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One Transformation Path Does Not Fit All—Insights into the Diffusion Processes of Education for Sustainable Development in Different Educational Areas in Germany

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Abstract: While Education for Sustainable Development (ESD) is increasingly being implemented in educational systems, monitoring projects which capture the status and diffusion processes of ESD are also gaining relevance. The article presents part of the national monitoring of ESD in Germany—a qualitative expert interview study—which aims to analyze the diffusion process of ESD in different educational areas (early childhood education, school education, vocational education and training, higher education, non-formal learning organizations, and local authorities). Its goal is to gain a systematic understanding of the diffusion process of ESD in the different areas of the German educational system. For the analysis of the 66 expert interviews, a qualitative content analysis was used. The overarching result of the study is that there is no single transformation path of ESD diffusion that fits all educational areas. Instead, characteristics of ESD as well as prevailing structural conditions, systemic goals, and the understanding of education within the respective educational area have an impact on the diffusion of ESD. The diffusion process of ESD evolves within this circular interplay of innovation and innovation system. A deeper understanding of it therefore has great potential for practitioners' (self-) reflections and for further research projects.

Keywords: education for sustainable development (ESD); diffusion of ESD; social innovation; innovation system; monitoring; governance

1. Introduction

In the process of finding solutions for the most important global challenges of today, such as climate change, loss of biodiversity, and poverty, sustainable development has become increasingly relevant in academia and policy. Education and learning are playing a pivotal role in tackling these sustainability challenges. In this context, the UNESCO Global Action Program (GAP) on Education for Sustainable Development (ESD) [1] is a concrete response, strengthening efforts to implement ESD in national educational systems globally. The United Nations Sustainable Development Goals (SDGs) specifically highlight the role of education in target 4.7, which aims to improve learners' knowledge and skills in promoting sustainable development [2].

While the mainstreaming of ESD is becoming increasingly successful, questions of capturing and measuring the state of ESD within a certain region or sector are becoming more relevant. Internationally, educational monitoring is based on a growing interest in indicator- and evidence-based educational policies [3–5]. Educational monitoring aims to inform experts, policy makers, and practitioners and to generate knowledge in order to shape future-oriented policy making [6,7]. However, there is a general lack of systematic monitoring and evaluation in the context of ESD policy efforts [8].

In classical educational monitoring approaches, indicators are highly relevant in capturing progress of different aspects in a specific area and a good basis for reporting [6,7]. Since the beginning of the UN Decade of ESD (2005–2014), different projects have developed indicators for examining the extent of ESD implementation within a specific region or nation [9,10]. Recently published indicators focus on teacher training [11]. Only a few indicator sets are specifically related to different educational areas [12,13]. Even output indicators, such as sustainability competencies [14–16] or the already operationalized Decision-Making Competence regarding Challenging Issues of Sustainable Development [17], are relevant in the context of quantitative measures.

As well as quantitative approaches to collecting data on the implementation of ESD [18], qualitative procedures have also gained importance. UNESCO's report [19] on the progress of the UN Decade of ESD used a variety of data for gathering the state of the art in different educational areas of its member states. It thereby highlights the different cultures and institutional pre-conditions for the anchorage of ESD in the specific educational areas in a more contextualized way. These more contextualized monitoring approaches are decisive, because they shed light on questions of how ESD is realized by different kinds of actors, and which dynamics and procedures have an influence on it. While classical educational monitoring approaches (i.e., educational reports on a national scale) are based on quantitative indicators, they can provide system perspectives about trends, but they are hardly able to explain causal relationships regarding which policies or strategies worked, and in what way [20]. For this reason, current UNESCO reflections on monitoring ESD make a case for multi-method approaches [21] with the aim of capturing, in addition, the contextual aspects of, and process-oriented perspectives on, the diffusion of ESD.

The purpose of this paper is to complement the more quantitative approaches of measuring the state of ESD on the level of an educational system with a qualitative study about the diffusion process of ESD in five educational areas (early childhood education, school education, vocational education and training, higher education, non-formal learning) as well as within local authorities in Germany. Here, a more process-oriented procedure is adopted in order to capture the diffusion of the social innovation of ESD [22] in the different educational areas. The study includes, altogether, 66 expert interviews containing reflections on the diffusion of ESD as well as on barriers and drivers in the respective educational areas. The aim is to broaden the knowledge base around the specific conditions and systemic influences of the anchorage of ESD in the different educational areas, and to provide advice for future strategies.

The results of the study show different diffusion paths in each educational area that are illustrated in detail. The synthesis of the different diffusion paths points to three important aspects: firstly, the nature and characteristics of the social innovation of ESD have an influence on its diffusion process. Secondly, the respective institutional and structural pre-conditions of the different educational areas into which ESD is diffusing (innovation systems) play a crucial role in determining the success of the diffusion process. Thirdly, the characteristics of the social innovation of ESD and the structural and cultural pre-conditions in the innovation systems are deeply interwoven with regard to the diffusion process of ESD. Based on these interrelations, the article provides some overall comparative reflections on the different transformation paths.

2. Theoretical Perspectives and State of the Art with Regard to the Diffusion of ESD in Different Educational Areas

2.1. The Diffusion of Social Innovations

In recent years, ESD has been increasingly understood as a social innovation. With the aim of complementing the discussion and investigation of technological innovations, Howaldt and Schwarz define a social innovation as a “new combination and/or new configuration of social practices in certain areas of action or social contexts prompted by certain actors or constellations of actors in an intentional targeted manner with the goal of better satisfying or answering needs and problems than is possible on the basis of established practices” [23] (p. 21). Bormann argues that the social innovation

of ESD can be considered with regard to its content-related, temporal, and social dimensions [22]. In terms of content, ESD has been proved to be a flexible concept that has been adapted in the light of changing political and scientific framework conditions. With regard to the temporal dimension, ESD has been a relatively enduring concept that needs to be developed further. The social dimension of ESD can be seen insofar as ESD has in many respects been able to produce structurally significant effects, and this has contributed to its further consolidation and anchoring [ibid.] (p. 284).

The success of ESD as an educational or social innovation in a specific region that is initiated or supported by the different (policy) actors can be analyzed through the lens of innovation and diffusion theory. The early literature about technological and social innovations highlighted in particular the characteristics of innovations [24] and its respective diffusion process [25,26]. In light of these insights, innovations should, firstly, be received as necessary and advantageous by the people who are working with them. Secondly, they should be communicated as clearly as possible and compatible with existing experiences, attitudes and values. Thirdly, they should be experienced as raising the quality of activities and supporting experiments in dealing with the innovation. Last but not least, they should lead to identification with, and ownership of, the content of the innovation. Rogers in particular emphasized the importance of networks in the diffusion of innovations, as they provide information and resources for the innovation and offer the opportunity to observe the innovation [24].

Further studies highlighted the necessity of understanding the innovation system of the respective educational area and its receptiveness toward change in order to bring an innovation into the heart of a system. The work of Ely was groundbreaking in this context [27,28], as he analyzed the different conditions for educational change. More recent literature from economics and sociology has emphasized the importance of organizations and institutions in an innovation system [29], for they play a key role in supporting or hampering the adoption of an innovation. On the organizational level, many structural barriers to the diffusion of ESD may come into consideration, such as time- and resource restrictions, lack of support, or perceived irrelevance [30]. At the same time, many activities that foster the uptake of ESD, i.e., professional development or student engagement, are taking place at the organizational level [31].

The interrelationship between an innovation (or policy reform) and the context in which it is to be transferred is also the objective of interest in current approaches of educational governance. They highlight the importance of the interdependency between different actors in the policy process [32] and overcome the idea of educational innovations as attempted linear steering by policy makers [33]. Even if governments try hard to implement an innovation, the target groups have the opportunity to change, withdraw, or reject these impulses. The research strand focusing on educational governance has therefore also broadened the perspectives on the diffusion of innovations into educational systems [34]. For this reason, innovations are seen as a circular endeavor that involves the diffusion of an innovation as a social process of communication, reflection, and co-constructive meaning making [35], which changes the innovation and the innovation system at the same time.

2.2. The Diffusion and Governance of ESD

In summary, upon looking for the ongoing multifaceted diffusion of ESD, the accompanying governance processes and their results in the sense of the implementation of ESD, it was stated that the governance of ESD is influenced and triggered by the agendas of international organizations (UN, UNESCO) [36,37], negotiated within multi-level policy systems in nations via hybrid constellations and processes [38], and mainly realized in local networks [37]. In these local networks a de-facto decentralization takes place, due to an absence of coherent policy along chains of implementation, and due to resource or infrastructure shortages [8]. These policy patterns are directly linked to the characteristics of ESD as a multifaceted and relatively new policy field that is influenced not only by a variety of policy actors in multi-level educational systems, but also by diverse non-state actors from educational practice, civil society organizations, academia and economics. Reviews of national policies for ESD conclude that a specific strategy for implementing ESD is always “the result of a

place-specific and historically contingent balance between national government, regional governments, and NGOs" [39] (p. 227). They also show that in promoting ESD many national governments use soft governance mechanisms (consultations, networking, facilitating) [8]. Furthermore, they conclude that educational concepts like ESD are not conceptualized clearly, rather the policy strategies are based on a broad variety of locally contextualized definitions [40].

2.3. The Context for the Diffusion of ESD in the Different Educational Areas in Germany

With regard to analyzing the diffusion process of ESD in different educational sectors, it is important to first describe the different institutional and structural pre-conditions in the respective educational areas as an important context of the study. These form the foundations of the innovation system for ESD. While all areas are influenced by larger trends such as digitalization and inclusion, several institutional and systemic procedures and dynamics vary between the different educational areas.

Early childhood education (ECE) in Germany has attracted increased attention over the past years and has been influenced by major political reform initiatives. In particular, the legal entitlement to a high-quality place at a day nursery for children up to the age of one (2007) has initiated a broad debate about quality development in the ECE organizations and training for the educators. Part of the quality development initiative has been to develop education plans for ECE in all federal states of Germany together with stakeholders from academia, day care institutions and parents' associations. Decisive for the landscape of ECE in Germany is also the diversity of different organizations (in German: Träger) that provide kindergartens.

School education in Germany falls within the remit of the federal states, so there is great regional variety in terms of the progress of implementing educational contents in general. In line with this, the school education sector is highly hierarchically structured, following a top-down-oriented logic. Schools are dealing with recent governmental reform initiatives, such as the reduction in the length of schooling up to high school graduation (in German: Abitur) from 13 to 12 years, as well as with societal challenges, e.g. inclusion and integration of refugees. These challenges and contextual changes within schools are accompanied by a gradual opening up to the possibilities provided by non-formal learning organizations.

Vocational education and training (VET) in Germany is set up as a so-called dual system, with compulsory vocational schools on the one hand and work-based training within companies on the other. The development of new VET programs, curricula and materials is usually negotiated between all partners involved (state officials, employers' associations, trade unions, and academia). Currently, there are 327 state-approved training professions (<https://www.bibb.de/verzeichnis-ausbildungsberufe>). The main aim of VET is the development of action competency (in German: Handlungskompetenz) in the concrete situation of professional activities. In addition, VET is influenced by economic and societal priorities and trends much more than the other educational areas.

Higher education institutions (HEIs) in Germany are the official responsibility of the federal states. They have legislative competence, although it is the federal government that also finances research and innovation, quality improvement in education and non-university research institutions. The higher education landscape in Germany is diverse. The profiling of the universities is a consequence of the ongoing differentiation of universities according to their performance and quality. Other characteristics of HEIs are the historically grown structuring into disciplines, self-government, and the Humboldtian principle of autonomy in research and teaching.

Non-formal learning organizations in Germany are characterized by a broad range of institutional particularities (regarding their size, amount of employees, or their profile). While most of the non-formal learning organizations in the field of ESD are traditionally civil society organizations with strong roots in either Environmental Education or Global Learning, they also have connections with the broader professional field of child and youth work.

Local authorities in Germany are heterogeneous, decentralized, self-governed units comprising big cities as well as small villages. Nevertheless, they all are strongly influenced by international and national politics, as their implementation takes place at the local level. Traditionally, local authorities are not responsible for educational issues, apart from their accountability for the buildings of educational institutions. Nevertheless, they have taken up some tasks of educational policy in the context of educational management (fostering the local networks between educational institutions and thereby strengthening the transitions between the different educational stages). They have therefore broadened the ‘voluntary service of education’ in the context of building up local educational landscapes, which in the end also contributes to economically relevant location factors.

3. Materials and Methods

The project presented in this article is part of the national implementation strategy of the UNESCO GAP on ESD. The Federal Ministry of Education and Research (BMBF) has taken the lead on the national GAP implementation in Germany and thus has established a committee structure with three main bodies: 1. the National Platform ESD as the central decision-making body that brings together key actors for fostering ESD in Germany, complemented by a scientific and an international adviser, 2. seven expert forums structured according to the educational areas—including a youth forum—which work on strategies for upscaling ESD in Germany, and 3. seven partner networks of ESD practitioners within various educational fields and topics. In June 2017, the National Platform launched the National Action Plan (NAP) as the result of a broad dialogue and negotiation process between the foresaid councils and further agents. The NAP defines fields of action, objectives and specific measures for the structural implementation of ESD in the educational areas of Germany.

The project is designed as an independent (and partly indicator-based) monitoring of ESD in the German educational system. In four research phases, the project monitored the national implementation of the GAP and issued recommendations on ESD and its development (see Figure 1).

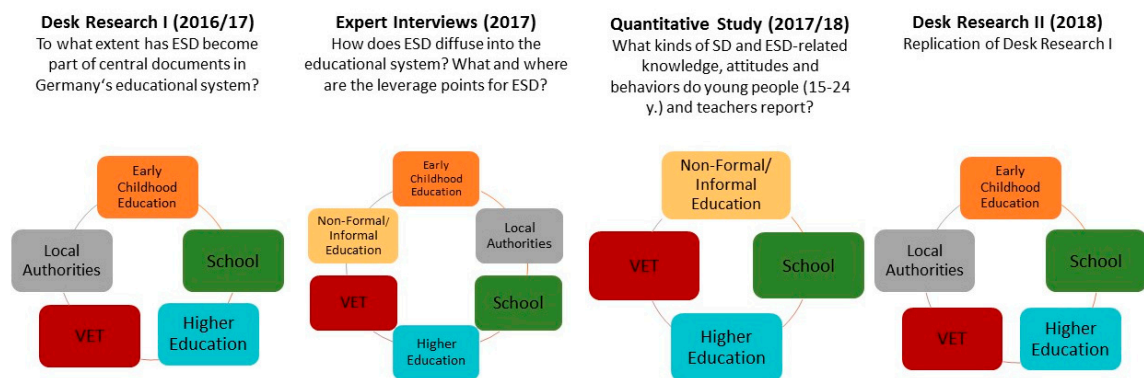


Figure 1. Design of the Research Project.

In the first phase, desk research on the extent of ESD-implementation in central documents of the German educational system was carried out, for the results see [41]. To illustrate development, this desk research was to some extent repeated after one and a half years in phase four. The second phase included expert interviews in order to reconstruct the diffusion of ESD into the German educational system and to identify leverage points for the implementation of ESD. A third quantitative research phase collected insights into (E)SD-related knowledge, attitudes, behavior and general levels of implementation of the educational concept from young people (age 14–24) as well as teachers ($n = 3.089$).

Based on the results of the qualitative study, the aim of this article is to generate a more systematic understanding of the diffusion of ESD into six areas of the German educational system and to identify their transformation paths. The central research question of the second phase was how ESD has been

diffusing into the different educational areas since the UN Decade of ESD, and which drivers and barriers have influenced the diffusion process.

Between May and August 2017, 66 expert interviews with 8–10 people in each educational area were conducted [42]. Most of the respondents were active stakeholders in the committee structure of the GAP in Germany. The criteria for selecting the interviewees were the duration of their professional employment within ESD (long-term vs. only a few years), educational expertise (specific educational area vs. cross-educational area), and professional background (educational practice, administration, academia, civil society, committees of the GAP ESD, and politics). For the analysis of the expert interviews, a qualitative content analysis, including deductive category application and inductive category development, was used in order to consider all material and systematically reduce it to the essentials, but also to be open to new aspects that it would not be possible to cover in an a priori defined category system [43]. Based on the theoretically derived category system, structuring rules were defined for each major category and examples were given in order to assign text passages to the respective category. This rule-based procedure enabled intersubjectivity in the qualitative content analysis. In regard to the systematization of the diffusion process of ESD in the respective educational areas, two major categories of the category system have been of particular relevance. The category ‘general innovation’ in an educational area included all the experts’ comments on general technical or social innovations that had had an impact on the educational area itself. These innovations were described in terms of processes and developments, taking into account the actors involved. The second main category contained interview statements on the ‘diffusion of ESD’, and generally referred to the process of diffusion, the state of diffusion, the drivers and barriers, and the characteristics of ESD. The analysis of the interview material was based on a comparison of the expert knowledge [44], which made it possible to systematize and illustrate the diffusion process of ESD in the respective educational areas. The process of coding the material was carried out using the computer software MAXQDA.

4. Results: Transformation Paths of ESD in the Educational Areas

The results of the study point to the fact that the diffusion process of ESD depends highly on the educational area: it is not only the professional activities of the actors involved that have an impact on the diffusion of ESD, but also the prevailing structural conditions, systemic goals, and the understanding of education in the respective innovation system [27], as well as the characteristics of ESD rooted in the typical patterns of action and professional self-image of educators (innovation). Against this background, the interplay between the innovation of ESD and the innovation system points to the following *transformation paths* that are specific to the educational area.

4.1. Endogenous Capacity Building in Early Childhood Education (ECE)

The experts state that the multifaceted political changes in the area of ECE over the past few years (i.e., the legal right to a high-quality place in ECE institutions, quality development, and integration) have made it easier for ESD to diffuse into the day care centers and kindergartens in Germany. Although the various dynamics of change have to a certain extent been a burden for the professionals in ECE, they have been combined with huge efforts of professionalization, so ESD has partly been able to enter the mainstream of ECE ‘en passant’. One expert argued that the conditions in the context of quality development in ECE fostered the diffusion of ESD because “a lot of money has been granted and, in addition, day care centers have adapted their own profiles, concepts, further training and development, and so on” (IP 1: 27). In contrast to other educational areas, ESD only began to gain importance within ECE during the UN Decade of ESD. Although not all institutions and pedagogical activities in ECE are realizing ESD in a progressive sense, the experts observed an increasing trend of ESD anchorage e.g., in the education plans for ECE of the federal states or in further education courses. One interviewee stated: “I really believe we are now at the point where the issue of ESD is a permanent one in the field of early childhood education (. . .), and where we have, nationwide, an unbelievable amount of approaches and focal points which we can develop further” (IP 10: 41). Even

large-scale model projects, public events, and an international exchange have boosted the diffusion of ESD. According to the experts, part of the success story of ESD within ECE is an overall educational understanding in ECE that integrates experience of nature, values, and the participation of children and is therefore compatible with the foundations of ESD. For this reason, one expert argues for a specific communication of ESD that builds on and appreciates the previous work of educators in ECC: “(. . .) so that colleagues in the institutions can say, ‘Well, that’s really something that helps me develop, something that perhaps gives me a somewhat broader perspective on my work. I really didn’t know that I was also doing such a great job in terms of ESD’” (IP 21: 29). The transformation path of ESD capacity building for educators has therefore been developed from inner-core perspectives on education and learning in ECE.

4.2. *Waiting for ESD-Policy and its Legitimation in Schools*

Even though experts emphasize that the process of diffusion of ESD in school education can only be regionally assessed, they generally attribute to ESD a slow and selective diffusion. Nevertheless, they highlight a trend toward sustainability from which ESD benefits. Drivers of the diffusion of ESD in schools include good practice, skilled and dedicated staff, as well as political actors who support ESD. In addition, the creation of new learning formats and the participation of pupils are evaluated as further central leverage points for the diffusion of ESD in schools. Features of the school system, such as sovereignty of the federal states and a top-down order, are understood as structures that hamper implementation. One expert argues: “We have a governance process on a national level in a ministry that is actually not relevant for formal education in schools. The central actors are the different states. And you have to really convince the contact persons who all have different political orientations” (IP 3: 35). On a more practical level, the concept of ESD is perceived as complex when it comes to implementing it within subject-related classroom practices. Another interviewee states: “I do think that the complexity of ESD is a problem. It can be everything and if it’s everything, it is always already included in the things we do (. . .). Instead you should try to really break ESD down to single aspects and then link them to single teaching units” (IP 12: 50). Paired with an expandable political meaning and insufficient communication on the added value of ESD, these aspects are seen as major obstacles to diffusion. These factors show that schools are more likely to react to educational policy reforms and that therefore the transformation path is waiting for the innovation of ESD to be governmentally ordered: “Inclusion is an example for an innovation that has been governmentally ordered. Of course, schools were not asked if they would like to implement inclusion. There was a legal basis that obliged the schools to do so” (IP 12: 50). The experts argue that school’s take-up of ESD in relation to individual topics only increases when there is a corresponding relevance to educational policy.

4.3. *Consensual Concretization of Sustainability in Vocational Education and Training (VET)*

According to the experts, the abstract, multi-dimensional, and normative concept of sustainability is in tension within the educational area where concrete action in the professional situation is of such high value. Therefore, the diffusion of ESD in VET is described as slow. The main aim should be to concretize ESD for the different branches, professions and companies. One expert argues that it is not sufficient to make a broad plea for more sustainability in VET: “Because then everyone will say: ‘Well, what does this mean in terms of training? What does it mean for me as a carpenter? Does it just mean that I (. . .) have to check where the wood I work with is coming from, or do I have to do more than this?’ (. . .) It means you have to look very concretely at the work process. In particular, you have to say: ‘Here, you can make sure you acquire sustainable products, and there, you can use non-toxic substances, e.g. paint or wood stain. (. . .) And, if you want to become the proprietor (. . .), you can also consider how you deal with your colleagues, how you nurture the next generation, the skilled staff in your factory, and so on” (IP 29: 25). While the concretization of sustainability is needed in the different branches of VET, the overall understanding of sustainability within VET in Germany seems to be mainly based on a consensual understanding of the three dimensions of

sustainability—the triple bottom line. Different interviewed experts claim the focus should be on a “triad” (IP 6: 19) consisting of the different “cornerstones, i.e., economy, ecology, and social concerns” (IP 20: 13) and a “balance between the three factors of ecology, economy and social concerns” (IP 29: 13). They argue that this “balance between the three factors of ecology, economy and social concerns” (IP 6: 45) is the principle question in the debate on sustainability, and it is also crucial in the business reality. In the past, the diffusion of ESD took place under the label of environmental protection, which was strengthened at the beginning of the 90s. Besides this, large-scale model projects and economic trends (green jobs, sustainability reports) fostered the dissemination of ESD. Platforms and networks were seen as important in sharing good practice, contributing to the development of educational landscapes on a local level, and supporting training and professionalization initiatives. Apprentices, however, were barely addressed as potential change agents. In sum, the overall transformation path of ESD in VET is shaped by a consensual concretization of sustainability within the different companies, occupations, and sectors.

4.4. *The Beacon Strategy in Higher Education Institutions*

Despite an increasing public discussion about sustainability, ESD has been diffusing slowly into Germany's HEIs. “Sustainability (. . .) has in fact only just, little by little, so to speak, become socially acceptable. And in this respect individual lecturers and individual subjects in the universities have been addressing education for sustainability. (. . .) But this has only grown slowly into strategies (. . .)” (IP 41: 11). The characteristics of the higher education system seem to contradict the interdisciplinary- and transdisciplinary-based ESD understanding of teaching and learning settings in HE and thus have hindered the diffusion process of (E)SD. One interviewee states that the tendency “toward acquiring more and more knowledge leads to a more pronounced differentiation and to increasingly specialized degree courses” (IP 14: 9) and makes it difficult “to create a learning environment that does not just operate within the narrow boundaries of the respective disciplinary degree courses” (ibid.). Nevertheless, the experts highlight the fact that some universities have already implemented (E)SD as a central element in their structures and organizational processes. A few pioneering universities have been highlighted as examples of good practice. Another interviewee argues that large universities have a “different starting point from that of a smaller university, which can only offer a particular proportion of degree courses and which must ask itself how it wishes to make its mark on the map, how it wishes to make itself visible. And I believe this is a great advantage, particularly in the present period of university differentiation” (IP 43: 23). These universities serve as beacons of sustainability, as they have established a clear profile by professionalizing their sustainability activities in research, learning, and teaching as well as in organizational management (Whole Institution Approach). In this context, the Beacon Strategy seems to have contributed successfully to the diffusion of ESD for two reasons: Firstly, it offers pioneering universities in Germany the advantage of positioning themselves in the higher education landscape, thereby attracting students and researchers. Secondly, the clear profiling of these universities initiates further sustainability efforts on different levels within the institution. The Beacon Strategy seems to be a promising way to improve a university's sustainability profile and thereby promote the diffusion of ESD in this educational area.

4.5. *Interwoven Efficacy of Non-Formal Learning Organizations*

The experts emphasize the diversity of non-formal learning organizations with regard to their thematic focus and institutional pre-conditions. Nevertheless, they unite a specific understanding of non-formal learning as voluntary, needs-oriented, learner-centered, experimental and participatory. For this reason, the young people are enjoying learning, “simply because they know that nothing can happen to them; they can make mistakes now and then, and nobody will laugh at them. (. . .) They aren't given good or bad marks for what they do, rather they can simply develop further and, above all, engage with the issues that interest them” (IP 61: 11). Over the past few years, there has been an uptake in ESD provided by the NGOs and an increased interweaving of non-formal and formal learning

organizations (mainly schools): educational services in all-day schools (in German: Ganztagschule) or institutionalized cooperation structures between schools and civil society organizations. One expert illustrates these developments with the example of cooperation agreements between schools and NGOs: “agreeing on the conditions and the mandate under which civil society actors may work with partners from education. And conversely, the conditions under which teachers may work with civil society actors” (IP 66: 13). This offers the possibility of greater efficacy on the part of the NGOs in Germany on the one hand, but on the other hand—based on the expert interviews—it seems to lead to a formalization of non-formal learning opportunities and thereby to a realignment of the NGOs. As the implementation of ESD is proceeding gradually and their core competency (lobbying for the uptake of ESD in formal learning organizations) is not that necessary anymore, they are becoming more important as learning partners for formal institutions in local educational landscapes. In the end, this leads—at least partly—to a confusion of the non-formal learning institutions regarding their own professional self-image. For one interviewed expert it is crucial to get the non-formal learning organizations “reflecting much more intensively on what they are doing and thereby gaining in self-confidence” (IP 53: 59). The transformation path of the interwoven efficacy of non-formal learning organizations therefore brings with it some ambivalences.

4.6. *Changing Modes of Governance for ESD in Unique Educational Landscapes*

According to the experts, local authorities are influenced by a broad range of societal processes such as the integration of refugees, inclusion, dealing with precarious financial situations and modernization processes (introduction of new public management). The international agreements on climate change protection and the UN Decade of ESD have pushed the debate on (E)SD within local structures forward and have created new forms of participation and cooperation. While the promotion of ESD in the local authorities has often been a process driven by civil society actors, stakeholders from local administrations have to a certain extent picked up their expertise and supported good practice. The administrations have therefore legitimized their own strategies by responding to the international demands for sustainability and combined ESD with efforts to profile their local image. Furthermore, the strengthening of educational landscapes with a focus on ESD fosters the diffusion of ESD. In this context, education in general has advanced from a voluntary service to an inherent task of local authorities. One interviewee explains this with reference to broadening the understanding of education: “The concept of education has changed somewhat. Before, we were always told that we, as a local authority, were only responsible for the school insofar as we appointed the janitors, were responsible for the buildings, things like that. But (. . .) over the past decade that has changed (. . .), so that now the local authority is also taking on more responsibility through educational landscapes, and education not only takes place at school but also at the children’s day care center and in the extra-curricular domain” (IP 47: 11). The continuous networking between different local actors and the changing modes of governance in which the civil society actors are strengthening their political legitimation can also be seen as the central diffusion path of ESD within local authorities. Through ongoing and vehement activities in the context of ESD, the NGOs are increasingly being taken seriously and the political relevance of ESD is raising. For this reason, one expert is not surprised that the diffusion of ESD was carried out as a bottom-up-process for years and “has now found its top-down pendant” (IP 15: 17). Contrary to the other educational areas, there is no panacea for strengthening ESD that is transferable from one local authority to another, as the historically grown local networks are unique to each local authority.

4.7. *Overall Findings*

When it comes to synthesizing the findings of the respective educational areas, the analysis shows that the diffusion process of ESD is influenced by the characteristics of the concept of ESD as a social innovation, general technical and societal developments as well as the institutional dimension in the innovation systems of the educational areas.

Firstly, the results of the interview study indicate that specific characteristics of ESD in the educational areas have a significant impact on the diffusion of ESD, as they are interwoven with typical patterns of action and the professional self-image of educators. In all educational areas, ESD is perceived as complex and vague. While the need to avoid instrumentalization makes teachers unsure of how to handle controversial debates about sustainability in schools, the ESD understanding of VET seems to be based on a consensual understanding of sustainability and a strong orientation toward action and thus tends to hide controversial debates or conflicting goals between the different sustainability aspects. In turn, the general understanding of education in non-formal educational institutions is characterized by voluntariness, innovation, and experimentation, and therefore resonates more with the conceptual ideas of ESD.

Secondly, all educational areas are confronted with different technical and societal challenges such as inclusion, digitalization, and demographic change, and thus their openness to the social innovation of ESD has been taken up with varying degrees of priority in the educational areas under study. In early childhood education, ESD has been transferred 'en passant' with other innovations through numerous professionalization efforts over the past few years, whereas in schools the relevance of ESD policy has not been as visible as reforms such as the strengthening of all-day schooling. In higher education, ESD has been perceived as a further cross-cutting task, along with internationalization and digitalization, beyond the disciplinary core business of research and teaching.

Lastly, these institutional pre-conditions in the different innovation systems or change environments have an impact on the diffusion of ESD. The degree of formalization is aligned with systemic characteristics of the educational area such as subject, disciplinary, and professional orientation. The higher the degree of formalization, the less permeable the educational area seems to be for the diffusion of the social innovation of ESD. Hence, according to the experts, in the educational areas of school, higher education and VET, ESD has been diffusing more slowly than in early childhood education, non-formal/informal learning, and local authorities. Furthermore, the understanding of education in less formalized educational areas appears to be more open to progressive educational ideas in the sense of ESD, which suggests the differences in the pre-conditions in the different educational sectors are more cultural. ESD as an innovation is more compatible with these educational areas.

5. Discussion

The results for the transformation paths regarding the diffusion of ESD in the different educational areas show that the methodological procedure of expert interviews provides a comprehensive perspective on the mainstreaming of ESD in different contexts. The aim of capturing a process-oriented and contextualized view that complements more quantitative measures regarding the anchorage of ESD has therefore been achieved, although there were only 8 to 10 expert interviews per educational area. Reflecting the data collection, the guiding questions were developed in a group consultation and, in a second step, adapted to the specificity of the respective educational area. In terms of the data analysis, interpretation sessions were held regularly with colleagues in order to discuss the derived category system and interview passages that could not be clearly assigned to a category. According to Steinke [45] interpretations in groups are a discursive form of the production of intersubjectivity and traceability through explicit handling of data and its interpretation.

With regard to the interpretation of the results, they are mainly in line with international developments in other educational systems, i.e., concerning structural barriers and drivers for the implementation of ESD [46], the individual conceptions of educators about ESD [47,48] or the pivotal role of learners engagement [49]. Nevertheless, the results emphasize the importance of the structural pre-conditions in the innovation system for the success of ESD-diffusion in the different educational areas. Besides the broad variety of transformation paths between different organizations *within* one educational area, all leading to their own, barely transferable strategies for integrating ESD, there are broader and more systemic reasons for the receptiveness of the different educational areas to ESD that became apparent in the results.

5.1. Discussion of the Results within the Different Educational Areas

Early childhood education for sustainable development has developed as a distinct research field in recent years, even internationally. Various reviews show that there is an emerging interest and a growing body of publications [50–52]. In contrast to other educational areas, many articles are published in early childhood education journals, not in ESD or Environmental Education journals [52], which points to the openness and adaptiveness of the overall educational area with regard to new trends. Furthermore, the self-conception of educators in ECE includes seeing pre-schools as an ‘environment where questions about values, morals, human rights, democracy, participation, and a relationship to nature are touched upon’ [53] (p. 197) and thereby highlights an educational self-conception that is highly compatible with ESD [54]. Few countries started to address (E)SD in their early childhood curricula [55]—a development that is emphasized even by the German experts. So, the transformation path of endogenous capacity building in Germany is stimulated by the ongoing professionalization of a dynamic educational area as well as by the basic understanding of education in early childhood education that is reflected in other countries as well.

School education in Germany does not demonstrate proactive take-up of ESD diffusion by the majority, due to its top-down-oriented logic. Lack of clarity [26] in political statements on the importance of ESD, in particular, fuels this sectoral challenge, which can be seen even in other countries such as Great Britain [56]. Nonetheless, in recent years, decisive strategies for the diffusion of ESD have evolved which deal with the implicitly difficult conditions in Germany. Here, the experts specify cooperating with non-formal learning organizations and strengthening controversial content in the classroom in relation to the emancipatory understanding of ESD [57]. Comparing the study to other studies [58] also shows that teachers in Germany still struggle with how to implement ESD as a holistic and pluralistic approach. The Whole School Approach is still on its way to being understood as an overarching task of action in which the participation of all involved, as well as measures of procurement, etc. within the institution itself, become the focus of a successful anchoring of ESD [59]. Pupils, teaching and school management staff [60], parents, and politicians supportive of ESD are therefore defined as decisive actors. Nevertheless, the transformation path of waiting for ESD policy and its legitimation in schools seems to be dominant in the German context.

Vocational education and training for ESD also internationally takes place in contexts where concrete action in the professional situation is decisive, but in Germany the competence of action-taking has a very high value [61]. Additionally, the transformation path of consensual concretization of SD aspects mirrors the structural conditions in VET in Germany, where all decisions have to be negotiated by the different stakeholders involved in the dual system of VET. This consensual understanding contrasts with international developments to a certain extent. UNESCO in particular has developed a comprehensive and more fundamental vision of ‘transformative VET’ [62,63] that shifts ‘the target of VET from economics to individuals’ [ibid.] and emphasizes that VET ‘does not adapt to current work and societal change, but aims to challenge and transform those’ [ibid.]. During the UN Decade of ESD, the understanding of SD in VET “has broadened from an emphasis on skills and employability to a transformation of business and community cultures toward sustainability, enabling TVET learners to become agents of change themselves” [19] (p. 102). While international publications in VET [64,65] promote this transformation, the diffusion of ESD in Germany’s VET system still seems to proceed quite slowly and to struggle with the ambivalences in the transformation path of consensual concretization.

Higher education for sustainable development is becoming increasingly relevant around the world [66,67]. There are lots of international examples of the promotion of HEIs shifting toward sustainable development. The case for Germany exemplifies that universities with a clear sustainability profile have institutionalized sustainability activities on different levels. Universities as beacons for sustainability seem to have a pioneering role for other HEIs. However, this transformation in the direction of a Whole Institution Approach requires the adopters to develop new skills and understandings and thus slows down the diffusion process [24]. The results of the study resonate with international findings showing that there is a high demand for supporting the implementation

of ESD in the curriculum [68,69], applying participative strategies in order to foster learning and teaching methodologies [70], offering qualifications not only to educators but also to students and administrative staff [71], and establishing networks of expertise within the universities. This suggests there should be a re-structuring of study and research programs, campus operations and life on campus. The openness of the educational concept of ESD has the potential to provide ideas for an interdisciplinary and practice-oriented curriculum design and research objective in order to overcome disciplinary barriers [46] and establish standards for high-quality HE.

Non-formal learning organizations have always been the backbone of ESD in Germany [72] and seen as “a critical enabler for a transition to sustainability” [73] (p. 789) with an increasingly important role internationally. Besides this, the research results of the German interview study can hardly be compared with other international studies because the international landscape of institutions that offer non-formal learning opportunities is also extremely diverse. One aspect highlighted by the German results is that the intensified cooperation between formal and non-formal educational organizations—which is claimed to be pivotal in enabling more ESD, and the ambition of which is “to work in tandem with the formal education sector” [74] (p. 13)—also carries some risks for the non-formal learning organizations. The confused self-image of NGOs found in the German study contrasts with international descriptions of the role-confusion of the state actors documented in other studies [8]. The transformation path of interwoven efficacy found in the German study is accompanied by some ambivalences that would benefit from further research.

Local authorities are named as one priority area in the GAP [1], as they influence the living environment of all learners and open up room for participating in sustainability transition processes. The negotiation and cooperation processes needed for the overall diffusion of ESD within the whole educational system are tried out, starting at the local level, through an ongoing networking [75]. While there is little research on the integration of ESD at the policy level of local authorities, the research strands focused on educational landscapes [76] and learning cities [77] are increasingly attracting attention. Regarding the transformation path of the changing modes of governance for ESD in unique educational landscapes in Germany, international studies, too, show that international policy concepts strongly influence local policy making [37,78], yet purely importing sustainability strategies does not work, as they are always contextualized, re-interpreted, and adapted to the local conditions. In particular, implementing (E)SD-awards procedures seems to result in a win-win situation for the various actors within the local authorities, as these recognize and bring together the mostly voluntary engagement by CSOs and policy actors [38].

5.2. Discussion of the Overall Findings

The main aim of this study was to complement the quantitative approach of an indicator-based ESD monitoring with a qualitative analysis of how ESD is mainstreamed in different educational areas in Germany. ‘One transformation path does not fit all’ is the key insight that emerges from summarizing and juxtaposing the transformation paths of the different educational areas. For future policies, this would mean developing a sensitivity to the specific conditions and logic in the different educational areas. Regarding future research, this main conclusion highlights the value of a differentiated view on the diffusion of ESD through the lens of the respective educational areas.

In general, ESD as a social innovation is perceived as complex and vague in all the educational areas analyzed, and these characteristics of the innovation strongly influence the diffusion process. This reinforces the insights from early diffusion theory [24], which emphasized that innovations should be seen as advantageous and compatible with existing experiences, attitudes and values instead of complex and ambiguous. In all educational areas, ESD not only includes a substantive examination of sustainability issues [41] and fosters key-competencies [14,15], but also needs a transformative pedagogy [1,79] which has an impact on the transformation of the respective educational institutions. The orientation of the learning organizations in the sense of the Whole Institution Approach plays a crucial role in every area of education. Nevertheless, the study shows that ESD seems to be spelled

out in a different accentuation in each educational area, which is possible because it possesses a kind of conceptual vagueness. These different accentuations of ESD in the educational areas reinforce the insights from policy studies that show that ESD definitions are not conceptually clear but based on localized and contextualized meanings in different regions [40]. In the governance of ESD this seems to be an advantage because the actors involved need to negotiate a shared understanding of ESD and thereby also discuss their cooperation structures [38].

Additionally—and this is the key insight in synthesizing the different transformation paths—the institutional characteristics, structural pre-conditions, and cultural aspects within the different innovation systems of the educational areas influence the success of the ESD diffusion process decisively. The degree of formalization and the typical patterns of decision making in the different educational areas play a pivotal role in the receptiveness of the change environments [27,28,80] and therefore also with regard to the success of the diffusion of ESD. This reinforces the insights from the comparison of national ESD policies, where the historically contingent balance between different actors has a huge impact on the realization of ESD [39]. In the case of the different educational areas in Germany, the interaction and interdependencies between the various policy makers, non-state actors, and scientists have produced six different innovation systems with their respective balance and particularities.

Furthermore, the characteristics of the social innovation of ESD and the structural and cultural pre-conditions in the innovation systems of the educational areas are highly interwoven in terms of the diffusion process of ESD. For this reason, the diffusion process of ESD can be conceptualized neither as a linear path that enriches and transforms the educational areas with sustainability aspects and a transformative pedagogy, nor as purely influenced by the structural conditions in the different educational areas. Instead of this, the diffusion of ESD takes place as a circular interplay [35] between the innovation and (the structures and actors of) the innovation system, transforming both of these in the process. A deeper understanding of this interplay holds great potential for the (self-) reflections of practitioners' regarding their own transformation strategies and constructing them along the typical patterns of the respective educational areas. It also opens up a lot of further research questions, i.e., in the context of comparative studies either between educational areas in other countries or between different educational systems.

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