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# Teaching action competence in education for sustainable development – a qualitative study on teachers' ideas, opinions, attitudes and self-conceptions

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Education for sustainable development (ESD) is a policy guideline which has a significant impact on the teaching of geography in Germany. A central element of this model is to impart and develop in students a goal-oriented action competence to solve sustainability problems. However, action competence in ESD has not yet been scientifically defined or sufficiently researched. This raises the question of how teachers currently teach action competence to students as a central element of ESD. This article examines teachers' understanding of ESD, action competence and their own role in this context. To this end, a literature-based model of geographical action competence in ESD is presented. Subsequently, a qualitative triangulated teacher study is presented, which is analysed with the help of the model. It is shown that teachers generally have a high level of knowledge about ESD and are highly motivated to teach action competence. However, it becomes clear that the teachers seem to differ in their understanding of sustainable action competence as well as in their understanding of their own role.

KEYWORDS

**education for sustainable development (ESD), action competence, geograpfic education, sustainable development, teaching action competence**

## 1 Introduction

The concept of education for sustainable development (ESD) is linked to the political goal of shaping and transforming societies according to the normative model of sustainable development (*cf.* Wettstädt and Asbrand, 2014, 5). To this end, the coming generation of responsible citizens should be enabled to achieve the Sustainable Development Goals (SDGs) set by the United Nations in 2015. To achieve this goal, students should not only be taught facts about unsustainable developments such as climate change or species extinction. They should be empowered to think ahead, to act independently and cooperatively, and to participate in social processes. These skills and competences can be summarised under the term 'sustainable action competence,' which plays a central role in ESD concepts. The competence to act 'encourages learners to take action on an individual and collective level to the extent possible in order to shape a sustainable future' (Bianchi et al., 2022, 26). In this context, the German Conference of Ministers of Education and Cultural Affairs (Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK) and Deutsche UNESCO-Komission (DUK), 2007, 3) states that the objective of ESD is to apply the

knowledge acquired. It is 'not only about the acquisition of general knowledge, but also about its application in concrete situations in which students learn to assess the effects of their own actions' (*ibid.*). Geography education is particularly suitable for teaching ESD, as 'topics on human-environment relationships and the distribution and use of resources are intrinsic to geography education' (Leder, 2015, 138), and action competence is a fundamental competence of the subject (Deutsche Gesellschaft für Geographie E.V. (DGfG), 2020).

However, research on action competence in the context of ESD is still a desideratum. Neither the term action nor action competence has been uniformly defined (*cf.* Wettstädt and Asbrand, 2014, 6). Although action competence is a component of some theories of ESD, such as De Haan's (2010) Gestaltungskompetenz, action competence itself has hardly been explicitly considered. In this respect, there is also a research gap in the research on geography teachers. It has not yet been investigated how teachers understand ESD action competence, what didactic goals they associate with it and what they want to convey to their students in this context. In order to investigate this, ESD action competence first needs to be scientifically defined and described. Therefore, this article presents a theoretical model that describes the sub-competences of action competence on the basis of the scientific literature. With the help of this model, the understanding of 14 geography teachers is analysed and classified. The following research questions are examined:

1 How do teachers understand ESD and action competence in this context?
2 How do teachers understand their own role in promoting action competence in the context of ESD?

Based on the current state of research, this article describes the sub-competences that make up action competence in ESD. Then the methodological approach and the results of the qualitative teacher survey are presented. Finally, various conspicuities, uncertainties and contradictions in the teachers' attitudes are discussed.

# 2 Theory

## 2.1 State of research

Action competence plays a central role in almost all concepts and models of ESD. For example, in his Gestaltungskompetenz, De Haan (2010, 320) implicitly mentions action competence in 8 out of 12 sub-competences through expressions such as 'thinking and acting with foresight' or 'participating in decision-making processes'. It sees the application of knowledge about sustainable development as a central building block of ESD. Furthermore, the European Commission's 'GreenComp Conceptual Reference Model' of 2021, designed as a guideline for the implementation of sustainable strategies, identifies 'acting for sustainability' as one of the four central components of ESD. A distinction is made between 'individual initiative,' 'collective action' and 'political agency' (Bianchi et al., 2022, 3). As a final example, the Education 2030 initiative launched by UNESCO as part of Agenda 2030, which aims to promote quality education for all, also refers to action competence in four of the nine sub-competences of ESD. Here, 'concrete action' is explicitly emphasised (Stelzer et al., 2012, 7).

Critics of ESD have shown that although ESD imparts a high level of environmental knowledge, sustainable actions and behaviour often do not follow (Gebauer, 2021, 151 ff.). Thus, ESD knowledge does not initiate action. For this, the action competence itself has to be conveyed. However, research dealing with action competence in ESD is rare. Conditions for the readiness to act are identified, but the competence to act itself is not clearly described. Furthermore, there is a lack of models that differentiate and relate the sub-competences of sustainable action competence. Rieckmann (2016, 7) therefore also sees a research gap in the systematisation and differentiation of sub-competences of ESD, such as action competence. The few works on action competence in ESD, such as the 'Action Competences in Sustainable Development' model by Sass et al. (2020, 301), seem unspecific, as action competence in their model only consists of knowledge and affective attitudes such as self-confidence, willingness, commitment and passion. However, especially when it comes to teaching action competence in classroom practice, there are some ambiguities that could make it difficult for teachers to teach ESD action competence, as no guidance is given on how self-confidence or passion can be fostered by the teacher. Due to this lack of scientific basis, controversies arise in the didactic implementation in schools about forms of action, implementation of action and the role of the teacher.

### 2.1.1 Forms of action

As ESD is still not uniformly defined (Gryl and Budke, 2016) and continues to be the subject of scholarly debate, there is also no uniform answer to the question of what forms of action ESD aims at (Hamborg, 2020, 3). Artmaier et al. (2021, 9), for example, argue that students should learn to make their personal behaviour sustainable in order to achieve social change collectively. In contrast, Pettig (2021, 12 ff.) sees ESD as an opportunity to create critically reflective, transformative learning opportunities that lead to collective and far-reaching action. The aforementioned 'GreenComp conceptual reference model' distinguishes between individual, collective and political action, all of which are included in ESD action competence (Bianchi et al., 2022, 3).

### 2.1.2 Action implementation

In the case of ESD action competence, the question also arises as to whether this is a theoretical competence that should enable students to act outside of school, or whether action itself should already be part of ESD teaching. According to Ohl et al. (2016, 90), action competence serves to enable students 'in the sense of ethical judgement competence to make their own decisions for action based on professional and value-related considerations'. Vare and Scott (2007, 193 f) go beyond this thinking through of possible decisions for action. According to them, in addition to learning theoretical options for action ('learning for sustainable development'), these must also be tested, tried out and critically reflected upon in school ('learning as sustainable development').

### 2.1.3 Role of the teacher

ESD, in particular, has repeatedly been accused of being developed in a 'top-down approach' (Gryl and Budke, 2016, 66) and therefore of running the risk of schools and teachers manipulating and indoctrinating students into what they believe to be the right behaviour (Ohl et al., 2016, 95). The German national educational standards for geography clearly state: 'Pupils must not be manipulated

or forced to act' (Deutsche Gesellschaft für Geographie E.V. (DGfG), 2020, 26). They refer to the Beutelsbach Consensus, which prohibits manipulating students by asking them to take actions that they consider to be the only right ones, without allowing them to form their own opinions and make their own decisions (Wehling, 2016, 24). The Beutelsbach Consensus is considered the minimum consensus of political education in Germany and is based on the preservation of the Basic Law (*ibid.*, 25). At the same time, however, the document contains surprisingly precise targets for action, such as the purchase of organic products, which should be implemented by pupils through ESD lessons (Deutsche Gesellschaft für Geographie E.V. (DGfG), 2020, 28). The different specifications could put teachers in a dilemma. This dichotomy was also explored in teachers' statements by Budke et al. (2016, 162) in relation to citizenship education.

Empirical research on German geography teachers' understanding of ESD action competence does not yet exist. However, some studies have been conducted on ESD among teachers and their professionalisation. The study by Hellberg-Rode and Schrüfer (2016, 25) makes it clear that 'teachers need special knowledge and skills to implement ESD in school', but that there are 'major deficits in the teaching of this knowledge and skills by universities and colleges' (*ibid.*). A study by Reinke and Hemmer (2017, 41) also shows that 'non-school actors in the field of sustainable development and ESD have significantly better conceptual knowledge than teachers.'

It can thus be seen that although action competence is an important component of ESD, research and discussion on it is still at an early stage.

## 2.2 Model of geographical action competence in education for sustainable development

Although many aspects of competences in ESD have been investigated in the scientific discourse, the models of action competence concentrate on aspects such as willingness and motivation (Sass et al., 2020, 301). There is no model that relates the competences to each other and that can be used by teachers for structuring purposes. Based on the current literature, a model of geographical competence in ESD has been developed (see Figure 1).

The model presented here is based on the relevant literature on ESD, research for action competence and the didactics of geography. Nine central components of geographic action competence in ESD have been identified and related to each other. These are presented below. Although the importance of each component has been proven in the scientific discourse, the resulting model cannot and should not claim to be complete or flawless. Rather, it can serve to help geography teachers develop an understanding of the components that can make up action competence in ESD and to examine their current understanding, and to help stimulate discussion in the scientific discourse. In the following, the relationships between the individual components are explained and then each individual component and its meaning is described and substantiated.

In order to describe the relationship between the different competences (see Figure 1), it must first be noted that subject knowledge, system thinking and conflict perspective, and knowledge of possible actions and solutions are not actions in themselves. Rather, they serve as a basis for competent action. Ideally, these competences are sufficiently developed before action is taken. The acquisition of knowledge and these competences always takes into account the sustainability square of economy, environment, social and political aspects (see light blue square in Figure 1). Building on this, students can carry out sustainable actions and improve their action competence. According to Weber (1922/1988), 22 ff), communication and argumentation and assessment are also independent actions. Nevertheless, a series of ESD lessons should ideally culminate in a participatory or creative action. As shown in the European Commission's 'GreenComp cenceptual reference model', these actions can be carried out at an individual, common or political level (Bianchi et al., 2022, 3) (see dark blue triangle in Figure 1). Ideally, in all these steps towards sustainable action competence, students should reflect on their intentions, ideas, methods, actions and the effects of their actions, and thus adapt their work process again and again. Finally, in all steps towards sustainable action competence, the geographical spatial reference and the different scale levels should be considered. The individual sub-competences of the model (see Figure 1) are described in more detail below.

### 2.2.1 Subject knowledge

The professional basis for any meaningful work on sustainability issues in schools is expertise. Without sufficient subject knowledge, any discussion and action can only remain at a superficial level. For this reason, both in ESD (Rost et al., 2003; *cf.* De Haan, 2010, 322; United Nations Economic Commission for Europe (UNECE), 2012, 14) and in research on action competence (Jensen and Schnak, 1997, 173; *cf.* Frey, 2004, 904; Sass et al., 2020, 299 f.), subject knowledge is regarded as a central basis.

### 2.2.2 Systems thinking

ESD topics are usually characterised by their complexity, as they often relate to current societal debates with a multitude of actors, and especially topics such as climate change are based on complex cause and effect relationships. Therefore, students need to have a strong systems thinking competence in order to be able to make meaningful decisions on this basis. The importance of systems thinking competence in the context of ESD is emphasised, for example, by Bertschy (2007, 9), De Haan (2010, 323), Gryl and Budke (2016, 64 f.), and Rieckmann (2021, 13).

### 2.2.3 Conflict perspective

ESD action plans are often based on conflicts between different actors from the environmental, economic and social spheres. For example, when switching from fossil fuels to sustainable energy sources, both environmental and social aspects, such as affordability, as well as the economic aspects of energy companies, need to be taken into account. Students must therefore be able to analyse such conflicts (De Haan, 2010, 323; *cf.* Gryl and Budke, 2016, 64 f).

### 2.2.4 Knowledge of possible actions and solutions

In order to get an idea of what could be done in principle, students need knowledge about possible actions and solutions. By learning about different options for action on different sustainability issues in class, they can choose from different options for action and develop their own new actions. They can gain this knowledge about possible actions and solutions, for example, from solutions that have been already found and actions that have been taken in similar sustainability

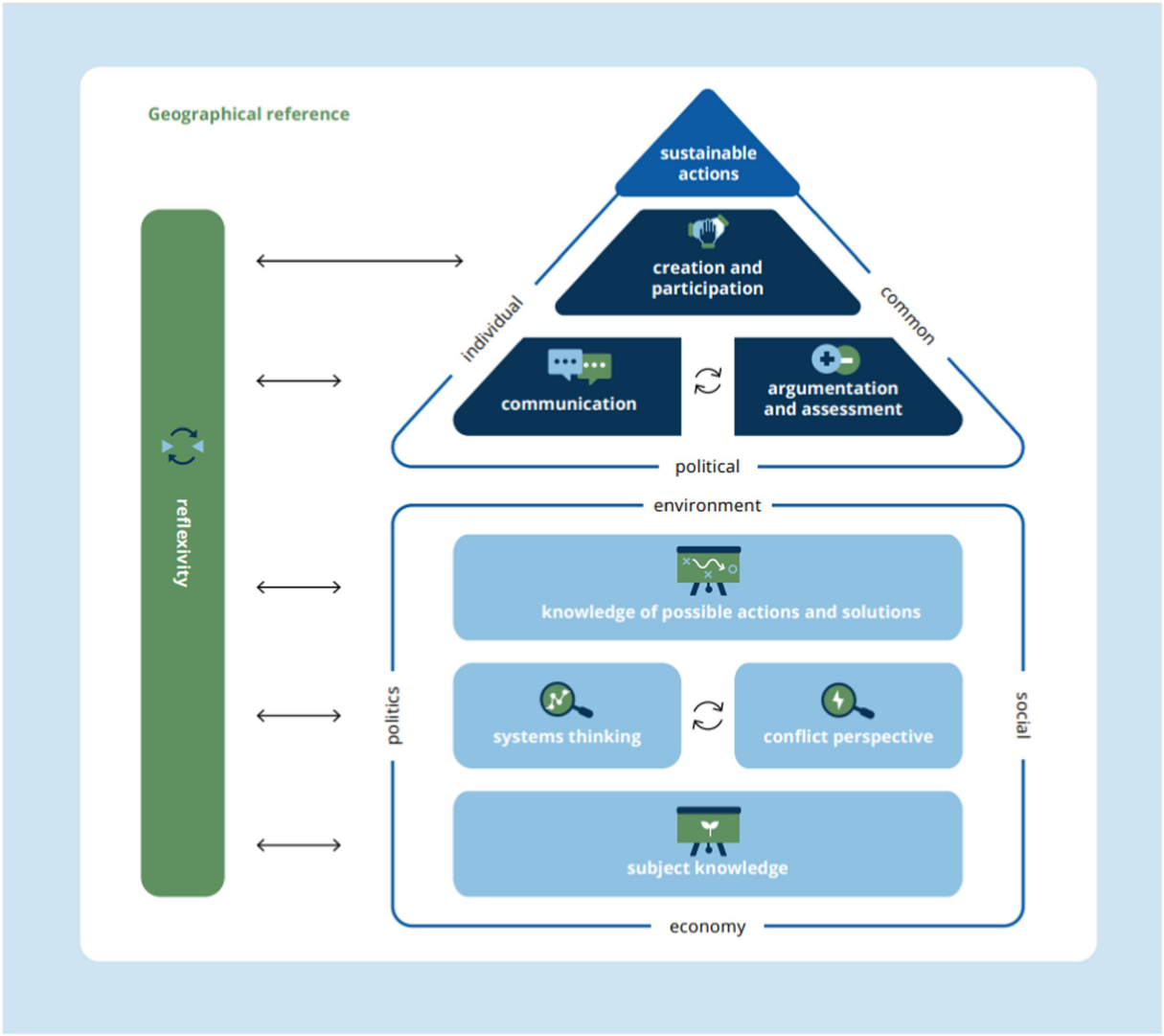


FIGURE 1
Model of geographical action competence in education for sustainable development (ESD). Own model by Schönstein and Budke. Design by Julia Heinrich.

conflicts and issues (*cf.* Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK) and Deutsche UNESCO-Komission (DUK), 2007, 5).

### 2.2.5 Communication

As ESD issues are complex and many actors at different scales have different ideas about ideal solutions, communication with and between these actors is a first step of action. Communication skills enable people to work together and negotiate courses of action (De Haan, 2010, 323 f.; Rieckmann, 2012, 130; Rieckmann, 2021, 13).

### 2.2.6 Argumentation and assessment

Through argumentation, students can develop, justify, test, strengthen and adapt their own position on sustainability. At the same time, they can change the views of others. On the basis of these arguments, students can be enabled to assess a sustainability conflict in a meaningful way (De Haan, 2010, 323; Budke, 2012, 5–18; United Nations Economic Commission for Europe (UNECE), 2012, 14; Rieckmann, 2018).

### 2.2.7 Creation and participation

Participation and creation are two different types of action. Participation is the 'sharing and taking part in the social, political and economic processes of a society in freedom' (Schnurr, 2018, 633). This means that the participant takes part in already existing, mostly democratic processes and thus co-determines and changes them through his or her action. Creation, on the other hand, is a creative process in which the creator influences the social environment, which according to Werlen (2017, 138) is one of the central goals of geographical action. It is about 'learning step by step […] to work conceptually, […] to present ideas convincingly' (Rauner, 2021, 14). In contrast to participation, students create a new, independent idea for an action, rather than taking part in an existing action. These forms of action can be found, for example, in De Haan (2010, 323–325), Rieckmann (2012, 130), and Wettstädt and Asbrand (2014, 11 f.).

### 2.2.8 Reflexivity

Actions need to be reflected upon at all levels in order to gain experience and knowledge and to avoid repeating mistakes. At the same time, reflection influences further action, which requires further reflection. Dewey called this cycle 'continuity of experience' (quoted in Jensen and Schnak, 1997, 166) and Werlen (2017, 138) 'continuous flow of action'. Hence, reflexivity is also listed by Frey (2004, 905), De Haan (2010, 324), Rieckmann (2012, 130), and Sass et al. (2020, 301).

### 2.2.9 Geographical reference

According to Giddens (1984, 141), any social action is always related to the geographical space in which it takes place, and in the case of ESD it is particularly important to consider these spaces, since individual ESD issues usually have a local spatial reference on the one hand, and on the other can have a wide variety of effects at the global level (*cf.* Arnold, 1998, 137). ESD issues can be considered and discussed in different spaces and at different scales, which always influence and condition each other. For example, the resettlement of Lützerath in North Rhine-Westphalia for lignite mining has a local impact on the population and a global impact on the climate. Globalisation has dramatically increased this link between the local and the global (Werlen, 2017, 19). At the same time, such sustainability conflicts, which always move in geographical spaces, need to be considered not only in physical space, but also in socially constructed and perceived space (Wardenga, 2006, 21 f).

## 3 Methods

A qualitative study was conducted with 14 German geography teachers in order to find out how they understand ESD and the related competence for action as well as their own role in it. The study was carried out using a triangulated method with a qualitative guided interview and a quantitative survey questionnaire. Thus, the focus of the method was on 'describing lifeworlds from the inside out from the perspective of the actors' (Flick et al., 2010, 14). The aim is to show how teachers, as actors in the teaching of ESD, understand and describe action competence and its role in ESD. In doing so, they provide an insight into the world of their teaching to encourage the action competence.

### 3.1 Sample

Due to the qualitative and open design of the study, a sample size of 14 teachers was chosen. Since no quantitative statements were to be made, theoretical saturation was reached after 14 interviews to the teachers' understanding. The 14 subjects selected were all active geography teachers at a secondary school in Germany. In order to obtain the most meaningful results possible, the subjects were selected according to the 'theoretical sampling' method (Glaser and Strauss, 2010). This means that the most informative subjects were selected, in this case active German geography teachers, who differed as much as possible in characteristics such as age, gender, second subject or professional experience. In this way, the 'range of results, meaning generalisability and quality' could be achieved as well as possible (Dimbath et al., 2018, 3). The age of the subjects ranged from 24 to 50 years, with an average of 37 years. Teaching experience ranged from one to 22 years with an average of 9.4 years. Eight female and six male teachers with 10 different second subjects were interviewed. Other characteristics of the school or subject, such as a high level of inclusion in the student body or a bilingual profile of the school, were also collected and taken into account in the discussion of the results. For

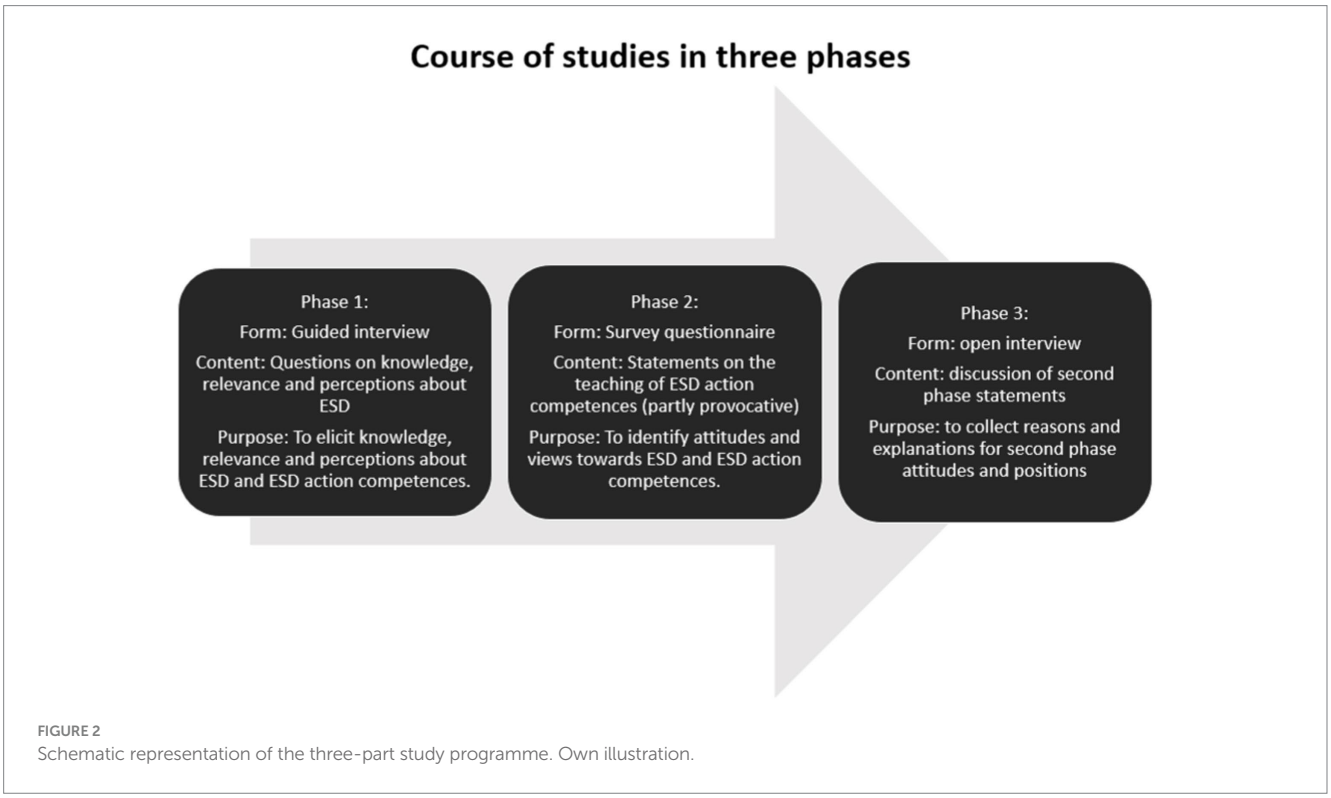


FIGURE 2
Schematic representation of the three-part study programme. Own illustration.

the sake of anonymity, the female teachers are referred to as W1 to W8 and the male teachers as M1 to M6.

## 3.2 Course of studies

The course of the study is described below. It took place in three phases, as shown in Figure 2.

First, introductory questions about ESD were asked in a guided interview. These were answered in detail by the respondents at their own discretion. In this phase, the interviewer only asked questions in case of comprehension problems. In this way, further attempts at structuring are prevented by the interviewer's ideas (Hohl, 2000, 143). The initial aim of this part of the survey was to find out what the teachers thought about ESD. For example, questions were asked about the teachers' understanding of the term ESD, what competences they wanted to promote in their teaching of sustainability, or how motivated they were. As the teachers were not specifically asked about action competence at this stage, it was possible to ascertain the importance of action competence in the context of the other competences and at the same time to exclude the possibility that it was put in the foreground due to social desirability.

Subsequently, the respondents were asked to rate a questionnaire with 42 statements on ESD action competence using a four-point Likert scale (see Table 1). With the help of the questionnaire, attitudes and opinions on action competence could be elicited. Conflicting statements on action competence were presented to the teachers for evaluation. In addition, various controversies in the current scientific discourse (see Chapter 2) were described by two opposing statements. This form of 'reverse coding', in which an item is presented once positively and once negatively, compensates for teachers' tendencies to rate positively or negatively (Magazine et al., 1996). For example, the two contrasting statements 'When sustainable behaviour is clearly right, I as a teacher recommend it as a course of action to my students'

TABLE 1 Structure of the survey questionnaire with selected examples and references.

| Topic | Examples of statements to be rated by teachers (Likert scale from 'strongly agree' to 'strongly disagree') | Literature reference (mentions and discussions of the respective aspect in the scientific discourse) |
|---|---|---|
| Prior knowledge | Through my studies and training, I have been sufficiently trained to promote action competence in the context of Education for Sustainable Development. | Hellberg-Rode and Schrüfer (2016) and Reinke and Hemmer (2017) |
| Motivation | Personally, I am particularly motivated to promote sustainable action competence in my students because of its relevance and timeliness. | Reinke (2021, 115 f) |
| Problems/uncertainties | I feel insecure about how to deal with my own opinions about how to act sustainably. | Budke et al. (2016, 162) |
| Partial competences of the action competence | In my geography classes, students learn to communicate and argue about sustainability issues. | Derived from the model of geographical action competence in education for sustainable development (see Figure 1) |
| Understanding the action competence | Geography lessons on sustainability are more about raising awareness of problems than empowering students to take action. | Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK) and Deutsche UNESCO-Komission (DUK) (2007, 3) and Deutsche Gesellschaft für Geographie E.V. (DGfG) (2020, 26) |
| Students' actions in class | I want my students to become active and take action on sustainability issues right from my lessons. | Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland (KMK) and Deutsche UNESCO-Komission (DUK) (2007), Ohl et al. (2016), and Vare and Scott (2007) |
| Recommendations for action | If a sustainable behaviour is clearly right, I, as a teacher, give it to my students as a recommendation for action. | Deutsche Gesellschaft für Geographie E.V. (DGfG) (2020, 26) and Budke et al. (2016, 162) |
| Problem versus solution orientation | I design my geography lessons to be problem-oriented. Therefore, a detailed conflict analysis is necessary when teaching sustainability issues. | Lehner et al. (2021, 49) |
| Controversy | Controversial topics that lead to discussion, individual solutions and complex actions are more important than topics that only aim to change students' behaviour. | Zowada (2019, 80 f) and Wehling (2016, 24) |
| Local versus global action | My geography lessons on sustainability are mainly about global issues. | Coy (2007, 3) and Gryl and Budke (2016, 66 f) |
| Forms of action | My sustainability lessons aim to make my students more sustainable in their everyday behaviour, for example by buying green products or switching to bus and train. | Stelzer et al. (2012) |
| Individual versus collective action | My students should be empowered to act sustainably in their personal lives. | Bianchi et al. (2022), Pettig (2021), and Artmaier et al. (2021) |

and 'I as a teacher keep my own opinions about sustainable behaviour to myself in order not to indoctrinate my students' were presented to teachers and rated by them.

In the third phase of data collection, an open interview was conducted on the basis of the statement sentences (see Figure 2). Here, the controversial statements of the second part usually provided many opportunities for discussion. In this part of the interview, the interviewer asked specific questions about teaching examples and implementation possibilities.

This form of methodological triangulation was chosen because the approaches and contents of the three parts of the survey should complement each other in a meaningful way (Flick, 2011, 48 ff). The first part of the interview was designed to assess understanding of ESD and ESD action competence. As the teachers were not aware at this point that the survey was about action competence, they were honest about the role they thought it should play in their ESD teaching and the goals they associated with it. The second part of the interview provided an opportunity to explore attitudes and beliefs about teaching action competence with controversial statements. In the third part of the interview, the attitudes were to be explained and deepened with examples. Due to the open form, this part showed which statements were particularly important for the teachers. This methodological triangulation also showed whether the teachers' statements were consistent or whether they changed or contradicted each other from the first to the third part. It is precisely these contradictions and ambivalences that are of particular importance in this qualitative interview (Hohl, 2000, 144).

## 3.3 Evaluation

For the qualitative evaluation of the results, the teachers' answers to the questions of the first and third phases (see Figure 2) of the survey were transcribed and coded. The first part of the interview (see Table 2) was analysed using deductive categories, which were formed on the basis of the academic discourse (see Chapter 2). The discourse shows that there are no harmonised definitions or goals for action competence in ESD to which teachers can orientate themselves. The aim is therefore to analyse how teachers view ESD, the goal of their ESD lessons, their problems and uncertainties and

TABLE 2 Categories for the evaluation of guided interviews.

| Category | Description | Example statement |
|---|---|---|
| ESD definition (deductive) | Teachers' statements on what ESD means to them, how they define it and what ESD consists of. | *'First of all, it is somehow a cross-cutting concept based on Agenda 21, that is, this process that was started in Rio in 1992 and has actually been carried through to the present day'. (M4)* |
| ESD goals (deductive) | Teachers' statements on what they think the ESD mission statement and their individual teaching mean in the context of sustainability. | *'So of course you have to prepare the future generations to take responsibility, and that is my main goal in this'. (M6)* |
| ESD competences (deductive) | Teachers' statements on which competences and components they think belong to ESD. | *'So first of all you need to have a basic knowledge of the subject'. (W3)* |
| Motivation (deductive) | Teachers' statements on what motivates them to teach ESD. | *'[…] because it is becoming more and more important, especially against the background of current world events, and we have the chance to educate students to live more sustainably or to make their everyday lives more sustainable'. (W4)* |
| Problems and uncertainties (deductive) | Teachers' statements on problems and uncertainties that hinder and influence their teaching on ESD. | *'First of all, I find it very difficult, because in everyday teaching there is simply no time to deal with topics very, very intensively, so that the pupils can make a differentiated judgement and then derive a competence to act from it'. (W4)* |
| Teaching the action competence (inductive) | Teachers' statements on what teaching ESD action competence means to them and how they have implemented this in their teaching. | *'But action competence also means training, it also means that I can negotiate with others. It also means communicating about it. To shape this negotiation process for myself'. (W2)* |
| Implementation of sustainable actions in the classroom (inductive) | Teachers' statements on whether and how sustainability actions are carried out in their lessons. | *'So I do things like that more often, so that it goes into the families, what I do in class, but what I said before: We talked about rubbish and now we are going to do a rubbish collection campaign or something, so I do not know anything directly like that now'. (M6)* |
| Dealing with one's own opinion about sustainable actions (inductive) | Teachers' statements on how they deal with their own opinions on ESD issues and the resulting options for action. | *'So in geography the students do not know what my own opinion is, in geography I do not give my own opinion on a subject'. (W3)* |
| Didactic methods to promote action competence (inductive) | Teachers' statements on the didactic methods they use in their ESD lessons and which they believe promote action competence. | *'Because I use the Future Workshop method, which focuses on critiquing a problem and, of course, trying to make it more sustainable'. (W7)* |
| Sources of knowledge for sustainable action competence (inductive) | Statements about where teachers get their knowledge about teaching ESD action competence. | *'I have acquired it over the years through internships and textbooks'. (W7)* |

their own role in teaching ESD. Secondly, the deductive categories were formed with the help of the model of geographical competence in ESD (see Figure 1). This makes it possible to analyse how the teachers understand the competence to act in the context of ESD and to what extent this understanding corresponds with that of the other teachers. This results in deductive categories on the definition, goals and competences of ESD, which are intended to show the understanding of ESD and the competence to act within it. In addition, the categories on motivation, problems and uncertainties as well as the goals in relation to the action competence provide information on the teacher's understanding of their own role. These categories were formed using the method of qualitative content analysis according to Mayring and Fenzl (2019) and were intended to contain the teachers' ideas about ESD and ESD action competence (see Table 2). In this way, the statements of all teachers in this part could be coded, summarised and then compared (Krüger and Riemeier, 2014, 139). For the third open interview part, new inductive criteria were developed on the basis of the transcriptions. As each interview in this part was very different and went in unpredictable directions, new categories could be developed that were not visible to the interviewer (see Table 2). It became clear that several teachers came up with the same topics on their own initiative. As the form of teaching and implementing sustainable actions, dealing with one's own opinion, the choice of methods and the sources of knowledge about ESD competences were discussed in many interviews, it can be assumed that these topics are of concern to the teachers. They were therefore included in the analysis as inductive categories. The respondents' statements in the second phase of the survey were statistically analysed and graphically presented. The creation of the codes and the creation of the coding guidelines were discussed and determined by two people. The coding, evaluation and typing were discussed and reviewed by a larger team of experts.

## 3.4 Typology

In order to make a typification, all interview parts were examined for patterns. Attention was paid to whether the teachers showed agreement or disagreement in the categories (Prommer, 2018, 252–259). For some categories there was a high level of agreement among most teachers. These are presented in the results section without typification. For some categories, the results were so diverse that no types could be identified. However, some other categories were answered by the teachers in similar patterns, so that the teachers could be grouped into these categories. The groups of teachers in each category were compared and clear overlaps were identified (*ibid*). In this way, teachers could be grouped into three types in their understanding of action competence and into four types in their understanding of their own role. Finally, each interview was individually checked for typification.

# 4 Results

The findings of the qualitative teacher study on the research questions are presented below. Firstly, results are presented on how teachers understand ESD and sustainable action competence, and then on how teachers see their own role in teaching it.

## 4.1 How do teachers understand education for sustainable development and sustainable action competence?

ESD is an interesting and important part of geography teaching for all teachers interviewed. They often emphasise the high global relevance as well as the topicality. Most teachers also show that they have a good knowledge of ESD. 13 out of 14 teachers could immediately give a definition of ESD, 8 teachers highlighted the sustainability square and 4 teachers highlighted the SDGs. When it comes to teaching action skills in ESD, 11 teachers claim to be sufficiently trained overall to teach them. At the same time, 10 teachers disagree with the later statement that they were sufficiently trained in their studies and training to promote action competence in the context of ESD. The teachers therefore appear to state that they did not acquire their knowledge during their studies or training. This is consistent with the fact that in the course of the interview they reported that they had rather acquired the knowledge for teaching action competence through further training, the internship or by themselves.

A first difference in the statements can be seen in the aims of teaching ESD. Five teachers state that their main goal is for the students to make their private behaviour more sustainable, while five teachers want to develop an awareness of global sustainability problems among their students in order to prepare them for their future and the challenges that lie ahead. The remaining four teachers do not specify an objective.

> W1: 'Yes, so that the pupils are a little more aware of their own behaviour and its effects'.

> M4: 'Well, I try to make pupils fit for the world they grow up in, the world they are born into'.

These two quotes show the difference in the teachers' aims. While teacher W1 wants her pupils to make their private behaviour more sustainable, teacher M4 defines her task much more broadly.

This difference can also be seen in the understanding of ESD action competence. First of all, it can be stated that the teachers almost uniformly attach great importance to teaching ESD action competence. 12 teachers state that they are particularly motivated to promote the action competences of their students and 10 teachers attribute a higher importance to them than to other competences such as subject competence, communication competence or spatial orientation. Furthermore, all teachers agree with the statement in the questionnaire that ESD aims to promote action competence (see Figure 3). However, in the interviews it became clear that teachers' understanding of action competence is very different.

In order to analyse how the interviewed teachers understand action competence in detail, the previously deductively developed model for the promotion of sustainable action competence is used as an analytical tool (see Figure 1). It can be examined which theoretical sub-aspects of action competence are actually important for the

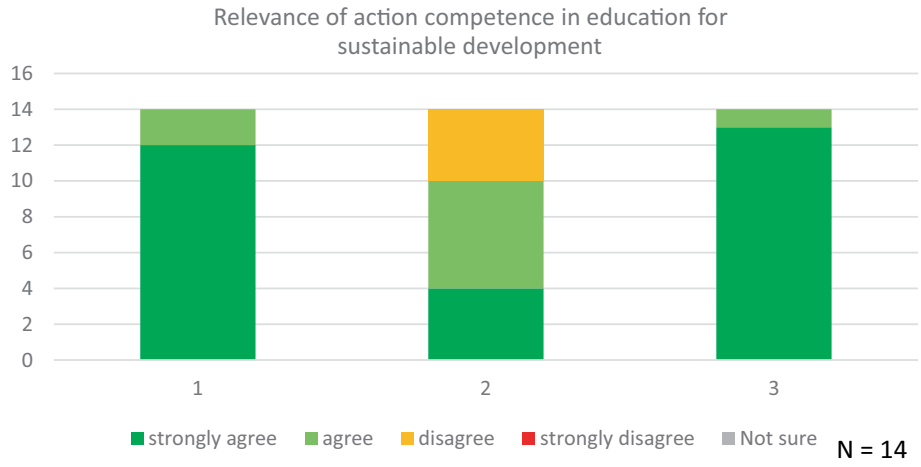


FIGURE 3
Teachers' assessment of the statements in the questionnaire on the relevance of action competence. Own illustration. Statements in the questionnaire: (1) I am personally particularly motivated to promote sustainable action competence in my students because of its relevance and topicality. (2) Compared to other competences such as spatial orientation, factual competence or communication competence, the teaching of action competence in ESD is particularly important to me. (3) The teaching of geography in ESD must aim to promote students' action competence and thus enable them to make their own contribution.

teachers. In the interviews conducted, the first thing that stood out was that subject knowledge was named by 10 teachers as the most important sub-competence. Systems thinking and conflict perspective were also mentioned several times. Knowledge of possible actions and solutions was described by about half of the teachers as the epitome of action competence. They described that they would promote factual, systemic and conflict competence in order to then provide options for action or to discuss them in class. Most of the teachers were aware that these competences, as described in the model (see Figure 1), could be considered and taught within the framework of the sustainability square. Eight teachers even mentioned the sustainability square in their definition of ESD. It can therefore be stated that the subject knowledge, system thinking and conflict perspective, the knowledge of possible actions and solutions as well as the sustainability square, which are represented in the model (see Figure 1), seem to be present to the teachers and central to their sustainability teaching. Interestingly, for most of the teachers interviewed, this is where the promotion of action competence ends. This is illustrated by the fact that the importance of argumentation skills, communication skills and reflexivity for the development of students' action competence in the context of ESD was only mentioned by one teacher each. Design and participation were not mentioned at all. However, it is clear from the interviews that four out of the 14 teachers also promote these sub-competences in their teaching (see type 1 in Figure 4). These four teachers stand out from the others in that they were able to give examples from their lessons in which their students were able to communicate, argue, participate or create.

> M4: 'My students have now produced a fair guide. It's a leaflet that's displayed in the town, showing sustainable shopping opportunities. As an example'.

For example, teacher M4 reports several lessons in which not only theoretical knowledge about options for action was discussed, but the pupils themselves became active. Through the examples of action and the way in which the teachers of the first type (see Figure 4) prepare their students for these actions, it becomes implicitly clear in the interviews that these teachers see competences such as argumentation, communication, creation and participation as an important component of sustainable action competence. The will to let the students participate in and shape sustainable actions is also shown in the statement of teacher W7 about the orientation of her sustainability lessons and the resulting learning product:

> 'What do I want to change? That's what it's all about! […]. In the form of project work, in the form of presenting a learning product. This can also be done through a homepage to make certain topics more accessible'.

The students of this teacher obviously get the opportunity to participate in a self-chosen sustainability topic and to create their own form of action. In the course of the interview with teacher W8, it also becomes clear that collective cooperation and joint action seem to be very important for her teaching:

> 'Because if you do it as an individual, of course it is a lot of work. But if you think about the added value and if you work with several people, then I think it's super important'.

This also shows that the teachers of the first type (see Figure 4) seem to use both individual and collective and political forms of action, which are also described in the model (see Figure 1), in their teaching. The other 10 teachers seem to rely exclusively on the individual form of action. This means that, according to their statements, they want to promote action competence primarily by discussing with their students possibilities of action that could make their private lives outside of school more sustainable. The basic understanding of sustainable action competence seems to differ among the teachers, especially in the type of ESD action form they are aiming for.

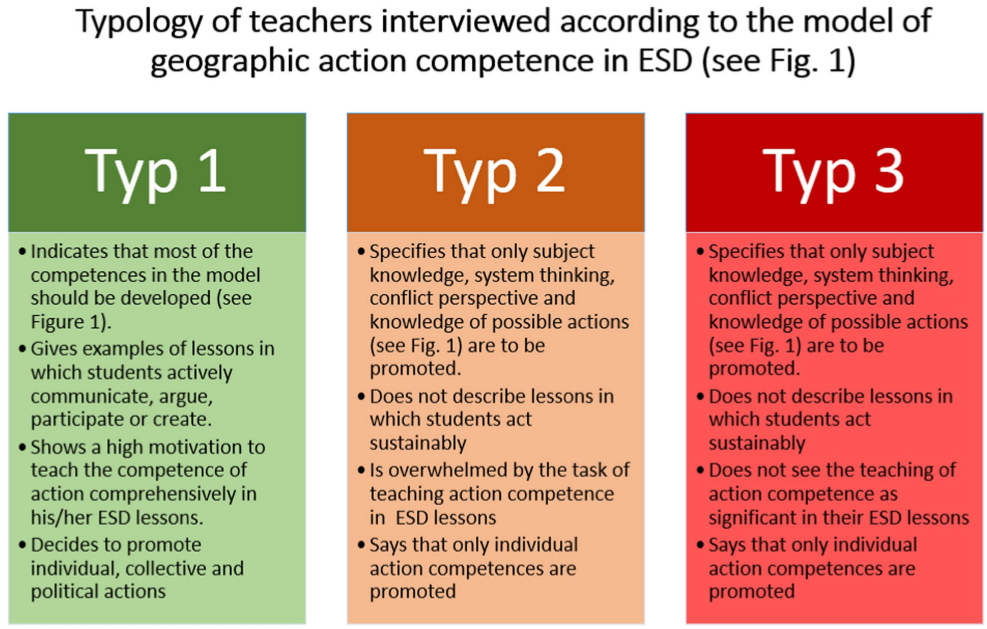


FIGURE 4
Typology of teachers interviewed according on the model of geographic action competence in ESD (see Figure 1). Own illustration.

These 10 teachers can be divided into two groups according to the reasons why they only promote competences such as factual, system and conflict competence and knowledge of possible actions and solutions (see Figure 1). Five teachers (see type 2 in Figure 4) state that they could not promote students' ESD action competences in their geography lessons as much as they would like to. Many reasons are given for this, such as the high complexity or the lack of individual training. It is noticeable that lack of time is mentioned as an obstacle by all teachers of the second type (see Figure 4). The following quote from W5 may serve as an example for this type:

> 'I think it definitely plays a big role, but it can't really be implemented in terms of time. […] there is just not enough time to do it somehow'.

When asked if she could give an example of a lesson in which she had promoted action competence, teacher W5 replied: '*No.*'

It becomes clear that Teacher W5 considers ESD action competence important in principle, but apparently does not teach it much, if at all, in the classroom. As a result, these teachers seem to limit themselves to providing their students with theoretical options for action on an individual level.

The remaining five teachers (see type 3 in Figure 4), on the other hand, are very self-confident and show that for them the promotion of action competence seems to mean the promotion of subject knowledge and systemic thinking as well as providing students with knowledge about theoretical options for action at the individual level. For example, their series of lessons on the sustainable clothing industry might end with an appeal to the pupils to buy more second-hand clothes. ESD action competence does not seem to be very important for these teachers either.

> W6: 'From my teaching experience I can say that action competence is rarely promoted. So it comes at the end of the line, after all the other competences, and I don't think it's necessarily right, but for me it's rather treated neglectfully. […] It doesn't prepare students for the exam. So let's be honest. […] So I think the output is not worth the input'.

The statements of this teacher in particular show that action competence is not a central component of her ESD teaching. She seems to associate a very high effort with the promotion of action competence and therefore seems to pay attention primarily to the competences that her students need in order to get a good grade in the exam. From this perspective, action competence seems rather superfluous. Even if the second and third type of teachers are similar in most aspects, especially in the implementation of action competence, they differ significantly in their reasons for doing so. Type 2 teachers would like to teach action competence differently but are unable to do so. Their lack of confidence and overwhelming demands mean that they only promote competences, such as subject knowledge, which do not involve any action. Type 3 teachers in contrast reject central aspects of action competence teaching out of conviction. This fundamental difference leads to the separation of the two types.

By analysing the interview with the help of the model (see Figure 1), the teachers could be divided into three types. While the first type seems to want to teach action competence in ESD in detail at all levels of action, the second type seems to be unable to do so due to ignorance and excessive demands. The third type, contrary to the initial statements, does not seem to attach much importance to action competence. Therefore, it also seems to play a subordinate role in his teaching.

Interestingly, three teachers of the third type (see Figure 4) stated in their statements that they are particularly motivated to promote action competence, and one of them even stated that action competence is more important in his sustainability teaching than the other competences (see Figure 3). So there is a contradiction in the statements of the third type.

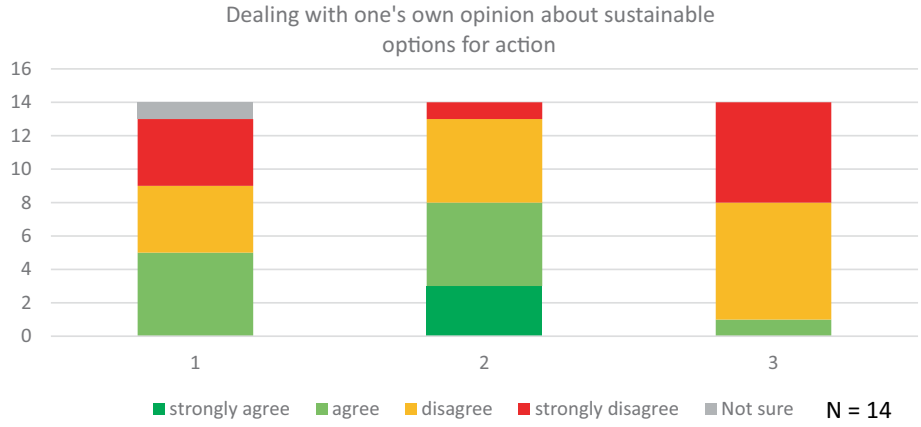


FIGURE 5
Rating of different statements in the questionnaire on how teachers deal with their own opinions on sustainability issues. Own illustration. (1) If a sustainable behaviour is clearly right, as a teacher I recommend it to my students. (2) As a teacher, I keep my own opinions on sustainability issues (e.g., environmental protection, climate change, etc.) to myself in order not to indoctrinate my students. (3) I feel insecure about how to deal with my own opinion on how to act in a sustainable way.

## 4.2 How do teachers understand their own role and responsibilities in teaching sustainable action competence?

Teachers show great differences of opinion about their own role in teaching sustainable action competence. This is particularly evident in the way they deal with their own opinions and the danger of influencing pupils with them. The importance of this topic for the teachers is particularly evident in the fact that 10 teachers steered the interview towards this topic before the interviewer could ask a question in this direction.

The ratings of statements 1 and 2 (see Figure 5) show large differences in the way teachers deal with their own opinions on sustainability issues. Five teachers state that they give their students recommendations for action. Four teachers tend to disagree and four teachers disagree completely. At the same time, eight teachers state that they tend to or completely keep their own opinions on sustainability issues to themselves. Six teachers disagreed. As this topic was discussed in more detail in 12 interviews, the teachers' statements can be examined in more detail.

It is clear that 42% of teachers say that they keep their opinions on sustainability issues to themselves in geography lessons. The reason given by these teachers is that they do not want to influence students' free choices (see Figure 6). This is particularly evident in the case of teacher W3:

> W3: 'I absolutely try to avoid that. That's not the point. […] They should eventually be able to find out for themselves. That is the ultimate goal, so that they can make up their own minds'.

The second reason given by the teachers, as exemplified here by W5, was that as teachers they were not allowed to do this at all:

> W6: 'I'm not allowed to do that, am I?'

This part of the teachers seems to understand the institutional guidelines of the school and the German education system as not allowing them to reveal their opinion under any circumstances, as this could influence the unguided decisions of their students. The remaining 58% of teachers say that they would express their own opinion on appropriate sustainable behaviour in the classroom (see Figure 6). This group can be further subdivided. The following statement by teacher M4 can serve as an example for 25% of the teachers:

> M4: 'Well, the opinion of the students and their ability to judge critically, that is already in the foreground, and yet it is sometimes the case that I am convinced, even if it is a bit frowned upon in Germany, that this is the way to go. So I wouldn't give my opinion in the sense that I pour it on them, but I behave accordingly'.

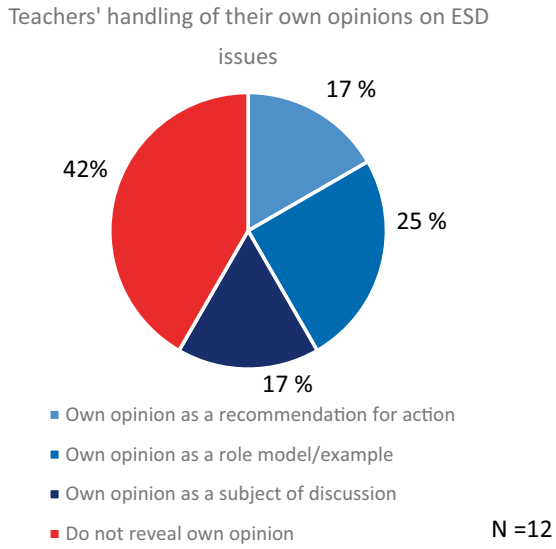


FIGURE 6
Teachers' statements in interviews on whether they include their own opinions in geography lessons. Own illustration.

The teacher seems to be aware of the danger of indoctrinating the students by expressing his own opinion, and yet he does not see his role as value-free. He wants to be a role model and show the students a sustainable way of life through his own behaviour. However, he only expresses his opinion when asked by the students in class.

17% of teachers say they put their own opinions up for discussion in their sustainability lessons. Teachers express their own opinions about sustainable options in class and try to discuss them with students without presenting them as the only correct solution. Teacher M6 explains this as follows

> M6: 'Well, I'm not saying you have to do it this way. But I am saying: I see it that way or I would do it that way. […] the pupils already know that I stand for something and they can work on it. Then they can decide for themselves: Do I adopt this? Is this a good example for me? Or they can just distance themselves from it'.

This group of teachers also see themselves as role models, but they are much more aggressive about it. By confronting the pupils with their opinions, they want to encourage them to think about their own opinions and to start opinion-forming processes.

As a last group, 17% of the teachers say that they give their opinions as clear recommendations for action in geography lessons. This is exemplified by the statements of teacher M1, who clearly tells the students which action he thinks is the most sustainable. He justifies this as follows:

> M1: 'I don't think I can teach without opinions, especially when it comes to these topics. […] I've also studied this subject and I'm interested in this topic and of course I have an opinion about it, also about many problems and I can't just keep it under wraps, then often'.

This group of teachers seems to be convinced of their own opinion regarding the right sustainable action decisions, especially when it comes to sustainability issues. Therefore, they also see it as their task to communicate this to their students and to convince them.

It is therefore clear that the teachers interviewed define their own role in relation to the teaching of sustainable action competence in geography very differently. Interestingly, only one teacher stated that she was not sure how to deal with her own opinion (see Figure 5).

## 5 Discussion

Both in the answers to the introductory questions on ESD and in the evaluations of the statements in the survey questionnaire, it first becomes clear that ESD in general and the competence to act in particular are described by the teachers as relevant for geography lessons and as personally interesting. This is mostly due to the topicality and social importance of sustainability issues. Furthermore, the teachers show that they have a general and broad knowledge of ESD, as they are aware of central concepts such as the SDGs or the sustainability square. They also indicate that they want to share this knowledge with their students. This is not surprising, as ESD is now a recognised and agreed educational goal in German education policy (*cf.* BMBF, 2017). The majority of teachers also see action competence as an important component of ESD in geography lessons. They uniformly state that they are particularly motivated to promote ESD action competence and to enable their students to make their own contribution to sustainable development (see Figure 3). This is also in line with the scientific and educational policy consensus, because in the models of ESD, such as those of De Haan (2010) and Rieckmann (2012), action competence is of central importance. However, as it became clear in the course of this study that some of the teachers do not really seem to regard the competence to act in ESD as significant, it becomes clear that the teachers are aware of the anchoring of ESD in the German curricula (*ibid.*) and that they may have felt compelled to describe it as significant in the survey.

With the help of the presented model of geographical action competence in ESD (see Figure 1), it was possible to identify three types of teachers. It is important to note that the analysis using the model is not intended to test and assess knowledge or to validate the model. Instead, the model was used to show that teachers differed in their understanding and implementation of ESD competence. These differences, which became apparent through the analysis of the model, made it possible to categorise the teachers into different types. This typology shows that although the teachers initially almost uniformly stated that they understood action competence as a central building block of ESD, only some of them indicate to teach the action competence in such a way that actions are implemented in ESD lessons. On the other hand, some of the teachers seem to contradict their initial opinion in the course of the interview, while another part seems to feel that action competence is important but can only be taught to a limited extent due to various uncertainties and problems. This discrepancy in the statements, especially among the teachers of the second and third type, could be explained by the fact that the uniform educational policy consensus on ESD and sustainable action competence generates a certain social desirability. Therefore, the teachers first answer that they consider action competence important and promote it extensively and only reveal their problems, uncertainties and honest opinions in the later course of the interview. At the same time, this survey shows that there still seem to be teachers who both consider sustainable ESD action competence important and strive to promote it extensively.

In relation to their own role, it seems that dealing with their own opinions about sustainable actions is a topic that teachers are concerned about. This is evidenced by the fact that the majority of teachers mentioned this topic without being prompted by the interviewer. Furthermore, there is a striking lack of agreement on this issue. Although already in 1976 the pedagogical guideline of the Beutelsbach Consensus laid down the principle of how teachers should behave on political topics in order to enable students to form their own opinions (Wehling, 2016, 24), and this was also confirmed by Gryl and Budke (2016, 72) for ESD, teachers seem to behave differently when asked about sustainable actions. Some of the teachers try not to express their own opinion on sustainable options in class. Other teachers seem to give their students very direct recommendations for actions that they personally consider to be correct. As in the study by Budke et al. (2016, 162), it is evident that the teachers 'on the one hand want to be authentic and honest. On the other hand, they fear that their own expression of opinion could lead to an unwanted influence on students who are in a lower position of power'. One explanation could be that the debate on sustainability issues such as climate change is so emotionally charged that teachers find it difficult not to express their opinions. This uncertainty about their own behaviour could lead to problems in implementing

sustainability action competence in the classroom. If a teacher is too forceful and indoctrinating in communicating his or her own opinion on sustainable action, then he or she is manipulating the students. As a result, students cannot decide on their own attitude and the resulting action (Ohl et al., 2016, 95). On the other hand, if a teacher always behaves in a value-free way, the sustainability problem and the necessary actions could appear arbitrary and irrelevant, or the problematisation in class could simply be omitted. In both cases the promotion of sustainable action competence could be hindered.

When discussing these results, it must be pointed out that this study, due to its qualitative approach and the small number of subjects, cannot show quantitative distributions of teachers' attitudes and approaches. It serves to show the spectrum of opinions, attitudes and approaches of German teachers in the teaching of action competence in ESD. This made it possible to group the teachers into broad types. Furthermore, no lessons were observed and therefore no statements can be made about the actual teaching of the teachers. This study can only evaluate and discuss how teachers describe their own teaching. The study does, however, indicate that the understanding of action competence in ESD and the role of the teacher in this are very different. Building on these results, it would be necessary to observe ESD lessons in order to examine the extent to which teachers' statements are reflected in their actual teaching. On the other hand, it is necessary to investigate how ESD action competence can be taught more consistently and purposefully in teacher training, so that the next generation of teachers can teach ESD action competence in a more confident and meaningful didactic way. The model for geographic action competence in ESD presented in this study could be one component of this.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

Ethical approval was not required for the study involving humans in accordance with the local legislation and institutional requirements. The Faculty of Mathematics and Natural Sciences at the University of Cologne does not have an ethics committee, but the research was nonetheless conducted in accordance with all relevant institutional and national regulations. The participants provided their written informed consent to participate in this study.

## Author contributions

RS: Writing – review & editing. AB: Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note



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