Action-orientation in education for sustainable development : teachers' interests and instructional practices

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Abstract

Instructional practices in Education for Sustainable Development are thought to play a crucial role in the cultivation of students' action competence towards Sustainable Development issues. This paper explores teachers' interests and their action-oriented instructional practices in ESD. The Action-orientation in ESD Questionnaire (AoESD-Q) employs a survey methodology consisting of vignettes describing different instructional practices and following open questions. Thematic analysis was employed to reveal teachers' interests, and qualitative comparative analysis (QCA) and frequency analyses to detect the least or more often reported interests and instructional practices. The study revealed that teachers in this study have poor interest in and limited instructional practices of action-orientation in ESD. As such, they mostly apply low action-oriented instructional practices. Teachers' interested in action-oriented instructional practices also apply mostly low action-oriented instructional practices. Potential factors are discussed which are responsible for teachers' poor interest in action-oriented practices and limited implementation in ESD teaching and implications for teacher professionalization programmes.

Keywords: Teacher Interests, Instructional practices, Education for Sustainable Development, Action-orientation, vignette methodology

Introduction

Policy- makers, youth, as well as research worldwide have pinpointed the importance of living in a more sustainable society even if it a great challenge to pursue it. Two decennia ago, Chawla (2009) has already pinpointed the need for taking action to tackle environmental issues. Nowadays, environmental citizenship is still seen as a great necessity (Hadjichambis et al. 2020). Education should not target at students' behaviour modification towards predetermined solutions but rather making them capable of making informed and conscious decisions (Rudsberg & Ohman, 2010) and citizens able to engage in action for sustainable development (Smederevac-Lalic et al. 2020). SD is a dynamic and wickedly complex concept and also, open to several interpretations due to various disciplines or social and cultural contexts (Sinakou, Boeve-de Pauw & Van Petegem, 2019a) and in this regard, taking the 'right' action is quite challenging and even questionable (Hungerford & Volk, 1990). Education for Sustainable Development (ESD) allows learners to understand SD issues and get skills to cope with them (Sandell, Öhman, Östman, Billingham & Lindman 2005). More specifically, Mogensen and Schnack, (2010) have pointed out that education should encourage the development of students' action competence.

The instructional practices that teachers apply in class play a crucial role in the cultivation of students' action competence towards SD issues (Evans et al. 2017; Olsson, Gericke, & Chang Rundgren, 2016, 2022; Sass et al, 2022). Action-orientated instructional practices in ESD are thought as highly significant when it comes to the cultivation of action competence (e.g., Jensen & Schanck, 1997, 2004; Sinakou, Donche, Boeve-de Pauw, Van Petegem, 2019b; Varela-Losada, Vega-Marcote, Pérez-Rodríguez & Álvarez-Lires, 2016). Action-oriented instructional practices are the observable behaviors and actions teachers undertake during lessons (Cohen & Grossman, 2016) which put emphasis on students' getting engaged with actions in order to deal with SD issues (Sinakou et al, 2019b). It is known that teacher interest appears to play an important role in teachers' instructional choices (Schiefele, Streblow Retelsdorf, 2013). Teacher individual interest is seen as "*relatively permanent attraction to certain topics*" (e.g., school subjects) (ibid, p. 11). Teachers interested in ESD will possibly apply teaching about Sustainable Development issues in their lessons (Andersson, Jagers, Lindskog & Martinsson, 2013). There may be not just an interest in ESD, in general, but also an interest in ESD instructional practices. A teacher may value and enjoy the use of specific effective instrucitonal practices, such as action oriented instructional practices in ESD, while not being necessarily competent in efficiently applying this method in teaching (Schiefele, Streblow Retelsdorf, 2013).

There is now an increasing body of studies on ESD implementation in schools (e.g., Boeve-de Pauw, Gericke, Olsson & Berglund, 2015; Boeve-de Pauw, Olsson, Berglund & Gericke, 2020; Olsson et al., 2016, 2022; Sinakou, Donche, Boeve-de Pauw, Van Petegem, 2021).

However, action-oriented instructional practices in ESD teaching, which incorporate teaching learners about engaging in action(s) towards SD issues, they are underexplored in both elementary and secondary education. UNESCO and UN call for monitoring the quality of ESD teaching implemented in class (UNESCO, 2020; United Nations, 2015). Also, Jensen and Schnack (2006) call for more research on instructional practices that have the potential to promote students' action competence in SD. It is indeed important to investigate teachers' instructional practices in ESD since this is how ESD is implemented in class and if teachers' interest in them play a role (Özdem Yilmaz, Cakiroglu, Ertepinar & Erduran, 2017; Schiefele, Streblow & Retelsdorf, 2013). In order for teachers to get better supported to cope with the everyday challenges at school, ESD researchers should learn more about their instructional practices and the role of teacher interest (Forbes & Zint, 2010; Schiefele, Streblow & Retelsdorf, 2013). However, there is little theoretical or empirical research on teachers' interests in action-oriented instructional practices in ESD (cf. Watt & Richardson, 2008) and how this relates to their instructional practices (Hulleman, 2010; Long & Woolfolk Hoy, 2006; Schiefele, Streblow & Retelsdorf, 2013). In this regard, this study focuses on teachers' action-oriented instructional practices, their interests about these practices as well as the relationship among them. To do so, we first develop and validate an instrument to investigate teachers' ESD action-oriented instructional practices and their related interests.

Action-orientation towards Sustainable Development issues

The concept of action competence was introduced in health and environmental education research by Jensen and Schnack (2006), Breiting and Mogensen (1999), Mogensen and Schnack (2010), Fontes (2004), Chawla and Flanders Cushing (2007). It aims at empowering students to take part in actions to cope with environmental and SD related issues. An action should then "*be directed at solving a problem and it should be decided upon by those preparing to carry out the action*" (Jensen, 2002, p. 326). The agent needs to take into account the context in which SD issues occur and have knowledge of the action possibilities in this specific context (Breiting & Mogensen, 1999; Jensen, 2000). Sass et al, (2020) also pinpoint that action competence consists of a range of both personal and interpersonal competences. The first set of competences refer to the individual's passion and vision for SD which leads to (a) his/her commitment to engagement towards solutions, (b) knowledge about the SD issue under consideration and (c) knowledge about possibilities of action in each context, (d) a holistic view of SD, (e) critical thinking and finally, (f) a feeling that s/he is capable of changing the status quo. Alongside personal competences, interpersonal ones are also important to action competence. These are the willingness of a person to support choices with arguments, his/her openness to different (people or cultures), communication skills necessary for collaborations and confidence that the team is capable of bringing changes (Sass et al., 2020). Sass et al, (2020) finally put it in a nutshell stating that action

competence '*entails the willingness, commitment, knowledge, skills and confidence to engage in finding solutions to controversial problems or issues'* (p. 6) such as SD issues.

Teachers should develop those learning environments that will foster the cultivation of students' action competence in Sustainable development (Mogensen & Schnack, 2010). Recent research has confirmed that what is happening in class can influence students' action competence towards SD issues (Sass et al., 2022). Students should have direct experiences which allow authentic learning (Chawla, 2009). Students' action competence should be developed by interaction with practice-based learning and theoretical knowledge obtained through an internal process of meaning formation and grounded representations (Fuertes-Camacho et al., 2021). Teachers convey messages about the content of SD and contribute to the development of students' action competence (Ferguson, Roofe & Cook, 2021). Teacher-student collaboration may improve student-centered instructional approaches (Dhungana et al., 2021). Instructional practices need to promote learning activities that develop students' capacities to understand and act for sustainability issues (Kalsoom & Qureshi, 2021).

A recent conceptual framework on the instructional design appropriate for the cultivation of students' action competence towards SD issues, namely the Action-oriented ESD framework (Sinakou et al., 2019b), describes which instructional practices teachers should apply:

(a) *Action-taking,* which refers to students' conscious participation in action aiming to solve SD related problems. The action may address straightaway the root of the problem (direct action), or may be an attempt of sensitising others, informing them or persuading them to take action (indirect action). The students can also take public or private sphere actions; on individual and collective level. Students can start with simulations of actions (artificial 'as if' situations, e.g., role-playing) and then go on with real context actions.

(b) *Leadership in learning and teaching:* Students get an active role taking responsibilities and decisions related to SD issues. Students' active participation is examined using the Shier's (2001) participation ladder with five levels of increasing participation on students' part: 1) students not encouraged to express their views, 2) students encouraged to share their views, 3) students' view taken into account in decision-making, 4) students and the teacher plan the teaching activities collectively, 5) students and the teacher share equal responsibility and power in decision- making.

(c) *Peer interaction:* The students in class can work in small groups or as a whole.

(d) *Community involvement,* which is about the involvement of the local community, but also to the involvement of schools in the community. Community can be students' closer

environment (e.g., parents and neighbourhood) or their local region. It can also refer to actors of the local place that related somehow to the school.

(e) *Interdisciplinarity*, which refers to the integration of several fields of disciplines to allow students to study SD issues. An interdisciplinary approach let students get diverse subject knowledge and methodology, which allows them to take more informed actions.

Teacher interest and its relation to teacher instructional practices

Teacher interest is a sort of motivation linked to a certain psychological state occurring when the individual interacts with the object of interest (Hidi, 2006; Schiefele, Streblow & Retelsdorf, 2013). The object of interest may be an event, an idea, a situation or an object and as such, interest is content-specific (Alexander & Murphy, 1998; Hidi, 2006). The individual's interest on an object is about relatively enduring predisposition to engage again and again with that (Hidi, 2006). Interest is connected to positive feelings, increased value and knowledge about the object of interest (Renninger, 1992, 2000; Renninger, Ewen, & Lasher, 2002; Schiefele, 1998). People who enjoy, value and know an object of interest (Dewey, 1899; Schiefele, 1991) are characterized as interested in that object (Long & Woolfolk Hoy, 2006). Individual interest is connected with beliefs related to values or feelings (Schiefele, 2009). Value-related beliefs are about the personal significance of a subject or instructional practices, while feeling-related beliefs refer to the positive emotions about a subject or instructional practices (e.g. enjoyment). A teacher values a specific instructional practice because s/he enjoys it and not because of external reasons, for instance, a better job position. Interest on instructional practices is about teachers' interest on teaching methods with respect to a particular subject (Schiefele, Streblow & Retelsdorf, 2013).

Research on teacher interest indicates that teacher interest has a strong effect on instructional practices (Long & Woolfolk Hoy, 2006). Schiefele, Streblow & Retelsdorf (2013) measured teacher interest as a predictor of teacher instructional practices. They confirm that interest in instructional practices supporting students' autonomy and treating students in class according to their needs have a strong positive impact on their instructional practices. Teachers interested in these practices will most possibly implement them in class (Schiefele et al., 2013). Müller, Alliata & Benninghoff (2009) found that teacher interest in instructional aspects functions also as a motive for choosing to become a teacher. This shows how important that sort of teacher interest is.

Personal or contextual factors may hinder the enactment of teachers' interests into practice (Hidi & Renninger, 2006). Recent ESD research revealed that a series of barriers that teachers experience when teaching about SD issues. Teachers' lack of teachers' knowledge and skills, limited timeframes in combination with closed and subject-centred curriculum

objectives (Corney, 2006; Dimenas & Alexandersson, 2012; Ilisko, Ignatjeva, & MiËule, 2011; Kimaryo, 2011; Ortega & Fuentes, 2015; Summers et al., 2005; Velasquez et al., 2005) are only some of the challenges teachers face when implementing ESD. Teachers are also contronted with a lack of teaching and learning resources, school climate and school policy and resistance in the community to change policies towards sustainability (Anyolo et al., 2013; Ilisko et al., 2011; Kimaryo, 2011; Summers et al., 2005; Verhelst et al, 2020).

Research purpose and research questions

Although there is a rich discussion about the concept of action competence and what this entails, there is little empirical research done to investigate teachers' action- oriented instructional practices in ESD and how these practices match to their ESD teaching. There is also, to our best knowledge, no research about (a) teachers' interest in action- oriented instructional practices in ESD and (b) the relationship between teachers' action- oriented instructional practices in ESD and related interest. The Action-oriented ESD framework reveals several aspects of action-oriented instructional practices in ESD based on the latest ESD discourse and research. This paper zooms in on teachers' interest in action-oriented instructional practices as well as if these match with their instructional practices during ESD teaching.

The research questions are the following:

1. In which aspects of SD-related action orientation are teachers interested?
2. What is the relationship among teachers' action-oriented instructional practices in their ESD teaching and their interest in them?

Methodology

In what follows, the steps taken to develop and validate the Action-orientation in ESD Questionnaire to answer the research questions are explained. The initial draft of the AoESD-Q was first developed, which consists of vignettes describing class situations and following questions, which the respondents need to respond to. Interviews were then conducted interviews, an expert team checked the instrument and finally, we conducted cognitive and pilot testing to check the validity of the instrument. In the second section, the sample and the analytical approach of our main study are described. Figure 1 shows the steps taken for the development and the validation of the instrument, as these are described below.

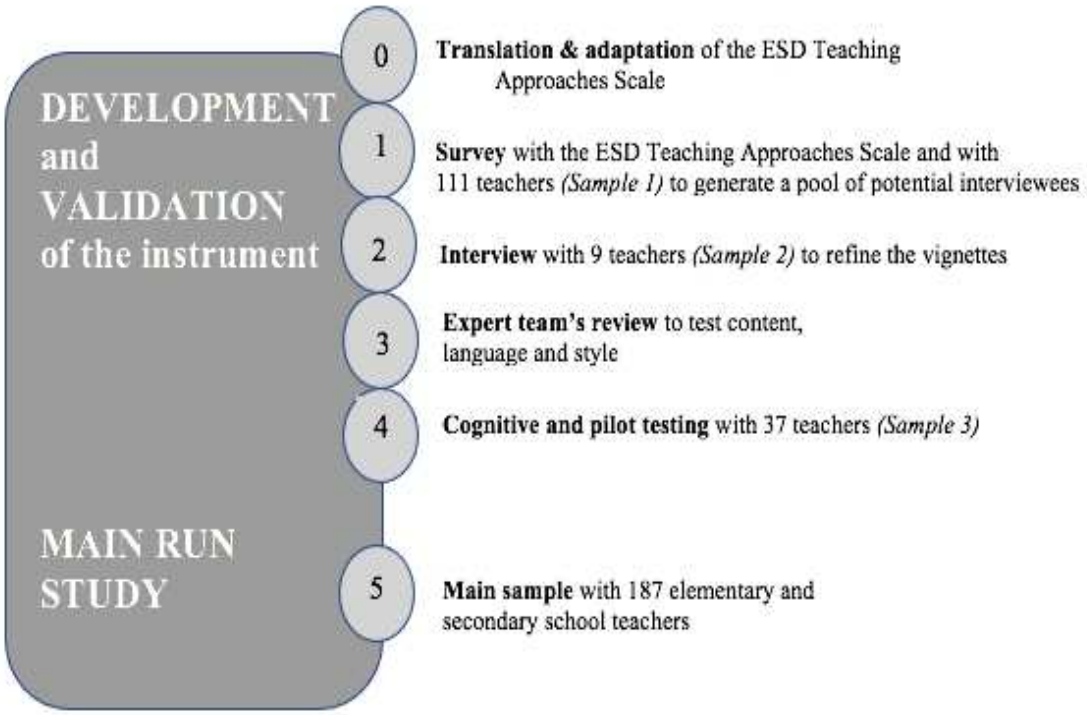

Figure 1. The process of the development and the validation of the Action-orientation in ESD Questionnaire and the main run study.

Instrument Development and Pilot study

Pilot Sample

The target group of this study are elementary and secondary school teachers in Flanders, the Dutch speaking part of Belgium which are, given the current curriculum, expected to include aspects of ESD in their lessons. In this study, four different samples were used to develop, test the instrument and collect data. Subsequently, the sample during the development of the instrument is first described, the samples used in the validation process and then, the methodology used to validate the instrument.

The purpose of the first survey study was to choose interviewees for next phase, namely the interviews which was important for the development of the main survey instrument. The instrument used for the survey was the ESD Teaching Approaches Scales by Boeve- de Pauw et al. (2020, unpublished). This instrument measures teachers' holistic and pluralistic approaches in ESD teaching. Holistic approaches consider (a) three aspects of SD issues (environment, society, economy and (b) time and place perspectives, while pluralistic approaches refer to taking into account several perspectives, viewpoints, interests related to

SD issues. The instrument was translated from Swedish to Flemish and adapted to the local context. The Cronbach's alpha for the Holism scale is 0,86 and 0,84 for the Pluralism scale. Table 1 in Appendix shows the ESD Teaching Approaches Scales. This first survey was conducted with a sample of 111 elementary and secondary school teachers (*Sample 1*). Based on the survey results, a sample for the interview study was drawn, based on heterogeneity of the scoring. In particular, the score of each respondent in the survey was calculated. Based on the mean score, the teachers were divided into three groups: (a) one group of teachers with average scores, (b) one group of teachers with low scores and (c) one group of teachers with high scores. Then, the interviews were conducted in autumn 2018 with 3 elementary school teachers (one teacher with low score, one teacher with average score and one teacher with high score) and 6 secondary school teachers (two teachers with low score, two teachers with average score and two teachers with high score). The interviewees constitute *Sample 2*. The third random sample used for this study (*Sample 3*) includes 37 teachers: 19 elementary and 18 secondary school teachers. These teachers have taken part in cognitive interviews and pilot-testing in spring 2019.

Instrument

Our goal is to detect variations of teachers' interests in ESD and action-oriented instructional practices in ESD in order to bring the complex classroom reality to light. To do so, a novel approach was used, that is, the survey vignette methodology, which gains more and more space in educational research in ESD research (e.g., Cebrián & Junyent, 2015; Kopnina, 2014; Sandri, Holdsworth & Thoma, 2018). Contrary to traditional survey methods, the vignette methodology due to the variations of the dimensions succeeds in capturing nuances in respondents' ESD thinking and practice (Atzmüller & Steiner, 2010). In a vignette methodology, the participants come across a set of vignettes, which are ''*short, carefully constructed descriptions of a person, object, or situation, representing a systematic combination of characteristics''* (Atzmüller & Steiner, 2010, p. 128). As multivalent representations of subjects or situations, they offer a specific context (Steiner & Atzmüller, 2016, Kopnina, 2014). Context- based vignettes account for increased construct validity (Steiner & Atzmüller, 2016) and lead to more realistic scenarios (Atzmüller & Steiner, 2010). Also, while the respondent needs to deal with the interaction among the several characteristics in the vignette (Aguinis & Bradley, 2014; Steiner & Atzmüller, 2016). This enables us to explore teachers' interests and action-oriented instructional practices in ESD in an integrated way. The vignettes methodology has also the potential to minimize the effects of social desirability responding since they portray hypothetical situations (Kopnina, 2014; Sniderman & Grob, 1996).

To set up our vignette research, our first steps was (1) the operationalization of a set of dimensions to be included in the vignettes based on the Action-oriented ESD framework

(Sinakou et al, (2019b) (see the theoretical background of this study), (2) the assignment of subdimensions of each dimension for each vignette. The vignettes should be structured based to the theory, that is, the dimensions chosen, and their subdimensions should be drawn on theory (Atzmuller & Steiner, 2010). Our following steps were (3) the development of the vignettes, (4) the validation of the vignettes and (5) finally, the main survey.

All necessary dimensions of real-life settings are included based on a theoretical framework (namely the Action-orientation in ESD framework). This ensures the ecological validity of the vignettes, that is, the generalizability of context- specific results (Atzmüller & Steiner, 2010; Lewkowicz, 2001). Since our goal was to detect variations of interests and instructional practices, two subdimensions are distinguished for each dimension. The first subdimension of the dimension represents practices of low action-oriented practice, whereas the second subdimension refers to high action-oriented practices. This process resulted into two vignettes: one with low level action-oriented practices and one with high level action-oriented practices. The vignettes are also adjusted to the local Flemish context. Table 1 presents the final vignettes used and the questions that followed. Vignette 1 describes an instructional situation including a range of low action-oriented ESD instructional practices taking place, while Vignette 2 describes an instructional situation including a range of high action-oriented ESD instructional practices. The dimensions used are pointed out in the brackets. In Appendix 2, the Dutch version of the instrument is presented.

Table 1.

The vignettes of the Action-Orientation in ESD Questionnaire (AoESD-Q)

Vignette 1: low action- oriented ESD instructional practices *Teacher A lets the students during the language lesson work on the topic of energy saving (**interdisciplinarity**). S/he has chosen this topic because the students have expressed their interest about that in a previous discussion (**leadership in learning and teaching**). During the language lesson each student reads on his/her own an article of a newspaper (**peer interaction**). The article is about how we should behave in more energy efficient way in our everyday life (**community involvement**). Teacher A makes it clear that the students should change their everyday behaviour (**action-taking**). In the following day, an energy-expert gives a speech in class about the topic and the students have the chance to ask questions (**community involvement**).*
Vignette 2: high action- oriented ESD instructional practices *In the class of teacher B, the students have expressed their concern about a nearby forest. The teacher has decided to let them work about the nearby forest in the following lessons (**leadership in learning and teaching**). The teacher during his/her lessons makes connections among several subjects (**interdisciplinarity**). The students work about the topic in small groups and they then present their work to the whole class (**peer interaction**). The students take part in workshops organized by local organizations about the value of the forests and, in that way, they understand why it is important to preserve them (**community involvement**). The students perform a short play during a local event with which they want to let the residents of local community know what the consequences are from the deforestation (**action-taking**).*
Following Open Questions: 1. *"Do you find this scenario interesting or not and why?"* 2. *"Which aspects of the scenario match with your teaching practice?"* 3. *"Which aspects of the scenario do not match with your teaching practice?".*

Only two vignettes were used in this study since research has shown that if a respondent comes across with a large number of vignettes, one responds repetitively the same all over the vignettes (Sniderman & Grob, 1996). Few or short vignettes do give the chance to the researcher to gather the data needed (Weber, 1992). Therefore two vignettes with 200–300 words each were included which according to Barter & Renold (2000) is easy for the reader follow. Each vignette is followed by three open questions: *"Do you find this scenario interesting or not and why?", "Which aspects of the scenario match with your teaching practice?"*, *"Which aspects of the scenario do not match with your teaching practice?".* They were first asked to explain if and why they find each vignette interesting or not and then, to report aspects of each vignette that match with their own instructional practices or

not. We applied a within-person design, in which the same participant comes across the same set of vignettes (Atzmüller & Steiner, 2010).

Instrument validation

To further refine the vignettes and make them as close to a real classroom situation as possible, interviews were condicted with *Sample 2* in autumn 2018. The teachers first read the vignettes and respond to the questions by giving examples of their teaching practice. If some of the dimensions in the vignettes were ignored by the teacher, they were then asked them explicitly if they are interested in these actions, if these occur in their lessons and to provide examples. Before the interviews and as a result of the survey the interviewees were put into two groups: one with low and one with high scores in the survey. The instructional practices that came out of the group with low scores were used for the refinement of the low-level vignette. On the contrary, the instructional practices from the group with high scores were used for the high vignette. An expert team gave written feedback on the Action-orientation in ESD Questionnaire in terms of content, structure, lay-out and language. The experts team consisted of (a) four experienced researchers in the field of ESD, (b) three teacher trainers who are responsible for ESD courses for pre- and in-service teachers, and (c) three experienced pedagogical advisors; two for elementary and one for secondary school teachers in Flanders. Finally, cognitive testing was applied, to pretest and potentially adjust the instrument. Then, pilot-testing was conducted as a second round of testing the instrument with a broader sample (*Sample 3)* during spring 2019, which revealed that the Action-orientation in ESD Questionnaire was understood by the teachers as intended. Table 1 shows the final vignettes and the following questions.

Main study

Main sample

The final version of the Action-orientation in ESD Questionnaire was administrated in autumn 2019 to the main sample of teachers (Main Sample) to read the vignettes and respond to the following questions. For the purpose of this survey, an online survey tool, QUALTRICS was used. The Main Sample consists of 187 teachers: 77 elementary and 110 secondary school teachers from 49 schools. It includes 33 males and 154 female teachers; teachers with an equal representation across school types and grades, and with 20 years of mean of school experience. Secondary school teachers are specialized in several subject areas such as sciences (38%), social sciences (25%), language 19%), vocational and esthetical subjects (18%). The teachers of the Main Sample have taken part in a teachers' professionalization project entitled 'Valorizing Integrated and Action-Oriented Education for Sustainable Development at School (VALIES)'. VALIES studies factors that facilitate

or hinder integrated and action-oriented ESD in schools in Flanders. The data were collected before the beginning of the professionalization programme. Since this study was part of the larger project the Main Sample a purposively selected sample (Teddlie & Yu 2007).

Data analyses approach

Thematic analysis

As far as RQ1 (In which aspects of SD-related action orientation are teachers interested?) is concerned, the data gathered from the first open question about teachers' interests were analyzed using thematic analysis (e.g., Boyatzis, 1998). A combination of deductive/theory-driven thematic analysis was applied (Cohen, Martin and Morrison, 2011). Our coding scheme, thus, consists of dimensions and subdimensions based on the Action-oriented ESD framework. The first author set the initial coding scheme, which was then shared to the rest of the authors of this study to ensure internal validity (Cohen et al., 2011). In order to test its reliability, the first and the second author rated each 20% of the data. To test the agreement between the ratings for the dimensions, measured Cohen's Kappa was measured (Gwet, 2008) which resulted in excellent level of agreement (0,92, p<0,001). Cohen's Kappa was calculated for each of the subdimension, also. The Kappa's range from 0,91 to 0,96 indicating high levels of agreement between the raters.

Qualitative Comparative Analysis

As for RQ2 (*What is the relationship among their perceptions of their action-oriented instructional practices in their ESD teaching and their interest in them?*), a configurational analysis was applied which is central in the Qualitative Comparative Analysis method (QCA); a case study method in which the researcher quantifies the qualitative data (Ragin 1987). A basic assumption of QCA is that qualitative results are not solely reported on separate dimensions (in our case the dimensions of the vignettes) but also with combination of dimensions (also called configurations) (Rihoux, 2008). In other words, QCA is a configurational analysis method analyzing dimensions in relation to other dimensions (Ragin, 1987, 2008). As such, the data are treated in an integrated way being fully understood in their entirety (Ragin 2008). An added value to apply QCA on vignette data, is the potential to reveal the heterogeneity within participants' responses that a variable-oriented approach could not (Ragin 2008). The focus is not then on the individual dimensions but on the configurations of the dimensions of the vignettes, as well (Thomas, O'Mara-Eves & Brunton, 2014).

First, for each dimension (that is action-oriented instructional practice), the presence (with the value '1') or absence (with the value '0') of the dimension in each participant's response

(Ragin, 1987) were indicated. This was done for all three open questions separately: (a) for teachers' interests, (b) for the instructional practice that they apply in their lessons and (c) for the practices that they do not apply in their lessons. Second, the number of dimensions reported by each participant was calculated for each of the three open questions. A range of 0 to 6 was possible for the number of the reported dimensions per case. Third, combinations of the reported dimensions were found, which were labelled configurations. This process resulted in three sets of configurations for each participant; one set of configurations for each open question. Lastly, the frequency of occurrences in terms of percentages of (a) each dimension and (b) their configurations was calculated.

Results

Teachers' interests in action-orientation in ESD

The thematic analysis of the vignettes (to answer our RQ1) showed that the teachers point out their interest in a range of five dimensions of action-oriented ESD: (*A) Peer interaction, (B) Interdisciplinary approach, (C) Action-taking, (D) Community involvement and (E) Leadership in learning and teaching*. All the above dimensions are based on the Action – orientation in ESD framework. The majority of the dimensions (except *Peer interaction-A* and *Interdisciplinary Approach-B*) are divided in two or three sub-dimensions. *Community involvement (D)* is divided into two subdimensions: (a) The community gets into the school (e.g., via actuality, experts giving a speech in class or parents involved in class, or (b) The school gets out to the community (e.g., to workshops organized by local organizations, to ask residents' opinion on issues, or to investigate an issue in its real context and contribute to its solution).

Action-taking (D) is also divided into two subdimensions: (a) changing our everyday lifestyle behaviour or about how policy- makers and companies should behave or (b) taking action either to inform or persuade others (e.g., via performing a play in a local event) or to directly contribute to the solution of a real problem. Teachers are interested in both the low (the first subdimension) and the high (the second subdimension) aspect of *Action- taking*. The focus of the conceptual framework is on action-taking towards concrete SD problems and not on behaviour. Action is not the same as behaviour, but it is "*directed at solving a [concrete] problem and it should be decided upon by those preparing to carry out the action*" (Jensen, 2002, p. 326). However, the teachers mention not only actions but behaviour options, as well. They report their interest not only on everyday lifestyle options but also to policy- making and companies' options, that is, towards behaviour options on personal, policy and business level. Teachers are interested in making students aware of the need to change their behaviour in their everyday life in accordance with teacher's view. This could

be associated with the ESD 1 typology proposed by Vare and Scott (2007), which entail behaviour modification according to prescribed solutions.

Leadership in learning and teaching (E) is divided into slightly different subdimensions than these on the vignettes. While two subdimensions had been used (see table 2: 'The teacher uses fixed themes to work with the students' & 'The teacher takes students' interests when choosing themes for students to work about'.), one more subdimension came out of the data (see table 2: 'The students indicate about which themes they want to work'.). This categorization is in alignment with Lee's (2014) findings based on case studies at two Eco-clubs in UK. She concluded, based on the Harts' participation ladder (1991), also in three subdimensions of participation in class: (a) Adults lead; children involved, (b) Adults lead; children influence, (c) Children lead; adults support & assist.

Table 2 shows the resulting dimensions and their subdimensions. The dimensions are presented in rank order according to the frequencies (in percentages) from the least to the most reported dimensions. Figure 2, in the next section, depicts the frequencies in percentages of the reported dimensions and subdimensions.

Table 2.

Action-oriented instructional practices: Dimensions and Sub-dimensions

Dimensions	Sub-dimensions
A. Peer interaction	(1) The students work in small groups and then, they present their work to the whole class.
B. Interdisciplinary approach	(1) The students work via several disciplines.
C. Action-taking	(1) The students concern themselves with how they should change their or their parents and family everyday lifestyle behaviour or about how policy-makers and companies should behave. (2) The students take action either to inform or persuade others (e.g., via performing a play in a local event) or to directly contribute to the solution of a real problem.
D. Community involvement	(1) The community gets into the school (e.g., via actuality, experts giving a speech in class or parents involved in class) (2) The school gets out to the community (e.g., to workshops organized by local organizations, to ask residents' opinion on issues, or to investigate an issue in its real context and contribute to its solution).
E. Leadership in learning and teaching	(1) The teacher uses fixed themes to work with the students. (2) The teacher takes students' interests when choosing themes for students to work about. (3) The students indicate about which themes they want to work.

Differences between teachers' interest in ESD-related action orientation and their instructional practices

To respond to RQ2, the differences between teachers' interests and instructional practices are mapped (a) on the dimensions level and (b) on the configurations. To examine above differences, the frequency values first of the dimensions (dimensional analysis) and then of the configurations (configurational analysis) were calculates and compared.

Dimensional analysis

The frequency analysis (in Figure 2) showed that, all in all, the teachers are little interested in action-orientated instructional practices in ESD. Even the dimensions with the highest interest rates (*Community involvement (C)* and *Leadership in learning and teaching (E)* get low frequency percentages: 17,8% and 17,9%, respectively. In other words, less than one in five of the teachers are interested in these practices. The teachers who show interest in *Leadership in learning and teaching (E)* are mainly interested in taking into account students' interests when choosing themes for students to work about (12,2%). The teachers interested in *Community Involvement (E)* are interested either in the local community getting in the school (9,9 %) or in the school getting out to the community (7,9%). The teachers are even less interested in the dimensions of *Interdisciplinary approach (C), Action-taking (D)* with frequency percentages of 10,3% and 10,2%, respectively. The teachers interested in *Action-taking (D)* may be interested in making their students think of everyday lifestyle behaviour (4,5%) or encourage them to take action or inform/persuade others to take action (5,7%). The teachers are also less interested in *Peer interaction (A)* (2,2%).

Considering a cut-off point between highest values and lowest values at 10%, we see that teachers are most interested in *Leadership in learning and teaching* (*E), Community Involvement* (*D)* and less in *Interdisciplinarity (B)* and *Action-taking (C).* However, their instructional practices do not always match with their interests. As for *Community involvement (D)* practices, the teachers are divided into two groups; these whose instructional practices do match with *Community involvement* (D) practices (24,6%), these whose instructional practices do not match with *Community involvement (D)* practices (38%). Similarly, the teachers are also divided to these whose instructional practices match with *Action-taking (C)* practices (18,2%) and those whose instructional practices do not match with *Action-taking (C)* practices (31%). It is surprising that while few of the teachers are interested in *Community involvement (D)* (17,8%) and *Action-taking (C)* (10,2%), more of them report that *Community involvement (D)* and *Action-taking (C)* match to their instructional practices (24,6 % and 18,7%, respectively). While one out of five teachers report that they are interested in *Leadership in learning and teaching (E)*, their instructional practices do not match with that. One out of ten teachers are interested in an *Interdisciplinary*

approach (B), while half of them report that their instructional practices matches with an *Interdisciplinary approach (B)* and half of them not. Figure 3 depicts the differences among interests in and instructional practices regarding action-orientation. All in all, while teachers are interested in letting students' taking responsibilities of their own learning (*Leadership in learning and teaching (E*)) and they may involve the community into their ESD teaching or not (*Community Involvement (D*). Also, they may encourage students to take actions against issues or not (Action- taking against SD issues (*Action- taking (C)).* In any case, they do not let much room for decision-making on students' part.

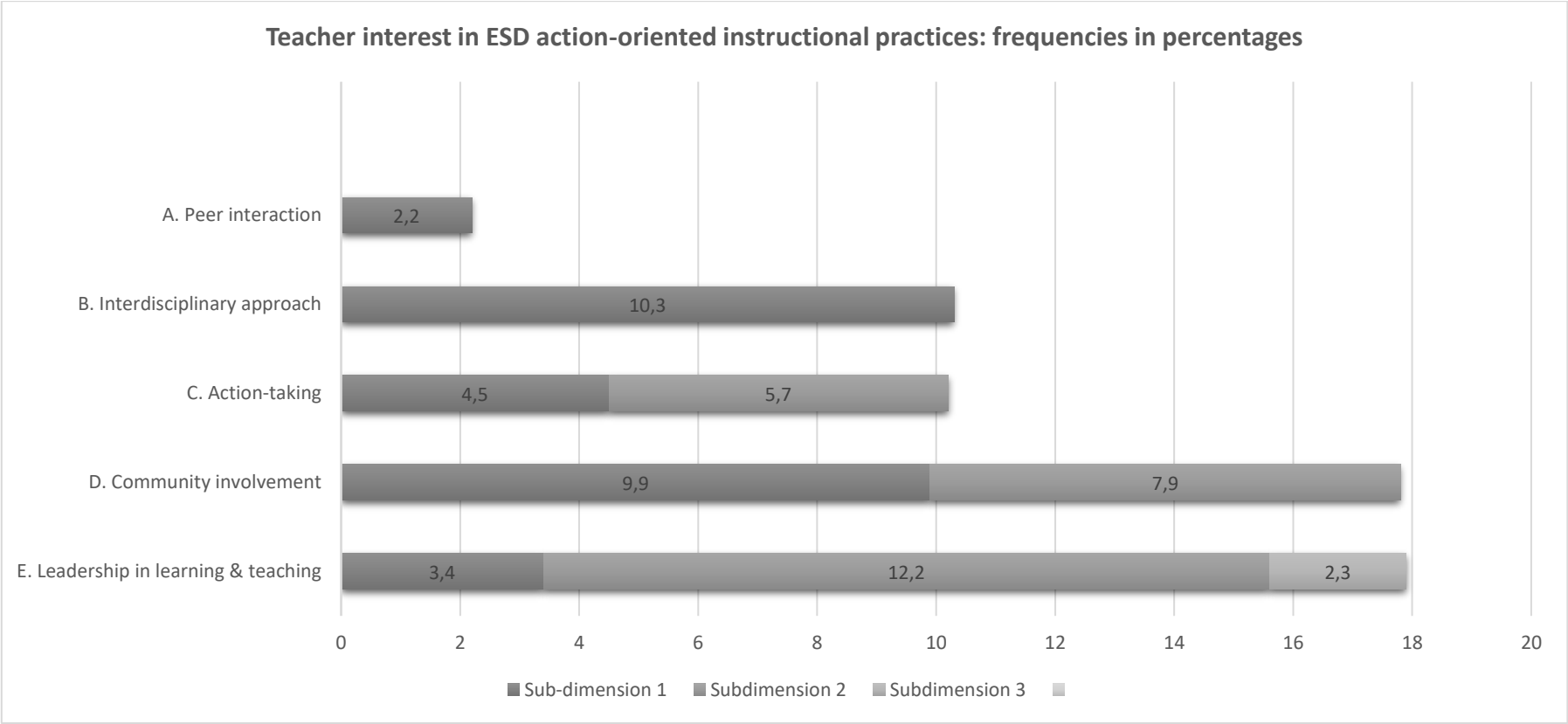

Figure 2. Frequency occurrences of the dimensions and the sub-dimensions in percentages (as these are described in table 2) in which teachers are interested.

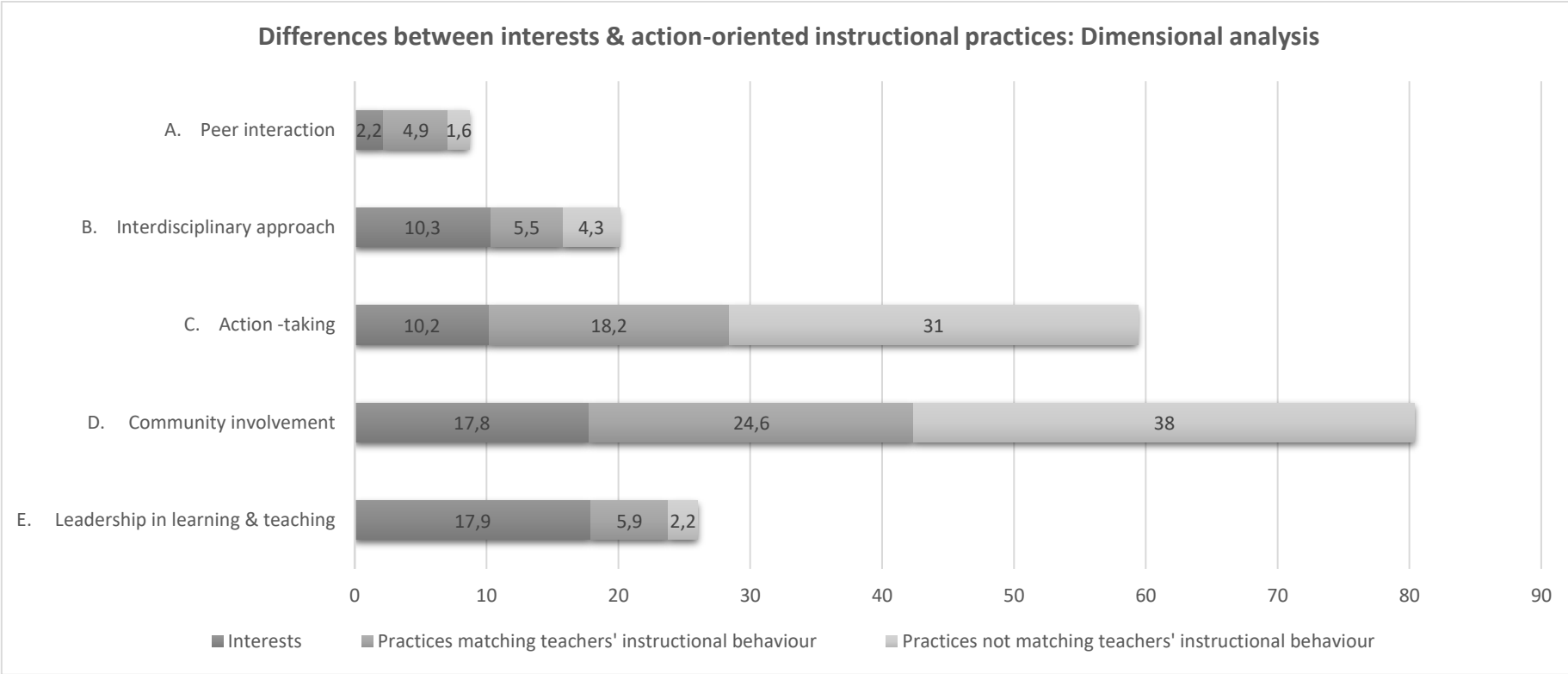

Figure 3. Differences between frequency occurrences (in percentages) of interests and instructional practices: dimensional analysis

Configurational analysis

Even if the majority of the teachers report one dimension, there are some teachers, which refer to two dimensions when responding to each of the three open questions in the vignettes. The analysis showed that some of the dimensions are associated. The most often occurring associations, which consist of two dimensions, are the following: *Community involvement & Action-taking (DC)* and *Community involvement & Leadership in learning and teaching (DE)*. *Community involvement* (D) is thus often reported in configurations. It seems that the involvement of the community is not an instructional practice to stand on its own in ESD teaching practice. One out of six teachers mention that they are interested in combining *Community involvement* practices with *Action-taking* practices *(DC)* (15,8 %) in their ESD teaching. However, fewer (11,8 %) put this configuration into practice. This group of teachers involves the community in order to collaborate with it with the purpose of taking an action against a SD problem. Figure 4 shows the results of the configurational analysis.

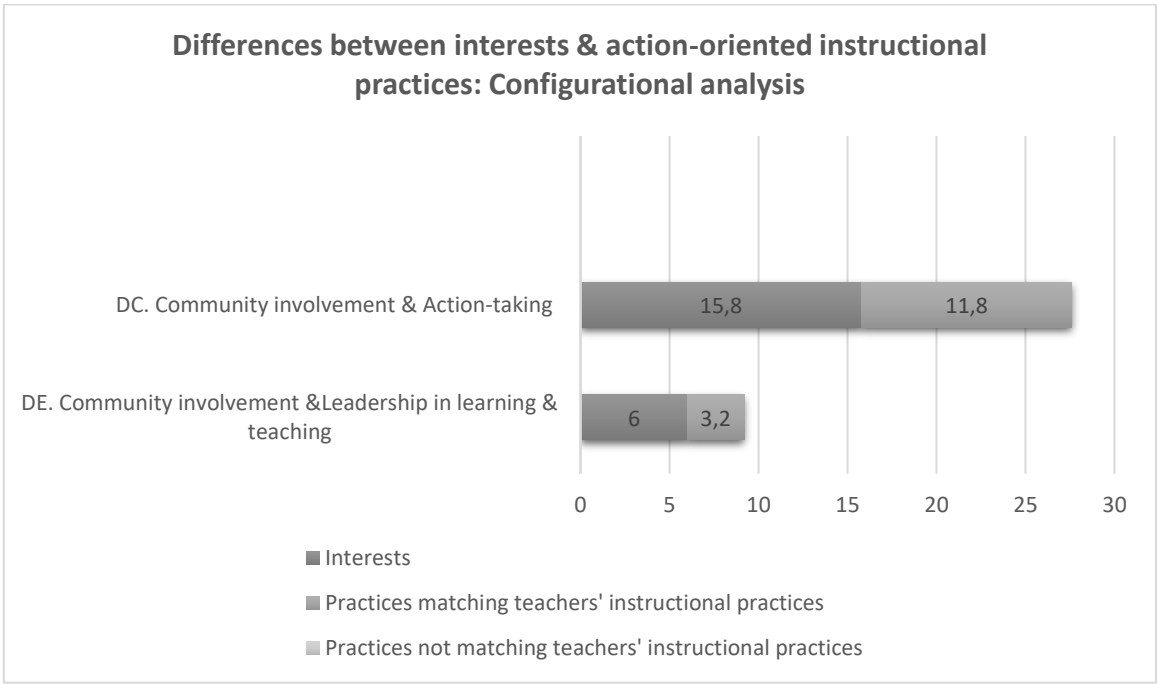

Figure 4. Differences between frequency occurrences (in percentages) of interests and instructional practices: configurational analysis

Differences among reported interests and instructional practices due the vignettes

In this section, possible differences between teachers' interests and their instructional practices are examined based on the two different vignettes, which contain different subdimensions. Vignette 1 contains the subdimensions related to low level action-oriented practices while vignette 2 contains the subdimensions related to high level action-oriented practices (table 1).

The teachers emphasize slightly different dimensions depending on the Vignette which they are confronted with. When they respond to Vignette 1, the teachers are interested more in *Community involvement (D)* practices with a percentage of 10,7%. On the contrary, as a response to Vignette 2, they report that they are more interested in *Leadership in learning and teaching (E)* (11,5%) and in combining *Community involvement practices* with *Action-taking* practices *(DC)* (11,5%). As for instructional practices, when they are confronted with Vignette 2, they mostly report that that they apply *Community involvement* practices (dimension *D)* (16,6%), Action-taking (14,4%) as well as their combination (10,7%). When they get confronted to Vignette 1, they favour Community involvement (D) (10,2%) and Action-taking (C) (7,5%) but not their combination, as it is rarely reported (1,1%) by the same teacher. There is however a difference in their responses, when they are asked if *Action-taking (C)* does not match their instructional practices. As a response to Vignette 2, the instructional practices of one of three teachers (29,4% of the teachers) does not match with *Action- taking (C)*. This is the case only when they respond to Vignette 2 in contrast to Vignette 1, to which they do not mention almost at all (1,6%). The dimension *Community Involvement (D)* does not seem to have any difference among Vignette 1 and Vignette 2. In both cases, the same more or less percentage of teachers mention as a response to both vignettes that their instructional practices match with *Community Involvement (D)*. However, when they are asked which instructional practices do not match their instructional practices, one out of three teachers (28,9%) mentions that they do not involve the local community when they teach about SD issues. This is the case with Vignette 1, whereas this percentage declines to 9,1% of the teachers in relation to Vignette 2. Figures 5, 6 and 7 show the differences between frequency occurrences (in percentages) of interests and instructional practices as a response to Vignette 1 and Vignette 2, respectively.

Some dimensions are again emphasized more than others. In general, the teachers report their interest in *Action-taking (C)* and *Community involvement (D)* or their combination (*Community involvement/ Action-taking (DC).* These dimensions match more or less their instructional practices. As above, one group of teachers is distinguished which engages students into actions towards SD issue and collaborate with the community for that. The only dimension that is referred in relation to their interests and not often reported in the practices is *Leadership in learning and teaching (F)*. This means that while the teachers are interested

in negotiating who is taking responsibilities during the lessons about SD issues and even let the students make decisions, they do not enact this into their ESD teaching.

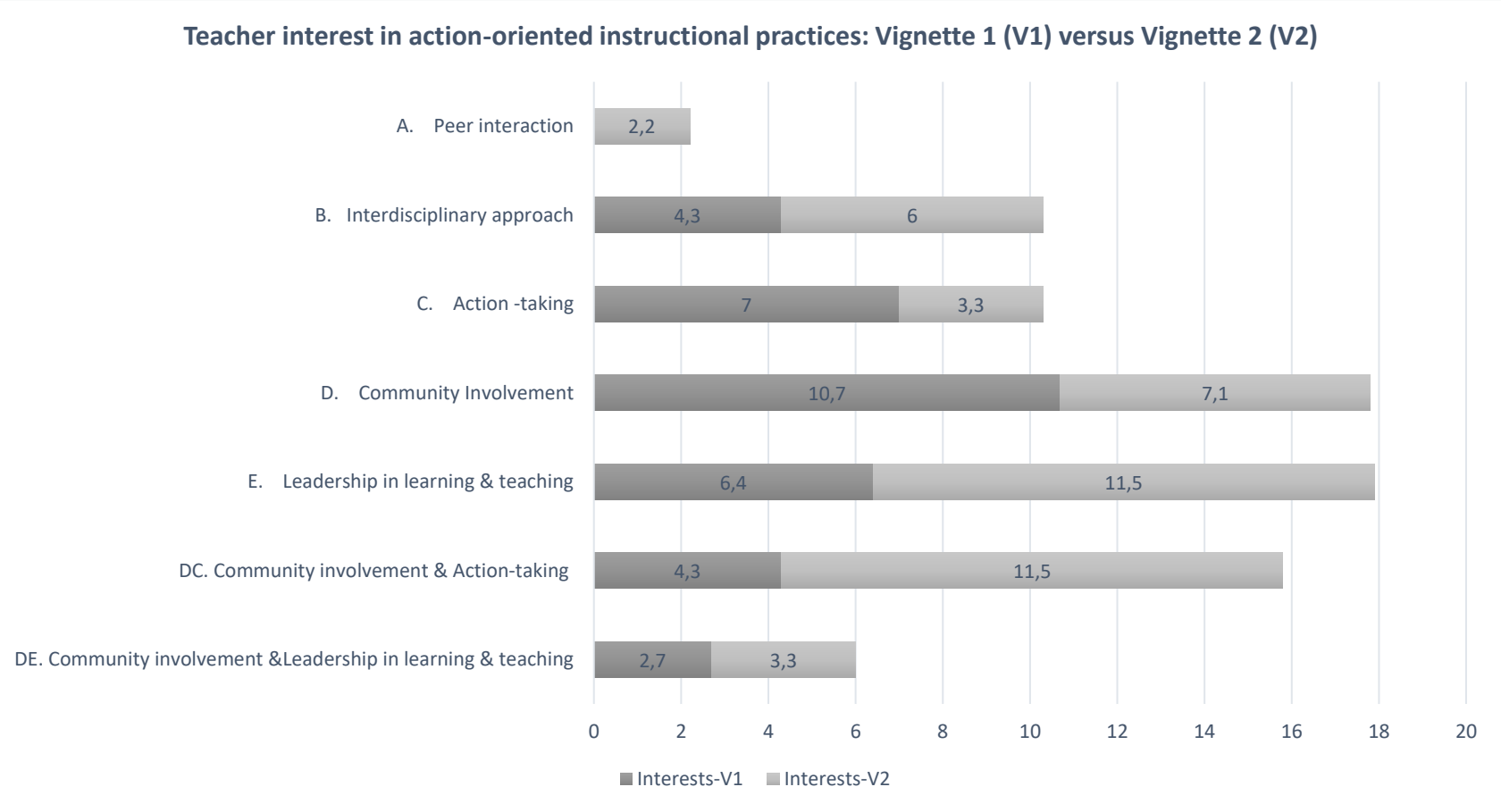

Figure 5. Differences between frequency occurrences (in percentages) of interests in action-oriented instructional practices as a response to Vignette 1 (V1) versus Vignette 2 (V2).

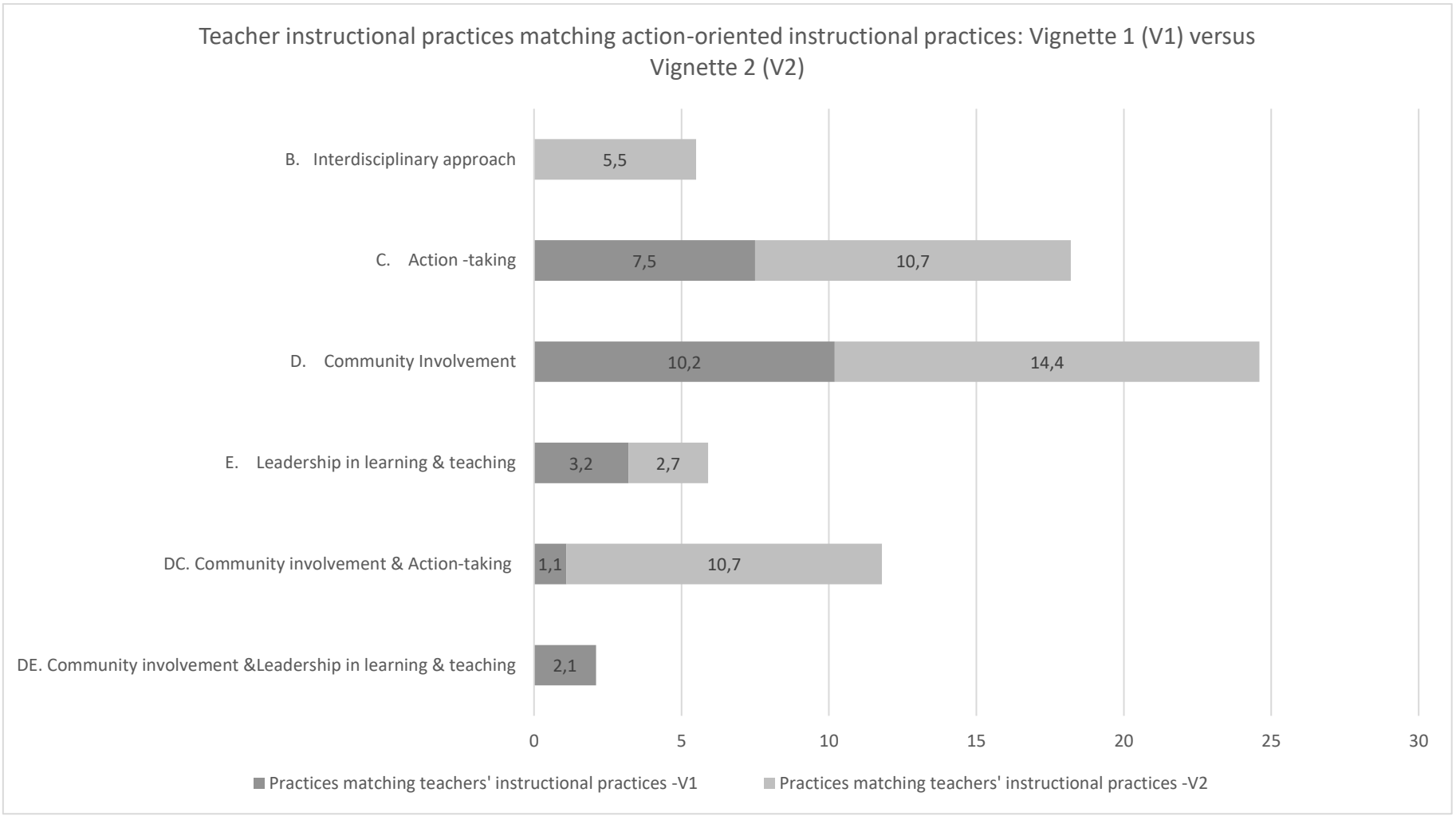

Figure 6. Differences between frequency occurrences (in percentages) of action-oriented instructional practices in ESD and teachers' instructional practices in ESD as a response to Vignette 1 (V1) versus Vignette 2 (V2).

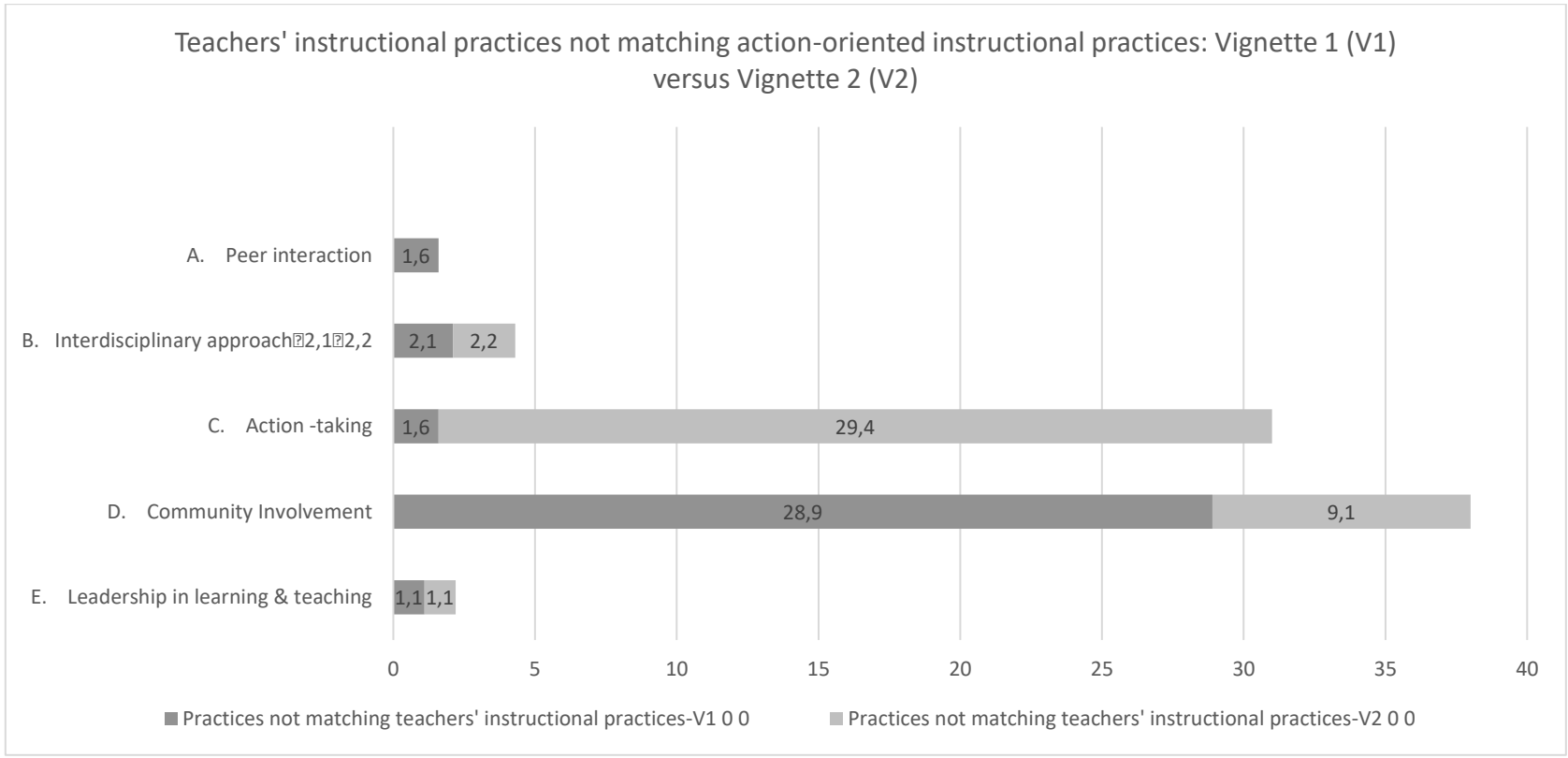

Figure 7. Differences between frequency occurrences (in percentages) of teachers' instructional practices in ESD not matching action-oriented instructional practices n ESD as a response to Vignette 1 (V1) versus Vignette 2 (V2)

Discussion

A gap between teachers' ESD action-oriented instructional practices and their related interests

In this study, a survey vignette methodology was used to explore if teachers' instructional practices match with action-oriented instructional practices and their interest in these practices. Also, the relationship among teachers' action-oriented instructional practices in their ESD teaching was examined, as seen are reported by them, and their interest in them. The teachers' interests in ESD action- oriented instructional practices are not always in alignment with their instructional practices. While they are mildly interested in *Leadership in learning and teaching (F), Community Involvement (E), Interdisciplinarity (C) and in Action-taking (D),* confronted with the vignettes they only recognise *Community Involvement (E), Action-taking (D)* practices in their own ESD teaching.

While teachers express their interest about *Leadership in learning and teaching (F),* they report that they do not let students make decisions and take responsibilities in their ESD teaching. Assumably, *Leadership in learning and teaching (F)* is an issue that teachers could not easily 'touch'. Possibly this might be related to the perception that a teacher, is always responsible for teaching and student learning. Teachers consider it as a given fact and thus, they think that there is no need to think of it as an issue under negotiation. Teachers, the one or other way, apply *Leadership in learning and teaching (F)*. When it comes to their practices, it is not easy for them to distinguish it in their ESD teaching and thus, report it. As for peer interaction, it is remarkable that teachers are not interested in peer interaction during their ESD teaching. However, students need to work together in order to deeper understand and deal with SD issues. Even if some actions can be taken individually, the most effective actions are the collective ones. In the latter case, students need together to take decisions, organize and undertake collective actions which have a major impact (Lee, 2014; Steiner & Posch, 2006; Wals & Rodela, 2014). Some teachers report that they are interested in ESD instructional practices, and report that they teach about behaviour options on personal, policy and business level instead of taking actions towards concrete SD problems. They involve to a certain degree the community in the teaching about SD issues in their efforts to let students identify and adopt everyday lifestyle behaviours. This instructional practice is closer to behaviour modification in ESD (typology ESD 1) (e.g., Vare & Scott, 2007). This instructional practice is probably less demanding for the teacher in terms of time, knowledge, skills, available materials than action-oriented instructional practices. Also, such discussions have most possibly no effect on the function of the rest of lessons of the same or teachers or even the school. This is because more often than not decisions are made in terms of concrete actions to be taken (Jensen & Schanck, 1997; Jensen 2000). At the same time, it is less demanding for the students, as well. This is because

except for expressing their views, what they expect them is the teacher to impose its solutions.

Despite the fact that the majority of teachers might conceive action- orientation in ESD largely unidimensionally, there are a few teachers who recognise two dimensions at the same time. The configurational analysis showed that some teachers collaborate with the community to act towards SD problems. It seems that some teachers engage their students with actions in the public sphere. While private sphere actions towards SD issues are also desirable in ESD teaching, actions directed at public sphere SD issues are very important (Lee, 2016). Public actions require students to act collectively. In this regard, public issues are often more demanding for students in terms of both understanding them and coping with them. And also, more challenging for teachers who need to effectively support their students. This type of ESD teaching can be directly connected with ESD 2 typology of Vare & Scott (2007), which is about making students critical thinkers and action takers. We have seen before that a group of teachers are interested in behaviour modification, while we now see another group of teachers who is interested in actual action-taking. The typology of ESD 1 and ESD 2, which was much discussed on a theoretical and conceptual level is largely confirmed by this study. This aspect of classroom reality could not be revealed if our data were treated unidimensionally and not integratedly through a configurational analysis.

Despite not directly examined by this study, some conclusions can be drawn in relation to teachers' conceptual understanding of action-orientation in ESD. The fact that the majority of teachers report only one dimension of action-orientation indicates that they do not recognize more. It seems, therefore, that they do not have an elaborated conceptual understanding of action-orientation in ESD but rather poor. Therefore, it appears that it is demanding to develop interest in action-oriented instructional practices in ESD and even implement them efficiently in practice. However, as this was not directly examined in that study and it was always related to the specific situation (each vignette) more research should be done on this topic.

Depending on the vignette which they are asked to respond to, teachers sometimes report different interests and instructional practices. The vignette with high action-oriented instructional practices might have raised their interest in more complex action-oriented ESD teaching. This is not surprising since this vignette includes advanced instructional practices. Teachers' interests as well as their reported instructional practices vary to some degree according to the context of the vignettes. It seems that different contexts provoke teachers' different interests and make them recall different instructional practices. By using two different class situations- vignettes, this study managed to reveal a variation of interests and instructional practices in relation to action-orientation in ESD, otherwise not possible. The 'real life' vignettes did not give rise to confusion in relation to shifts in focus from fiction to the 'real world' allowing the teachers to delve into their own experience and deviating the discussion from the

abstract to the personal (Risvi, 2019). All in all, the Action-orientation in ESD Questionnaire (AoESD-Q) is context-aware regarding the level of action-oriented instructional practices and as such, it allows to consider teachers' responses via a context-specific analysis (Steiner & Atzmüller, 2016; Friesen & Kuntze, 2021). However, AoESD-Q includes two vignettes (i.e., more than one), which allows for variations in context (Steiner & Atzmüller, 2016). Contextual variations allow for deeper nuances in the thematic analysis and in the configurational analysis. The AoESD-Q also gives us the opportunity to analyse teachers' responses independently from the fact that the vignettes include low or high action-oriented instructional practices (Friesen & Kuntze, 2021).

For this study, the data were collected through convenience sampling (Galloway, 2005) from 187 Flemish elementary and secondary school teachers at the schools which participated in the teacher professionalisation programme of the VALIES research project. The participating teachers had expressed their consent to also take part in this research. It is thus a limitation of this study that the findings are specifically relevant to this group of teachers. Further research is needed to investigate if the results of this study are also relevant to the larger samples of Flemish elementary and secondary school teachers or in other countries.

Factors that hinder the relationship between teachers' ESD action-oriented instructional practices and their related interests

This study revealed that teachers' interests do not always seem to match with their instructional practices in ESD. Despite the fact that teachers are often interested in action-orientation in ESD, they do not seem to put it into practice. Most possibly this is due to conflicts with mainstream school practices which aim at individual students, high achievements and not at the transformative goals and visions imposed by ESD (Hacking, Scott & Barratt 2007). It seems that teachers get little support to teach ESD effectively (Sinakou et al., 2019a). Even if there are available recourses for ESD teaching, teachers may have difficulties in using them so as to apply effective instructional practices (Anyolo, Karkaaien & Keinonen, 2018). It seems that policy initiatives about ESD have little impact on teachers' instructional practices (e.g., Olsson, Gericke & Rundgren 2016). Therefore, teachers professionalisation programmes should emphasise the value of applying action- oriented practices (e.g., Boeve-de Pauw et al, 2022). They should aim at broadening teachers' conceptual understanding of action-orientation in ESD, cultivating their interest towards action-implementation in ESD in order to make them more willing to implement them in class (Hidi & Renniger, 2006; Lauermann, 2017; Long & Woolfolk Hoy, 2006; Renniger & Su, 2012; Renniger 2009). Lately, it is found that innovative teaching approaches are not implemented during teachers professionalisation programmes (Sinakou et al., 2018). During professionalization programmes, teachers could be confronted with scenarios about class situations as a starting point of discussions.

Future research on teacher interests in ESD teaching is still to a great extent underexplored on both theoretical and empirical level (Lauermann, 2017; Schiefele, Streblow & Retelsdorf, 2013). This is especially the case with teachers' interests towards specific instructional practices in general but also in ESD, as well. How these are developed, sustained and put into practice are some the questions that need to be answered. Moreover, since until now there is much theoretical discussion on the teaching approaches and instructional practices in an action- oriented ESD, we would like to urge for more empirical research on that topic from both teachers' and students' perspectives for triangulation purposes. In that way, policy- making and curriculum development could be based on evidence-based practices. Several forms of evaluating whether teachers' action-oriented instructional practices are indeed efficient should be developed (e.g., at students' level) to inform ESD research and practice. Furthermore, future research should also focus on how a survey using vignettes as stimuli could be conducted. Instead for instance of using written scenarios, as in this study, researchers could make use of visual or verbal-only vignettes, which seem to be afforded for higher rates in responses (McInroy & Beer, 2021).

Implications for teacher professionalization programmes

Our study's conclusions are important to ESD teacher professionalization programs. These programs should assist teachers enhance their instructional practices and interests, as well as acquire knowledge and skills to put them into practice. Teacher co-learning activities, as Isac et al (2022) note out, have the ability to develop teachers' ESD competencies. These possibilities should be available through teacher professionalization programs. Teachers should also engage in deep and introspective dialogues, reflecting their existing instructional practices in order to be inspired to implement teaching innovations such action-oriented teaching in their class (Dhungana et al., 2021; Rauch et al., 2021; Rubenstein et al., 2018). Recently, some teacher educators have developed teacher professionalisation programmes in ESD based on action research methodologies (e.g., Dhungana et al., 2021; Rauch et al., 2021). Rauch et al. (2021) showed that teachers, taking part in action research project towards ESD, get knowledge and skills for systematic reflection on their own practice, as well as information on how to improve it. That participants get knowledge and skills for systematic reflection on their own practice, as well as information on how to improve it (Rauch et al., 2021). Teachers need experiences that will advance their interests in action-oriented instructional practices (Fuertes-Camacho et al., 2021). Participatory Action Research could be seen as way to integrate observation and methodical reflection. It is a method for critical understanding of reality that integrates theory and practice (Fuertes-Camacho et al., 2021).

Conclusion

The current paper deals with an underexplored theme, that is, teachers' action- oriented ESD instructional practices and related interests. The paper opens up a new line of research on ESD teaching using an innovative methodology by combining a survey vignette instrument with qualitative comparative analysis. A novel instrument is offered to the ESD research to further investigate ESD teaching and the data analysis collected is open to various methodological applications. Our study revealed that teachers are little interested in action- oriented ESD. They teach their students how they should behave in their everyday life in relation to SD issues or they engage them into actions towards SD issues. They mostly recognize the involvement of the local community in their lessons about SD issues. and they collaborate with it in order take actions towards SD issues. They also mention different instructional practices depending on given class situations. In this regard, this study succeeds in revealing a variation of action- oriented ESD instructional practices, as an attempt to disclose aspects of the complex reality in the classroom. Our research findings urge for more emphasis on action-orientation towards SD issues during teacher professionalization programmes.

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Appendix

Table 1. ESD teaching approaches scales.

Holism
1. I let my pupils work with the connections between past, present and future in different issues.
2. I let my pupils work with the connections between the economy, social issues and environmental problems.

3. I let my pupils work with local and global problems and the connections between them.

Pluralism

4. As the teacher, I lead my lessons. (reversed item)
5. When my pupils read texts, we usually review the contents critically.
6. Based on my experience, I decide which areas of knowledge my students have to work with. (reversed item)
7. I encourage my pupils to consider and have their own opinions on the issues we address.
8. I use many different methods, depending on the nature of the area of knowledge.
9. My lessons often include conversations in which different views are highlighted and discussed.
10. I spend much of my teaching time on skills training. (reversed item)
11. societal actors, for example from the municipality, business or associations, constitute the learning environment in my teaching.
12. Nature or other outdoor environments are used in my teaching.
13. My teaching is generally conducted within one subject at a time. (reversed item)
14. I refer to current events in my teaching.

Source: Boeve-de Pauw et al. (2020).