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Cooperatively shaping education for sustainable development:

Lesson development in the virtual learning research laboratory

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Research interest

The aim of the research project is the development and evaluation of a virtual cooperative university seminar for the integration of the educational concept of Education for Sustainable Development in university teacher training. It is of interest which influence the subject composition of the student group (disciplinary versus interdisciplinary) has on the processing of complex sustainability topics in the context of a joint teaching development.[1]

Initial situation, objectives and framework conditions

Education for sustainable development (ESD) describes an education that enables people to think and act in a sustainable[2] way (Stoltenberg, 2017, p. 1). Learners should have the knowledge, experience and methods necessary to deal with complex issues of the present and future (UNESCO, 2016). In this context, ESD is understood as an educational contribution to addressing current global challenges such as climate change, energy supply or biodiversity loss (de Haan, 2001). The ESD education concept is an education policy programme initiated by the United Nations and UNESCO. The goal of anchoring ESD at all levels of education in Germany (UNESCO 2014) is based on international agreements that were entered into as early as 1992 within the framework of *Agenda 21*[3] and are currently being continued with the UNESCO World Programme of Action and Agenda 2030 as well as the proclamation of the 17 Sustainable Development Goals. Teachers are described as important multipliers for the implementation of ESD, which results in the requirement to integrate ESD into initial and in-service teacher training (Ibid. 2014). In this context, ESD is not understood as a new subject, but as a cross-cutting issue that should be addressed from within all subjects (Schreiber & Siege 2017).

[1] With the closure of all educational institutions in spring 2020 due to the Corona pandemic, the seminar concept originally planned in face-to-face form has been completely digitalized. The cooperative lesson planning takes place in a virtual learning research lab and the students develop an online ESD learning environment that is tested by students in home schooling.

[2] The guiding idea of sustainable development aims to shape socio-economic development in such a way that it does not run counter to the living needs of people in other regions of the world. Furthermore, this development should grant future generations sufficient scope to shape their own lives by respecting the limits of the carrying capacity of the natural environment (Haan, 2001, p. 58).

[3] Agenda 21 is an official document of the United Nations Conference on Environment and Development, which met in Rio de Janeiro in June 1992. Agenda 21 was signed by 180 states and provides an orientation framework for political, economic and social action. The signatory states have committed themselves to orienting their political actions towards the guiding principle of sustainable development in the future.

Theoretical background

The integration of complex sustainability issues in the classroom requires a multi-perspective and systemic[4] approach that looks beyond the subject itself (Bormann & Haan, 2008). Learners should be shown ways to deal with the complexity of the relevant issues. ESD competence models for teacher education assign central importance to teacher cooperation[5] in the implementation of complex sustainability topics in the classroom (Rauch, Streissler & Steiner, 2008; Stoltenberg et al., 2014). Arguments for collegial cooperation in ESD are that the complexity of ESD topics transcends subject boundaries, synergy effects and a deeper understanding of the subject are made possible through multi-perspectivity, and an increase in quality as well as a reduction in workload through the bundling of competences is evident (Rieß 2013; Steiner 2011). In addition, student teachers are to be regarded as novices in terms of lesson planning. Cooperative lesson development enables them to share responsibility and expertise and thus reduces the demands on smaller sub-areas in the planning process.

Research interest & research questions

The research interest of the thesis is divided into a descriptive and an interpretative level. Within the descriptive level, a comparison of the qualities of a disciplinary (physics students, with mathematics as a second subject) and an interdisciplinary (student teachers of different didactic subjects) cooperation in a virtual university seminar for the promotion of competences for the implementation of ESD in later subject teaching is to be carried out. The associated research question pursues a scientific evaluation of the new seminar format and reads:

RQ1: What acceptance do the students express with regard to...?

- the preparation of ESD in the seminar?
- the personal significance of ESD?
- the importance of ESD for the classroom?
- the importance of cooperative lesson planning in ESD?
- the virtual seminar and lesson design in the implementation of ESD?

Within the interpretive level, an attempt will be made to take a closer look at the influence of the subject composition of the group of students. Of interest here are the differences that emerge in the evaluation of a given ESD lesson plan. The corresponding research question is:

RQ2: What influence does the composition of the students' disciplinary (group A: physics students) and interdisciplinary (group B: student teachers of different subjects) subjects have on their assessment of whether a given lesson plan is suitable for the implementation of ESD?

The second research question pursues a research concern with the aim of using an example to generate hypotheses for effective integration of ESD in university teacher education.

[4] Following the definition by Rieß et al. (2013, p. 59, 61), a systemic view encompasses the ability to recognise, describe and, if possible, also model areas of reality as systems. In this context, the term system basically refers to a complex whose elements are in constant interaction and whose relationships give rise to special properties (for example, living systems are autopoietic, have dissipative structures and show emergence).

[5] Following Ahlgrim et al. (2012), cooperation is understood here as the voluntary joint bundling of individual experiences, knowledge and responsibilities and group activities towards a common goal.

Study design

The research project presented here is a qualitative comparison group design with two levels: On the one hand, change will be measured at the individual level and, on the other hand, differences at the group level will be investigated. The variation between the groups is created by the different composition of the participants. The group size is 5 to a maximum of 10 students. In the online ESD seminar, the students work together[6] to develop an online ESD lesson[7] that is tested with invited classes in the virtual learning research lab.

Survey instruments & evaluation

The written evaluation of a given ESD lesson plan before and after participation in the seminar will be used to record the students' existing cognitions regarding ESD lesson planning. By means of qualitative guideline interviews after participation in the seminar, the acceptance of the seminar and the perception of the cooperation process in joint lesson planning as well as subjective theories on ESD and cooperation will be collected. The data obtained in this way is supplemented by an online questionnaire before and after participation in the seminar, which asks for information on experiences and attitudes towards ESD and cooperation. The written evaluations and transcribed interviews are analysed and evaluated in the form of a content-structuring qualitative content analysis according to Kuckartz (2018). The categories are formed by means of a priori categories, which are derived from the work assignment for the evaluation of lesson planning as well as the interview guide and are supplemented by category formation on the material.

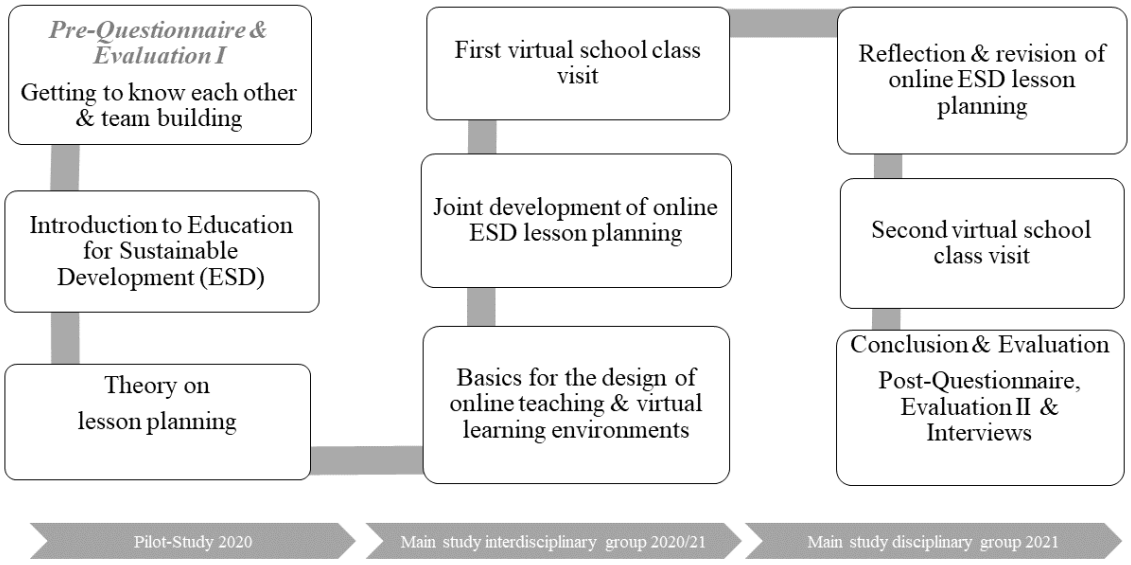

Abbildung Fig. 1: Seminar & study schedule

[6] Virtual cooperation in the seminar is made possible through the use of a video conferencing tool combined with a collaborative online whiteboard.

[7] The lesson development is based on the exemplary sustainability context "Online shopping & its impact on climate change" and explores the question of which shopping option - online shopping or shop shopping - is the more sustainable one.

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