to learn, connected to the themes of Eco-School, but hardly intends to assess their pupils to see whether the set goals were reached. Moreover, the only assessment that was mentioned was an assessment for the Eco Committee and only concerns four of the 16 pupils of the class.

Integration of sustainability into the intended curriculum. The five connections and components discussed above and the Spider Webs (figure 3 and 4) demonstrate that the school does integrate sustainability into the intended curriculum, but not completely. As

became clear from the interview with the principal and the Eco School Plan, the school is motivated to teach their pupils about sustainability and the environment and aims to influence their behaviour towards the environment and sustainability. However, the school is not able to implement sustainability into the curriculum as much as it wants to:

> I believe Eco-Schools … I think it is good that it is monitored, but I will not do something just because Eco-Schools wants me to … You will implement the things you find important and look at what to do in this situation, because it is, it is simply more difficult than in a larger school to implement something. … you try to implement as much as possible through the curriculum. Yes, but if I'm honest, there are other priorities. … When the results for Dutch proficiency, mathematics, reading comprehension aren't on the supposed level, then I have an angry school inspector and parents, and when Eco-Schools is not in my curriculum they will shrug their shoulders (Principal).

Implemented

The teacher indicated that she was involved with re-establishing the vision of the school when she started working there. The previous team had started working with Eco-Schools and the new team had (re-)evaluated what they wanted to do themselves, and what they wanted the pupils to learn. She believes it is about the same as what the first team had set out to do; placing sustainability into the life world of pupils, mostly in day-to-day life 'activities' (lights off, computers off). Real-life situations are less discussed, because they are considered to be of distant reality. And, the integration of sustainability into the regular classes is quite difficult according to the teacher:

> '… it is just very difficult with a 6-7-8-combo group with all the regular classes, which the inspection demands. So, I think that the themes [energy, water and waste] we have and what we do at school is good, but I believe, to deepen even more, is difficult.'

The implemented curriculum was established from an interview with the teacher of the class, a meeting from the Eco Committee and observations in the classroom. The observations showed hardly any implementation of sustainability into the curriculum of the school. Therefore, it was chosen not to use the video observations in the main analysis, but only as a source for anecdotal evidence. The Spider Web of the implemented curriculum was established from the interview with the teacher and the Eco Committee meeting, and

displayed in figures 7 and 8. Just like the webs of the intended curriculum, they demonstrate the qualitative results from the interview with the principal and the recordings of the Eco Committee meeting. When the school places emphasis on a component it is indicated with a long line in figure 7 and a thick purple line in figure 8. The linkages between the components indicate whether the school mentions a link between the components. The more often the school demonstrated the intention of focussing on a link between the components it is indicated with more linkages in figure 7 and a thicker lilac line in figure 8.

In the webs you can see that the focus in the implemented curriculum is mostly on time and aims and objectives, and that there are many connections between these two components. All other components are also considered, but with less connection to the other components. Below, the results of the five indicative connections/components, which were also discussed for the intended curriculum, are illustrated for the implemented curriculum (see also figure 8).

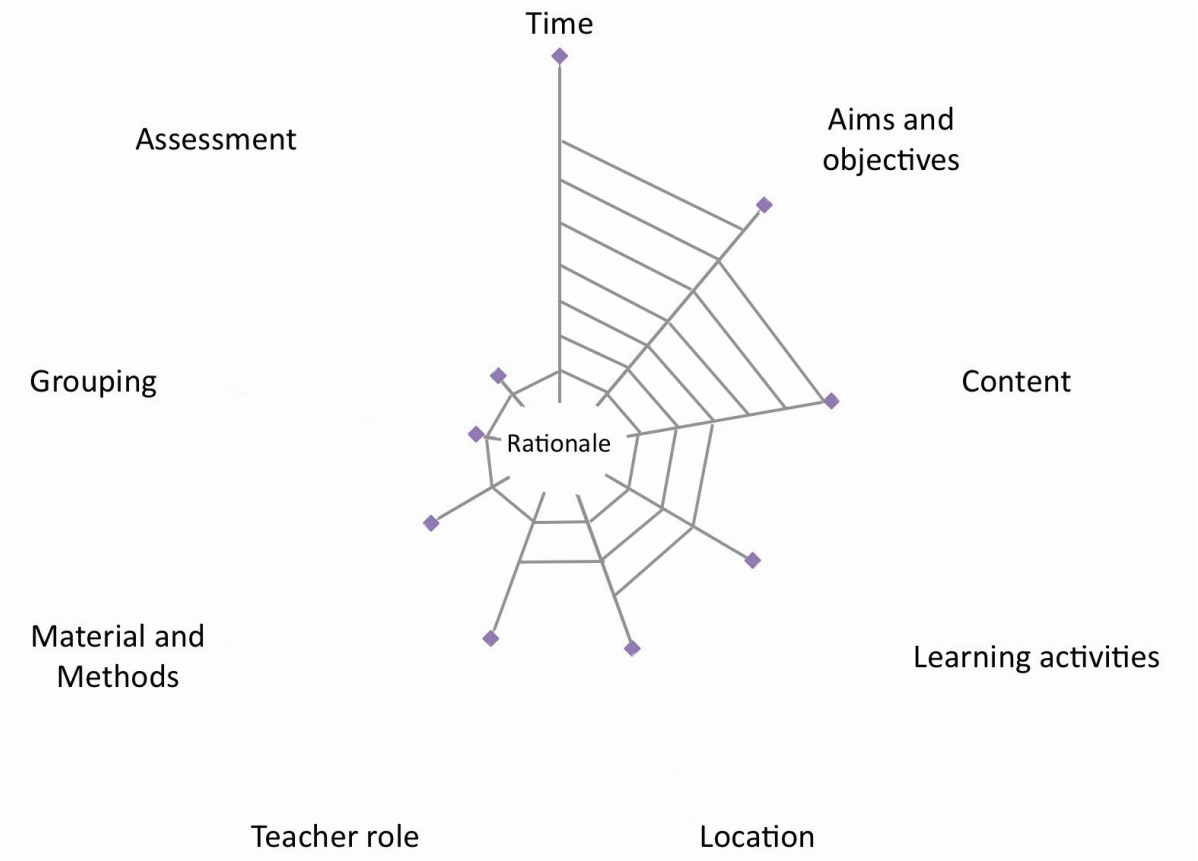

Figure 7. Spider Web of the implemented curriculum, only showing qualitative results from the interview with the teacher and the meeting of the Eco Committee. A long line in the web indicates more emphasis of the school on a component. The linkages between the components indicate whether the school mentions a link between the components. The more linkages, the more often the school demonstrated the intention of focussing on a link between the components.

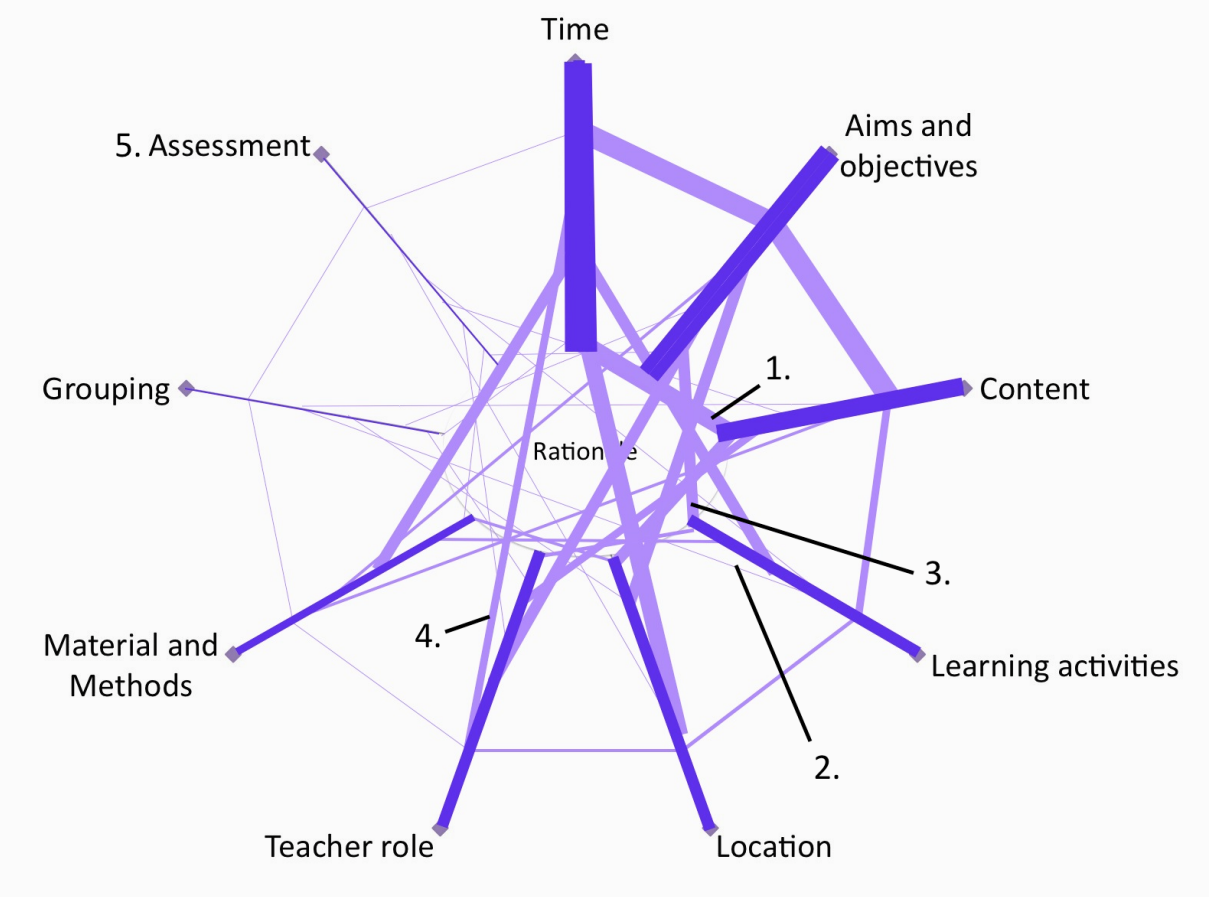

Figure 8. A complete overview of all the linkages between the components of the Spider Web of the implemented curriculum. Only qualitative results from the interview with the teacher and the meeting of the Eco Committee are demonstrated. A thick purple line in the web indicates more emphasis of the school on a component. The lilac linkages between the components indicate whether the school mentions a link between the components. The thicker the linkages, the more often the school demonstrated the intention of focussing on a link between the components. The numbers 1-5 indicate the discussed components.

1. Time – Content (see figure 8)

From both the interview with the teacher and the Eco Committee meeting, it became clear that there is an emphasis in the implemented curriculum on the connection between time and content. For the component time the rules of conduct are often mentioned, and it is explained how they actually use the rules day by day. But also many other projects about waste, energy and/or water that are not connected to regular classes are discussed. Occasionally an example is given by the teacher on the implementation of sustainability in regular classes.

In the meeting the members of the committee talked about the set-up of a corner with various trashcans for recycling for others to be used in their daily routines. While the teacher explained in the interview that she points out to pupils that they have to turn off the lights

every time they leave a room and that pupils actually correct each other. Pupils will call out when someone throws paper in the regular trashcan or leave the lights on, according to the teacher. Some similar events have been observed in the lessons. For instance, one pupil runs back into the classroom from the hallway to notify another pupil that she did not turn off the computer. During lunch breaks it was observed that pupils might know they have to recycle, though most of them do use plastic bags to carry their sandwiches and bring drinks in disposable packages to school. This indicates that there is possibly no focus on reduction on waste. But they do connect the themes reduction of energy and recycling of waste, content on sustainability, to time aspects like daily routines.

Other projects that are named in both the interview with the teacher and the Eco Committee meeting are the rainwater project and the 'Opschoondag', which can be specified as time, a project that is not connected to normal classes. Where the Committee talked about calculating the reduction of water use since the harvesting of rainwater, the teacher explained how she tried to connect the rainwater project to her biology lessons [time] on water pollution [content]. And, also for 'Opschoondag' the teacher tried to implement the topic in her regular classes. She used a text that was connected to the issue in her technical reading lesson, so the pupils would read about recycling and improve their reading skills at the same time, but the focus is at that moment mainly on the reading skills. The members of the committee mostly discussed what they had done on the day itself and whether it was a success or not.

The teacher named various other projects that were done at school. For example, they had done a project from an environmental organisation on water, which was not connected to normal classes, for which they went to some ditches to investigate whether the ditches were 'healthy'. Also, they have invited people to demonstrate the energy-use of several daily electrical utensils. These are projects outside the regular lesson for pupils to get in contact with the themes of Eco-Schools.

2. Grouping – Learning activities (see figure 8)

Most lessons (on sustainability) are started teacher-centred, as indicated by the teacher of the school, since they want everyone to receive the same information on the topic discussed. It is in the learning activities, to process the information, that various grouping arrangements are possible. What they will do and with whom they will be learning depends upon the assignment. The grouping arrangement and learning activities that became clear in the Eco Committee meeting is more outspoken on this issue. The pupils have to gather data, analyze them and draw conclusions while working together.

3. Aims – Learning activities (see figure 8)

The school often links the aims of People and Planet, and occasionally Profit, to the learning activities for sustainability education in the implemented curriculum. The data from the meeting and the interview indicated that there are various goals connected to the different learning activities.

For example, the aim 'Participation', which is a People-aim, and the Planet specification 'Use of resources' return in learning activities where the pupils have to work together to reduce the energy consumption in competition with another school, which can be considered as a learning activity. While 'Use of resources' is an aim that returns in the investigation of the Eco Committee, where they have to compare several months to see whether the school uses less energy since they have insulated glazing. These aims, connected to different learning activities, are mentioned in both the interview with the teacher and the Eco Committee meeting.

In the interview with the teacher another aim was suggested in connection to a learning activity. A discussion on the release of balloons at festivities led to the realisation that such an action has a big impact on birds and other animals, since they could choke on the balloons. Here, the learning activity is connected to the aims Planet and People, namely insight in the 'interaction human and nature'. The members of the Eco Committee discussed a learning activity with a Profit-aim and indirectly a Planet-aim, namely a project on wind-energy (reduction of the use of natural resources) and in participation with an organization that places wind turbines on the island, where they will learn with the private sector [Profit].

4. Teacher role – Time (see figure 8)

The role of the teacher in connection to time is quite clear on different levels in the implemented curriculum. For example, the teacher is a role model and go-to person in daily routines, a specification of the component time, like recycling products the pupils use during the day. The teachers' role here is to connect sustainability to the life world of pupils. In the interview the teacher indicates that pupils will confront other pupils and turn to her when something is not recycled properly. It was also observed that the teacher would indicate when she thought that paper or other materials were wasted when the pupils were doing crafts. And, she would give the correct example by always switching off the lights when she was the last one to leave the classroom.

Besides the daily routines, the teacher tries to connect the life world and real-life problems to different sustainability lessons. For example, she indicated in the interview that more emphasis would be placed on the biology lesson on water pollution or that the rainwater project, and the use of water, would be implemented in Dutch proficiency, writing skills.

From the Eco Committee meeting it became clear that the pupils from the committee have a teacher role towards the other pupils in motivating others in projects and daily routines. The pupils were however rather quiet during the meeting, and the volunteer did most of the suggestions of what they should be doing. The teacher also indicated that this year's committee was not the most active one they ever had. The role of the committee towards others seems to be less implemented than expected.

5. Assessment (see figure 7 and figure 8)

The component assessment in sustainability education is also not really emphasised in the implemented curriculum. Even though it was observed that assessment has quite a big role in the curriculum of the regular classes. The teacher explains that the assessment is mostly done with the questions on sustainability from the schoolbooks during regular classes. And occasionally when they have a project at school connected to one of the themes of Eco-Schools, they will have to make a poster of some sort in small groups or write an essay. It is, however, not clear whether this is done with all projects, or what the aims are that have to be assessed.

In the Eco Committee meeting it became clear the pupils are assessed on topics connected to the Eco-School themes. The pupils are asked by the principal to give a small presentation [assessment] in the next meeting on the energy use of the school during specific months [content: energy; aim: use of resources; teacher role: life world and real-life situations]. They need to compare data of specific months and draw conclusions [learning activities] of the differences in energy use and the weather in those months by analyzing weather reports downloaded from the internet [material and methods]. The group has to work together [grouping] on this project [time: projects not connected to normal classes] at school [location].

It seems like all components are present and linked in this project. Even more, it is clear how the pupils will be assessed on sustainability and what will be assessed. Yet, this is again only for the four pupils of the Eco Committee.

Attained

Sustainable Consideration. The results from the posters and the mini-interviews with the pupils are demonstrated in table 3. The results indicate that there is only one group (Group 1) who makes a sustainable consideration when finding a solution for the plastic soup problem. This group answered all the questions on the poster, except for what economic arguments play a role. Group 1 answered this question in the mini-interview.

Group 2 and 5 are making a good effort and only lack the naming of economical aspects. For example, Group 5 indicated that they wanted to develop a factory in which plastic would be burned with a technique where no toxics would be released (the technique had to be developed by others). This way less animals would die and eventually the plastic would disappear from the oceans. The group also indicated that it would be hazardous to society at first, but once the technique to burn plastic safely would work sufficiently it would no longer be a danger to humans. Here you can see that the group names People and Planet aspects and is able to consider the consequences it has on society, since it views the potential danger and the effect on the plastic soup. Alternatives that the group gave were not to throw plastic onto the streets anymore and demonstrating at a landfill site against the dropping of waste into the oceans. The group does not link the economical aspects of the solution into their consideration, so it can therefore not be considered a complete sustainable consideration.

Table 3

Results of the posters and the mini-interviews with the pupils combined. For the three questions of Bron et al. (2009) it is scored whether the pupils answered them. A group is making a sustainable consideration when it answers all three questions. The last column shows the answer of the pupils on where they mostly learn about sustainability.

	What are the consequences of my decision here and there, now and later?	*What role do socio-cultural, ecological and economic arguments play?*			*Are there alternatives?*	*Where did you learn about sustainability?*
		People	*Planet*	*Profit*		
Group 1	X	X	X	X	X	School and TV
Group 2	X	X	X		X	-
Group 3		X	X			TV
Group 4	X	X	X			Sometimes at school
Group 5	X	X	X		X	Eco Committee and TV
Group 6-1		X	X			-
Group 6-2		X	X			-
Group 7-1		X	X			Nature
Group 7-2		X	X			Home

Group 2 was not able to elaborate on their poster in an interview. Their score is therefore only based on the poster. Especially Group 3, 6 and 7 had difficulty coming to a solution. Even more, Group 3 gave a solution that was directly derived from a TV show, and therefore not their own solution. Groups 3, 6 and 7 contained all pupils of the lower grades, grade 6 and 7. The pupils from grade 8 showed more capability in getting towards a sustainable consideration.

Most pupils also indicated where they believed they learned most about sustainability. They indicated they were taught about it mostly at school (six pupils) or via TV programmes (seven pupils), one pupil indicated that she learned about it in nature, and one at home. The girl of group 5 also mentioned that she is active with it at home; recycling trash and throwing waste in the trashcan, not on the streets. The teacher had indicated, before the assignment was done, that the pupils who showed the most progress in consciousness on sustainability issues are the ones whose parents are active with it at home. This was not clear from this assignment on plastic soup, since it is mostly the pupils who learned about sustainability from TV and/or school who (almost) made a sustainable consideration.

Behaviour. From the interviews with the principal and the teacher it became clear that they see some progression in the pupils' behaviour towards sustainability. The teacher has indicated that the pupils are more 'conscious' and some find it more important:

> 'they all know that they have to turn the water tap off, when you leave it running you will waste a lot of water. And, they know that it's not good, that it is a waste. But, one will find it more important and turn the tap off and the other won't.'

The principal had noticed that pupils will correct each others behaviour more often and that it is possible to see that the pupils find it more important: 'If, during geography, the topic sustainable energy is discussed, then they [the pupils] already know a lot and they find it important. You can see it from their reactions.'

Coherence

The five indicative components that are discussed for the intended and implemented curricula are compared to check whether there is coherence between the various curriculum representations.

1. Time – Content

The data from the intended and the implemented curriculum indicates that there is a focus on daily routines and projects that are not linked to normal classes in connection with the themes of Eco-Schools. The school intends to point out to pupils that they have to follow the rules of conduct, and from the interview with the teacher, the meeting and the observations it becomes clear that they do focus on this in their daily practises.

Both in the intended and implemented curriculum data there are several projects mentioned with a connection to waste, water and/or energy so the pupils will be exposed more to sustainability. Sustainability is not often intended nor implemented in regular classes, only if possible or when the topic is mentioned in the textbook. Because the focus of the school is mainly on assuring that their scores are on a good level on Dutch proficiency, mathematics and reading comprehension according to the principal, and reading skills as mentioned by the teacher.

2. Grouping – Learning activities

The teacher and the principal have indicated that almost all lessons are started teacher-centred, so everyone can benefit from the information that is given, which indicates coherence between the two curriculum representations. What kind of grouping is necessary for other learning activities inside the classroom is left up to the teacher and, therefore, not considered in the intended curriculum. The teacher indicates on this point that grouping formation varies with the type of learning activity, but will also be carefully considered.

From both the Eco Committee meeting and the Eco-School Plan it is made clear that the pupils of the Committee have to work together on assignments to gain knowledge. From the meeting it is not completely clear with whom the pupils have to work together when they prepare actions for the rest of the school. The intended curriculum is more clear on this point: they have to work together, as with other assignments.

3. Aims – Learning activities

The aims Planet and People are expressed the most in the intended and implemented curriculum in general, but also in connection to learning activities. Occasionally there is a learning activity with, also, a Profit angle. Although, the data from the intended and implemented curriculum indicate different learning activities and different Profit aims within the learning activity, it does indicate that the school focuses on Profit aims from time to time.

Other learning activities are mentioned in both the data from the intended and implemented curriculum, with the same aims connected to the activities. It seems that the school focuses on the aims ‘use of resources’ [Planet] and ‘participate’ [People]. These aims are connected in the intended and implemented curriculum to learning activities in which pupils have to work together and try collectively to reduce the energy use of the school.

The aim ‘interaction human and nature’ [People and Planet] is only mentioned in the implemented curriculum in connection to a learning activity, while ‘responsibility’ [People] is only indicated in the intended curriculum. Here, there does not seem to be coherence between the two curricula.

4. Teacher role – Time

Different people have a role as teacher in the school, as indicated in the intended and implemented curriculum. The Eco Committee has a role, as intended, in guiding other pupils in their daily routines, while the volunteer has a teacher role towards the Eco Committee by sharing his knowledge and helping them acquire information in projects that are not connected to normal classes. The role of the Eco Committee is, however, not as profound as intended. The exact role of the teacher of the class in connection to time is only mentioned in the implemented curriculum. The principal acknowledges that the teacher has a role, but let the teacher decide for herself which role she will have in daily routines and projects.

5. Assessment

The intended and implemented curricula are coherent on the assessment of the Eco Committee. The principal had indicated that the Eco Committee presents their findings at some point, something that was seen in the Eco Committee meetings as well. No other assessment is mentioned in either curriculum, other than the assessment in the books they use.

Conclusions

The five linkages/components discussed above give an overview of how the curricula focus or lack focus on certain aspects of the Spider Web. It shows how certain components and linkages are considered often throughout both curricula, while others, like grouping and assessment, are hardly demonstrated in the data. From the results, the research questions of this study are answered below.

(1) What is the vision of environmental/sustainability education according to Eco-Schools (the intended ideal)?

The vision of UNESCO-UNEP (1978) and Eco-Schools (2014) is to integrate environmental education in the system of schools so pupils will be provided with the knowledge, skills and attitudes that are needed to find solutions to environmental questions for now and future generations, local and globally (Krnel & Naglič, 2009; Boeve-de Pauw & Van Petegem, 2011).

(2) How is sustainability incorporated in the intended (formal) curriculum of the researched primary school (connected to Eco-Schools)?

The schoolbooks that the school uses for biology and geography are, looking at the Spider Web, in balance. So, there is continuity at the school in their intended sustainability education. However, both subjects are not taught often and sustainability is only a small part of the subjects; they discuss many other topics not related to sustainability. It is, as a result, only a small part of the intended curriculum for sustainability education.

The five connections/components, demonstrated in the results excluding the schoolbooks, indicate that sustainability is incorporated throughout the intended curriculum, but with a focus on only a few components of the Spider Web and their linkages: time (daily routines and projects not connected to normal classes), aims and objectives (People and Planet) and learning activities. The component assessment is not focused on. Also, the aim Profit is hardly found in the intended curriculum. Only one learning activity intends to focus on all 3 P's of the Triple Bottom Line theory, which would suggest that not all aspects of sustainability are discussed. The other components and linkages are less present in the intended curriculum. The intended curriculum, therefore, does not seem to be in balance.

(3) What is the implemented (perceived and operational) curriculum in the classroom of the researched primary school (connected to Eco-Schools)?

While all components and many linkages of the Spider Web are considered in the implemented curriculum, there is a focus on time, aims and objectives and content and their linkages, while grouping and assessment are found in the data. The implemented curriculum concentrates itself, like the intended curriculum, on daily routines and projects that are not connected to normal classes. The focus on People and Planet demonstrates that there is an integration of sustainability into the curriculum, but not every aspect is considered since the

aim Profit is barely integrated in the implemented curriculum. This would indicate that the school implements the Eco-School themes in their curriculum often in connection with time and aims, but with less emphasis on the other components. The implemented curriculum is, therefore, also not in balance.

(4) To what extent are pupils of the researched primary school (connected to Eco-Schools) able to make sustainable considerations (attained curriculum) due to the intended and implemented curriculum of the school?

Most groups did not seem able to make a complete sustainable consideration for finding a solution to the 'plastic soup'. However, there were some groups who were (almost) able to make a sustainable consideration. Also, two of the groups that are (almost) able to make a sustainable consideration indicate that they learned mostly about sustainability at school, like one other group. This could suggest that the curriculum of the school had an influence on their ability to make a sustainable consideration, since the pupils are aware of the fact that the school teaches on sustainability issues, and probably gain knowledge and skills that are necessary for a sustainable way of life due to the curriculum.

Other groups indicated that they learn about sustainability mostly at home or in nature. This indicates that there are also other factors that influence pupils. However, it does not necessarily mean that these pupils are not influenced by the curriculum; they are maybe not as aware of the curriculum of the school as the other pupils.

How does the intended curriculum of the researched primary school (connected to Eco-Schools) influence the implemented curriculum and the pupils' (9-12 years) ability to make sustainable considerations (attained curriculum)?

The intended curriculum seems to influence the implemented curriculum. Both curricula have a focus on daily routines and projects that are not connected to regular classes and the aims People and Planet. Other aspects that seem to cohere are the teacher centred lessons on sustainability, the way of assessment of the Eco Committee, the teacher role of the Eco Committee in daily routines and projects (albeit less implemented than intended) and the focus on other subjects than sustainability. Furthermore, it does not seem like the two curricula lack coherence, they differ only slightly on the components on which they place an emphasis; learning activity is more pronounced in the intended curriculum and content is more of a focus point in the implemented curriculum.

Sustainability is however not integrated into the curriculum like Eco-Schools intended. And, since it is not completely integrated, one cannot expect that the learning outcomes will be as Eco-Schools intended; improved skills to find a solution to environmental problems, amongst others (Krnel & Naglič, 2009; Boeve-de Pauw & Van Petegem, 2011). It is however slightly integrated into the intended and implemented curriculum of the school, and half of the pupils of the class are aware of the sustainability education they receive. The pupils' ability to make a sustainable consideration is, therefore, probably influenced by the intended and implemented curriculum.

Furthermore, the school does not intend to focus on Profit aims, nor does it integrate them much into the implemented curriculum. It can therefore not be expected that pupils are able to name aspects of economical sustainability. The focus of the school on People and Planet aims seems to be reflected in the attained curriculum, the pupils' ability to make a sustainable consideration. It is noticeable that all pupils take People and Planet aspects into consideration. This could indicate coherence, and therefore an influence of the intended and implemented curriculum on the pupils' skills to find solutions to environmental problems, the ability to make a sustainable consideration.

Discussion

The aim of this study was to investigate how sustainability is incorporated in the intended curriculum of a primary school (connected to Eco-Schools) and how this affects the implemented curriculum, and the pupils in their ability to make sustainable considerations. From the data it was partly possible to achieve this goal. The data does indicate that the intended curriculum influences the implemented curriculum, and the pupils' ability to make a sustainable consideration is probable affected by the curriculum of the school.

Intended

Eco-Schools (2014) is a programme that asks schools to integrate sustainability and environmental education into the entire curriculum. This way pupils will have the knowledge and skills to find sustainable solutions, make sustainable considerations (Krnel & Naglič, 2009; Boeve-de Pauw & Van Petegem, 2011). The ideal curriculum is therefore a full implementation of sustainability and environmental education in the school and the regular classes.

However, an unbalanced Spider Web and only a partly incorporated intended curriculum with sustainability is seen in the intended curriculum. The principal indicates that

it is not possible for a small school to integrate sustainability fully, since they need all of their time and energy on the subjects that matter to the school inspector. The teacher has to teach three grades at the same time, which can be quite a challenge. And, the CITO scores of the school are below the national average. So, they need to focus on the reading and mathematics skills and knowledge of the pupils and choose to do this without incorporating sustainability into the curriculum of the regular classes.

Implemented

In the implemented curriculum there is also an unbalanced Spider Web. The teacher does implement sustainability into the curriculum as much as the school intends, with slightly more focus on the content. Consequently, the school does not often implement sustainability into their regular classes, but mostly in daily routines (the rules of conduct) and projects besides the regular classes. The extra time spent on sustainability is therefore less than Eco-Schools intends, while more teaching time is needed to gain better learning outcomes (Leithwood et al., 2010). Also, the role of the Eco Committee is intended to be quite large, but is less active than planned. This could influence the consciousness of the pupils on sustainability, since pupils will get more conscious when they are more actively participating (Conde & Sánchez, 2010).

Next, the way sustainability is presented is mostly connected to the life world of the pupils. Recycling of their own waste, the water project of the school, the energy use of the school; these are all projects/daily routines on sustainability that are recognizable for the pupils and used by the teacher and the Eco Committee to motivate others to be more sustainable. This way of teaching is good for the intrinsic motivation of the pupils (Warburton, 2003), which could lead to more willingness to learn about sustainability. Teaching about real-life situations could benefit the pupils even more, as this could also stimulate their intrinsic motivation towards sustainability (Warburton, 2003). The teacher, however, minimises the amount of real-life situations she implements in her lessons. She believes it is distant reality, and quite difficult for the pupils.

In addition, the assessment on sustainability is slim, as intended by the school. Most assessment is done with questions and tests from the Schoolbooks, when they discuss a topic on sustainability. Furthermore, it was mentioned that the pupils have to make a poster for some projects, but it did not become clear whether this is done every time. Now, it seems like the pupils are hardly assessed while assessment is important to check whether the aims and objectives are reached.

Attained

An aim the school sets out for their pupils is to change their behaviour towards the environment. The teacher believes that the pupils are actually more conscious of the issue, and the pupils recycle their waste at school. Therefore, it seems like they have reached this goal. However, the behaviour of the pupils was not investigated in this research, so it is not possible to conclude on this. It is an interesting topic for further research.

Looking at the focus of this research, a few pupils (almost) made a sustainable consideration on a solution to the 'plastic soup', while most pupils in The Netherlands have difficulty doing so (Hovinga, 2007). Also, the teacher and principal indicated that the behaviour of the pupils towards sustainability has progressed; they show to have knowledge about sustainability and to be conscious of the topic. The pupils of the Slovenian Eco-Schools also demonstrated to have more knowledge on sustainability as well, but show no awareness (Krnel & Naglič, 2009). This could indicate that the pupils of the researched school have more developed skills and consciousness towards sustainability, at least in finding a solution to the 'plastic soup'.

Coherence

The difference in the attained level could be explained by the difference in teaching and motivation level between the researched school and the Slovenian schools. In contrast to the Slovenian teachers (Krnel & Naglič, 2009), the teacher and principal of the researched school were involved with the topic and enthusiastic to incorporate it in the curriculum, when possible. Also, the Slovenian schools taught their pupils predetermined behaviour (Krnel & Naglič, 2009), while the researched school tried to have their pupils take their own responsibility and learn from each other, even though the lessons were often teacher-centred.

On the other hand, the school did not implement sustainability as much as the Spanish Eco-Schools, who implemented sustainability completely in the curricula (Conde & Sánchez, 2010). The Spanish pupils demonstrated the skills to act sustainably, probable because of the implementation of sustainability into the curriculum (Conde & Sánchez, 2010). Even though it was not studied in this research whether the pupils acted sustainably, the skill to make a sustainable consideration was researched. And, only a few pupils demonstrate (some) skill to make such a consideration. The difference in implementation could account for this.

Cognitive development

An aspect that should also be considered is that the ability of pupils to make a sustainable consideration may be affected by their cognitive development. Groups 1, 2 and 5, the groups who (almost) made a sustainable consideration, are all pupils of grade 8. Therefore, it could also indicate that the age of a pupil may influence the ability to make a sustainable consideration. The pupils of grade 8 showed more potential to make a sustainable consideration than the younger pupils, who gave hardly a solution to the 'plastic soup', no alternatives and did not consider any consequences of their solutions. This would suggest that they might not be able to fully consider all aspects of sustainability. This is an interesting point to consider in future research on this topic.

Limitations

The study performed was an in-depth single-case study in a small school in the Netherlands. A single-case study was performed because the school was considered a critical case and could, therefore, be used to investigate the integration of sustainability into the curricula of the school and its effect on the pupils' ability to make a sustainable consideration (Yin, 2009, p. 47). Nevertheless, a single-case study design is vulnerable and has its limitations, since multiple cases would strengthen the findings (Yin, 2009, p. 61). There were, however, no other schools that could be considered critical cases available to research. It is, therefore, not possible to generalize the results.

Other limitations should also be considered in a single-case study. Namely, the case study relied on methods that produced qualitative data, and, therefore, lacks rigour and can merely be used to describe the situation (Denscombe, 2007, pp. 45-46). Also, the observer effect is something to consider, since 'people are likely to alter their behaviour when they become aware that they are being observed' and studied (Denscombe, 2007, p. 53).

Furthermore, the research was set-up with the intention to triangulate all of the data used for one sub-question. The data of the various methods, however, hardly corresponded, and did not contradict each other, but complemented each other. The Eco-School Plan turned out to be a brief indication of what the school intended to do, while the principal was very extensive on their intentions. This way, the principal did underline the Eco-School Plan, but also gave much more data, which was not possible to triangulate with the Eco-School Plan. The intention was to check the outcomes of the research with principal in order to establish

more validity. However, the school was not able to respond to the outcomes in the period of writing this article.

The methods used to check the implemented curriculum also complemented each other. The data of the interview with the teacher and the Eco Committee meeting gave an indication of two separate ways of implementing sustainability into the curriculum. Both methods were supposed to be triangulated with the observations, but, unfortunately, no implementations of sustainability into regular classes were observed. Only a few daily routines were caught on camera. To have a complete view on the implementation of sustainability into the curriculum, observations should have been done during a project or in a period in which sustainability is discussed in the biology or geography classes. Unfortunately there was no time to do observations in another period during this research.

Spider Web as analysis instrument

The curricular Spider Web of Van den Akker (2003) was used to analyse how sustainability was incorporated into the curriculum. It turned out to be a useful model and tool to investigate the focus of the school in their sustainability education, since all components of a curriculum that should be considered and the connections between these components are demonstrated in this model (SLO, 2009; Van den Akker, 2003). It is possible to obtain a holistic view of the curriculum on sustainability, by identifying fragments in the data and labelling these fragments with the different components and (sub-specifications) and indicating whether the school focuses explicitly or implicitly on the component.

However, the instrument turned out to be rather difficult to use for the second rater, which led to a low interrater reliability. The instrument was, therefore, simplified from a three-option scoring system (not indicated – implicitly indicated – explicitly indicated) to a two-option scoring system (not indicated – indicated), which eventually led to a moderate to almost substantial interrater reliability.

Also, there was discussion between the two raters on the exact nature of several specifications and sub-specifications of the instrument. For instance, for the People-aim in the instrument, the sub-specifications ‘responsibility’ and ‘participation’ were a point of discussion. These sub-specifications were named as aspects that are important for socio-cultural sustainability in the literature that was used to develop the instrument (Bron et al., 2009). These terms can be interpreted too broadly, and too many things can be considered as one of these sub-specifications. Another aspect that was named in the discussion was that

there were no sub-specifications for some of the components of the curricular Spider Web. What should be considered as a learning activity, for example, was therefore open for discussion.

To further develop the instrument it may therefore be necessary to investigate these points more. Research has to be done on sub-specifications of the different components that are important for sustainability education. Then, the instrument can be tested and evaluated, so an even more reliable instrument can be used in future research on the implementation of sustainability into the curriculum of a school.

Implications

The question that is raised from this research is whether primary schools in the Netherlands are able to fully implement sustainability into the curriculum. Sustainability education does not have to interfere with regular classes. It can be implemented in language and mathematics classes. Eco-Schools also makes some suggestions on how to implement sustainability into the curricula, including the regular classes (Eco-Schools, 2014). With these suggestions the school might be able to implement sustainability more into the intended curriculum, which might lead to more sustainability education in the implemented curriculum. However, this small school on Goerree-Overflakkee has difficulty doing so, because of the necessity to focus on the regular classes and the lack of time of the teacher. It is not difficult to imagine that other (small) schools face similar problems.

While, if we want pupils to learn about sustainability and give them the skills to make sustainable choices, considerations, also for future purposes, then the primary school has an important role to fulfill (Remmers, 2007). Future research could therefore help to identify whether it is possible for schools to implement sustainability, without depriving mathematics and language education of attention. And, what changes might be necessary for schools to implement sustainability into the curriculum.

Furthermore, what might be interesting to investigate is whether pupils use their ability to make a sustainable consideration in their daily life and act on it. Because, being able to see the benefits and disadvantages of sustainable solutions, does not necessarily mean that the pupil will choose the most sustainable solution.

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Appendix A: Analysis instrument

Components Curriculum			**Score***	**Indication**
Indicator	*Specification*	*Sub specification*		
I. Content (Themes Eco-Schools)	*Water*	Pollution		
		Reduce consumption		
	Energy	Reduce consumption		
		Energy audit		
	Waste	Recycling		
		Reduce waste		
		Re-use		
II. Aims and objectives sustainability	*People*	Social Justice and equality		
		Poverty and Wealth distribution issue		
		Immediate environment		
		Interaction human and nature		
		Responsibility		
		Performance		
		Stewardship		
		Participation		
		Health		
		Appreciation and respect		
	Planet	Nature and environment		
		Earth and its natural resources– use of resources		
		Interdependence of all living organisms		
		Biodiversity		
		Natural balance		
		Natural cycle		
		Interaction human and nature		
	Profit	Consumptive values		
		Economic cycle		
		Learning with the private sector		
		Money, Profits and Income		
		Competition		
		Capacity		
		Stewardship		

III. Spider Web (remaining components)	*Teacher role*	Knowledge and motivation of teacher		
		Life world and real-life situations		
	Learning activities			
	Assessment			
	Material and Methods			
	Grouping			
	Location	Outdoor activities		
		School activities		
	Time	Implementation in all classes		
		Implementation in Biology		
		Implementation in Geography		
		All-school activities		
		Projects not connected to normal classes		
		Daily routines		

* A ‘X’ is used to indicate that something is explicitly mentioned, an ‘O’ will be used when it is implicitly indicated