Integrating Education for Sustainable Development in Geography — Between Curriculum and Classroom Practice

An expert interview with Prof Dr. Alexandra Budke (University of Cologne)

In this interview, Prof. Dr. Alexandra Budke, an expert in geography education at the University of Cologne, underscores the critical role of Education for Sustainable Development (ESD) in schools, particularly within the field of geography. While ESD is well embedded in curricula, its practical implementation remains insufficient, often due to a lack of concrete instructional strategies. Budke emphasizes the necessity of a multi-perspective approach, the inclusion of controversial discussions, and the development of innovative problem-solving strategies to effectively engage students with sustainability issues. She highlights the potential of digital games and simulation-based learning as powerful pedagogical tools that enable students to explore the consequences of their decisions in a dynamic and experiential manner. Through initiatives such as the Escape Climate Change Initiative (ECCI) and BNE-OER., Budke contributes to advancing the integration of ESD in geography education, fostering interdisciplinary collaboration and the development of open educational resources to support teachers in effectively implementing ESD in their classrooms.

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Prof Budke, how would you currently describe the importance of Education for Sustainable Development in schools?

I believe that there is already a strong integration of Education for Sustainable Development (ESD) within school curricula, at least in the field of geography. Many topics align with or overlap with ESD themes.

However, the actual implementation remains very inadequate. Many teachers are unsure how to put it into practice, which leads to significant challenges.

Regarding universities, at least in Cologne, there is a comprehensive integration of ESD in geography education. We have incorporated it into almost all courses, but this is certainly not the case at all institutions.

You mentioned that the integration of ESD in geography education is already well advanced. Could you elaborate on how this is reflected in practice? Are there specific curricular frameworks and thematic areas in geography that explicitly incorporate Education for Sustainable Development?

In fact, almost all topics in geography education are relevant to ESD, as the core thematic areas focus on human-environment interactions, scientific inquiry, and natural systems. In geography, the focus is on resources, climatic conditions, and geographical foundations, always considering how humans utilize these elements and the challenges that arise as a result. Typical topics include sustainable urban development, climate change and sustainable agriculture.

Therefore, almost every topic in geography education is naturally linked to ESD, which explains the significant overlap often discussed in academic contexts. While this connection is not always explicitly stated, a look at school textbooks shows dedicated overview sections that introduce ESD, present different sustainability models, and then integrate these ideas across various topics. This makes the implementation of ESD in geography education quite extensive.

From the perspective of Education for Sustainable Development, what would be the three topics that teachers, and ultimately students, should focus on in this context?

The fundamental aspect is resources, particularly how to manage soil water, air, and climate in a way that ensures future generations can still benefit from them.

Sustainable development also involves finding solutions, an area often overlooked. What can we envision for the future? What are our ideals? What do we truly want? There are many normative aspects that need to be discussed. What exactly are we aiming for?

It is essential not only to focus on problem analysis but also on creativity. It is not only about learning solutions, but also experimenting with, developing, negotiating and designing them. This, for me, is a crucial point.

Finally, from a geographical perspective, understanding how different spaces and scales are interconnected is vital — especially in the context of globalization, which plays a role in many areas. We have global processes that are influenced at the local level. This connection is the third significant point.

To summarize: Resources as a broad field, where different focal points can be set; the development of solutions and future perspectives; the distinction and especially the interconnection of different scales. Are there ways to differentiate here by age groups? For example, if I am a teacher covering a range of school levels, are there any recommendations on which topics should be addressed at which school stage?

Fundamentally, all these topics require a multi-perspective approach because they are highly disputed, involve various societal groups, and feature different solutions that are socially debated. Without a multi-perspective approach, it is impossible

to teach these topics effectively. There are certainly many possibilities for differentiation in this area.

For younger students, it might be sufficient to present two perspectives, while older students would likely engage with multiple perspectives. The complexity of the media used also plays a role - whether students need to research on their own or are provided with all the information in younger classes. Additionally, regarding solutions, the question

arises: to what extent can students implement them independently? How autonomous are they? How much room do they have for this? There is certainly more flexibility at the upper school level. In terms of content, I do not see any difference, as all topics must be taught from a multi-perspective standpoint.

Do you have an example of a dual-perspective approach and, in contrast, one for multiple perspectives?

This approach can be applied to any topic. For example, if we take a typical resource-related issue such as lignite mining, there has been a long-standing conflict near Cologne with RWE and the Hambach Forest. For younger students, it might be sufficient to say that there are people in favor and those against it. In higher grade levels, the issue can be explored in more detail. For example, there are environmentalists, but who exactly are they? Then, as I mentioned earlier, the different scale levels come into play. We have the overarching issue of climate change. What does this mean on a global scale? But also, what does it mean locally for the Cologne region?

This differentiation can also be applied in the area of nature conservation, considering the various actors involved. Are they individual or collective actors? Do they speak for themselves or on behalf of a corporation like RWE? There are many opportunities to examine this in more depth and to increase the complexity. This approach can be applied to any topic, whether it's deforestation of the tropical rainforest, palm oil, or others.

That sounds very interesting. And that means, a didactic approach would be to present multiple perspectives on a specific topic, if I understood you correctly. Do simulations play a role in this context of ESD?

Yes, I have a research focus on digital games, which are simulations involving models. There are many digital games, including commercial ones, that address topics of sustainable development. Examples include climate change or building a sustainable city. These are very interesting because students can directly observe the effects of their decisions made in the game. For example, when building something, like a road or an industrial area, they can immediately see the consequences. Talking about actions and solutions for the current sustainability problems, is quite challenging in traditional teaching. You can talk about effects and maybe find examples, but it's difficult to see them directly.

Therefore, the area of digital games is particularly relevant because students spend thousands of hours on them. It's one of their main leisure activities. In a way, they are already engaging with ESD all the time. However, it is not conscious, and it's not being reflected upon, so the learning effect is not truly present. But the game experience could certainly be used in the school context.

What other possibilities are there to integrate complex sustainability topics into one's own teaching?

In addition to multi-perspectivity, controversy is central for me because these topics cannot be understood without addressing the conflicts they bring. Many models speak about having a triangular, quadrilateral, pentagonal, or pillar structure that should somehow take ecological, economic, and social aspects into account. However, these models often overlook the fact that these issues involve key conflicts, and that there is rarely a solution that works equally well for everyone. As a result, these topics are often treated too quickly, too simply, and too superficially in teaching.

Therefore, you must focus on the central conflicts within a subject when approaching it didactically, so that students can understand why it is so complex and difficult. This allows them to follow the societal discourse and form their own opinions, which is an important point. To capture this controversy, there are many methods in the area of argumentation. I have written several books on this, so it's not possible to pinpoint just one method, but I would place argumentation methods at the core.

Do you have an example for our interested teachers? Specifically, an example embedded within a thematic context, with a brief reference to how argumentative structures could be integrated at this point.

We developed a lesson where students are supposed to learn how to handle different forecasts, which plays a significant role in the context of education for sustainable development e.g. on the topic of climate change. We do not know exactly by how many degrees the temperature will rise. We know that it will rise, but will it be 1.5 degrees or 2 degrees? This involves an area of uncertainty, in which students learn to deal with forecasts. This can be related to the topic of forest conversion in Germany, where different forecasts can be considered.

There could be a cautious forecast, a dramatic one, or a catastrophic one the students receive in class. They could then investigate the following questions: How would this impact the forest, and what consequences would I need to draw? Depending on the forecast considered, different consequences and decisions can be made in class, and these must be justified.

The question then becomes: what type of decisions do I make? These could vary significantly, which could lead to a conflict. Students must then learn how to justify their decisions appropriately, because in the classroom, it's not just about having an opinion. The key aspect is the justification, as that is what is truly interesting. We want students to use cards, diagrams, and online research to serve as evidence in arguments.

There are, of course, many different media that can be used, from newspaper articles to maps and the internet. This is also advantageous, as it provides access to many authentic sources that clearly present various perspectives on the respective issues.

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You mentioned that focusing on conflicts is central to your work. Could you further explain the importance of future scenarios? Is there a balance between discussing conflicts on one hand and developing creative future potentials on the other?

I believe both are important. Understanding these issues is crucial for students. What does climate change mean? What is the significance of deforestation in the tropical rainforests or our globalized world economy? I think it is important for students to grasp the problems and the systemic backgrounds. However, it can be discouraging for students if they only deal with problems in every class. Solutions and possible courses of action should therefore be derived from the analysis of the problems, which are not limited to the students as individuals, but also include the actions of economic and political actors.

How can students be supported in developing desirable future scenarios? What approach do you suggest?

The problem analysis works as a foundation. If I were to start with a solution, the students would be less motivated. Engaging with the problem is a fundamental step. This is widely debated in my field though, and there are certainly other opinions. But leaving out the problem analysis completely would not make sense to me. I like it when schools open up in that regard, so students can see how their

solutions contribute to the public discourse. There are resources like Web 2.0 but also possibilities to collaborate with newspapers or exhibitions. The area of public engagement and publication is an important part when it comes to finding solutions.

Let's move on to the next thematic section of this conversation. You briefly mentioned earlier that you have recently worked with video games. Could you share one or two examples of your own research that contain important insights or areas relevant to educators?

There are many games, especially commercial ones, that address topics related to sustainable development. Developers hope that there is significant market potential in this area. Therefore, educators should not focus solely on serious games and consider other options. We have conducted extensive basic research. What do players take away when they play such games? One finding is that, while players understand the game well, they do not connect it to reality, even in very realistic games. The reflection process must be guided in school, which is the main responsibility of the teacher. I have created a reflection model that outlines the phases in which such reflections should take place. At the first level, the game mechanics are reflected upon, and at the second level, it is compared to reality, which requires additional materials. Then, the medium itself must be discussed, including its limitations. Finally, self-reflection follows—what does this mean for me, and what solutions have I taken away? These four levels can be applied to any game reflection.

One of my doctoral students created a reflection journal, which essentially works with reflection questions based on these four phases. It has been tested extensively with students and published. It produced very positive results, showing that alternating between playing and reflecting in class, followed by individual reflection in the journal, enhances learning. The process consisted of three steps: playing phase, class discussions, and reflection in the journal. In the final step, we also conducted discussions among the students, supported by reflection coaches, which greatly reinforced the learning process.

Additionally, I have created games for various projects. For instance, we are currently working on an EU project, where we develop games about climate change for schools. We are at the project's conclusion. It is an project called "Escape Climate Change Initiative" (ECCI), which will be published soon. This project also implements the approach of multiple perspectives I mentioned earlier. Players encounter various stakeholders with different views on the issue of climate change in cities, particularly regarding solutions. Various options are discussed, allowing players to develop their own opinions by the end.

For teacher training, we also developed digital learning units, the Open Educational Resources in the project "BNE-OER.". This project is now expanding. We have completed the part for the university and are now involved in a large BMBF project aimed at adapting these learning units for the second phase of teacher training and implementing them in various German states. Brandenburg, Saxony-Anhalt, and North Rhine-Westphalia will participate.

What would you say if a teacher contacted you, saying they have difficulty integrating ESD into their teaching because their subject combination is Religion and Music? They come to you and say: "Ms. Budke, I

want to implement ESD in my lessons, but I don't know how or where." What advice would you give?

As a geography educator, this is not a question I can easily answer. Education for Sustainable Development is a broad topic that no single subject can fully cover. Geography certainly plays a central role, but a single lesson in the lower grades cannot address such broad topics. Therefore, I believe it is essential for schools to develop interdisciplinary concepts. My students report to me how schools are approaching this. Many schools try to create space for project-based learning or organize project weeks focused entirely on ESD, with teachers collaborating to achieve more. This is a key piece of advice. Otherwise, I would look at the approaches within the subjects and try to align with them.

From this, I understand that addressing ESD is more of a systemic issue at the school level than an individual issue for a single teacher. Do you agree with that?

It is both. The systemic aspect is certainly important. Schools and colleagues need to collaborate more. For individual teachers, it is also important to look for opportunities within their subjects. In subjects like German and Geography, there are aspects of material analysis, argumentation, and expressing personal opinions. As you mentioned, Religion involves normative aspects. The materials are often problematic, as textbooks in geography, for instance, present topics on a double page. As I mentioned earlier, multiple perspectives, complexity, and systemic approaches cannot be conveyed in such a limited space. The representation often does not take many perspectives into account. There might be a factual text but without stakeholders, different opinions, arguments, or authentic sources. This is inadequate because students should be forming their own opinions based on authentic sources. These are current topics with controversial discussions. From a media literacy perspective, students should engage with up-to-date and authentic sources. This means that textbooks alone are insufficient, which results in considerable additional work for the teacher. These topics need to be prepared because the available teaching materials cannot fully address them. I suspect that this is similar in other subjects. Therefore, collaboration is often needed to create a shared resource pool or to use Open Educational Resources so that materials meeting these requirements can be accessed nationwide. A major obstacle in implementing these topics is the handling of personal opinions. We have conducted interviews on political education, and this is a significant area of uncertainty for teachers. Teachers have their own opinions on these topics but fear that expressing them could influence or overwhelm students. At the same time, they want to be authentic and, ideally, role models. Discussions and argumentation should be facilitated in class. This is a delicate balance and a crucial issue for teachers.

Recognizing one's own position is the first step. Then, a way must be found to address the issue of influence. I believe that teacher training could address this aspect as well. It is essential to allow for critical discussions because that is what democracy entails. This is probably not easy for many teachers.

Ms. Budke, is there anything else you would like to share with us?

There is an international project that I find very valuable. These are not just structural considerations for schools, training seminars, and universities but also global issues. One challenge is the

aspect of spatial dimensions, which I mentioned earlier. The main issue is that the local level is often neglected. It is not feasible to create a textbook for every city in Germany. How do we link the students' real-life context with global dimensions?

The consortium is also valuable for thinking about this aspect. The teachers in the first round of training, if they were interested in ESD, chose very different topics based on their locations. For example, colleagues from Andalusia focused on drought. The exchange of ideas is fascinating. How can we bridge the gap between students and teachers from different countries? It is crucial to emphasize the global context, regardless of the topic. Structural global changes are needed. The integration of these issues varies. In our ESD project, which is also an EU project, the teaching of natural sciences, for example, is handled by Biology in France, not Geography. The subject structure differs across countries, meaning the collaboration between subjects also varies. However, this leads to opportunities for cooperation.

Thank you for this interview.

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