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# Shaping Education for Sustainable Development (ESD) cooperatively - Comparison of disciplinary and interdisciplinary cooperation in the planning of ESD lessons

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**The study examines the integration of the educational concept "Education for Sustainable Development (ESD)" in university teacher training**. Of interest is the question of how the educational policy claim to teach ESD as a crosscutting theme from all subjects (UNESCO 2014) can already be effectively implemented in teacher training. For this purpose, a new cooperative ESD seminar was developed within the framework of the study, based on which the different qualities of disciplinary and interdisciplinary cooperation in ESD lesson planning are considered.

**The implementation of ESD is challenging for teachers, as ESD topics are typically those that cannot be assigned to one (natural) science discipline alone.** In addition, there is a lack of structural anchoring of ESD in teacher education. In the ESD competence models of teacher education, teacher cooperation is seen as playing an important role in the implementation of ESD in order to meet the demands that ESD teaching places on the individual teacher. Examples include the KOM-BINE model (Rauch et al, 2008) or the competence recommendations of the LeNa network (Stoltenberg et al, 2014). One argument in favour of teacher cooperation, for example, is that it enables complex sustainability issues to be addressed in the classroom (Steiner, 2011). Looking at empirical results on teacher cooperation, there are indications of its positive influences, for example with regard to relief and burnout prevention (Aldorf, 2015; Huber, 2012). However, a prerequisite for cooperation to take place at all is that the conditions for success of cooperation are fulfilled (Gräsel et al. 2006). These include the existence of a common goal and a clear distribution of roles and tasks.

**In the study presented here, a qualitative comparison group design is chosen** and the participant composition of two groups of student teachers is varied in the context of a cooperative ESD seminar during joint ESD lesson planning. In a disciplinary group, physics students work together, whereas an interdisciplinary group consists of student teachers from different disciplines (including German, English, art, music, biology, chemistry and physics). The variation in the composition of participants in the study ties in with the benefit of interdisciplinary cooperation for the implementation of ESD, which has been postulated in research but not yet empirically investigated. Since the current training structure of teachers is subject-centred and the subsequent school day is also divided into subjects by the timetable, the question arises as to how the interdisciplinary claim of ESD can nevertheless be fulfilled. This study therefore examines the different qualities of disciplinary and interdisciplinary cooperation in the development of ESD lessons. For this purpose, the research questions consider an evaluative and a potentially generalizable level. On the evaluative level, it is investigated what acceptance the students express with regard to the new seminar format and how the cooperative lesson planning is perceived. In this context, it is of interest what relevance the students attach to ESD for their later subject teaching and whether the seminar was suitable for creating the conditions for successful cooperation. On the potentially generalizable level, the parallel occurrence of group differences is considered in connection with the variation in group composition. Hypotheses will be generated as to how group composition feeds back into the content-related or social quality of cooperative work.

**The aim of the seminar is to promote ESD competences for the design of online ESD lessons.** The online format is a framework condition of the study, which was due to the Corona pandemic and the resulting closures of educational institutions. In the seminar, students first receive an introduction to ESD and the basic principles of designing online lessons. The students then develop an online ESD lesson together and test it in the context of virtual school class visits. Following the implementation, student feedback on the perceived quality of the lesson is obtained. Based on the students' feedback, the students jointly reflect on the experiences of the lesson implementation and revise the original planning.

**A qualitative guideline interview will be conducted with the students after each seminar.** The interviews are intended to find out how the students perceive the newly developed seminar concept. Of particular interest in the interviews is how the students evaluate the disciplinary or interdisciplinary cooperation with the other seminar participants. Here, it will be investigated whether the joint lesson planning was perceived as helpful or as a hindrance and what value the students in both groups assign to cooperative lesson planning in ESD lessons. Furthermore, the students complete written evaluations of a given ESD lesson plan before and after participation in the seminar. In the evaluations, the students describe to what extent they consider the given ESD lesson planning to be successful for the implementation of ESD. The evaluations will be used to examine whether the students' perceptions change before and after participation in the seminar and which differences can be seen at the individual and group level.

**The evaluation is carried out by means of a qualitative content analysis** and is based on the procedure according to Udo Kuckartz (2018). The MAXQDA software is used for support. A mixture of content structuring and evaluative qualitative content analysis is used. The individual coding cycles were run through in a team and all documents were double-coded together with an independent second coder. Subsequently, the agreement of the coding was checked within the framework of a communicative validation. In the analysis of the coding, the code frequencies of the gradual categories were considered in order to be able to make statements about the acceptance of the seminar and the success of the cooperation. For this purpose, the absolute and relative frequencies of the degrees of expression of the categories were calculated. In addition, systematic summaries of individual categories were written and group and case comparisons were made.

**The first results from the analysis of the interviews are presented below**. These are to be interpreted against the background that it was a matter of voluntary participation in the seminar and that in the interview situation it is to be expected that the effect of social desirability exerts an influence.

**Research question 1a**: **Acceptance of seminar? Answer: YES**: The contents and methods experience a very high acceptance in both groups. The digital format is also rated positively overall. What is perceived negatively is the difficulty of getting to know each other in person and the inhibited communication in the online seminar. Both groups describe ESD as an important social topic of the future and see the advantages of online ESD lessons in terms of the availability and dissemination of materials in digital format. Perceived disadvantages of online teaching are the lack of technical equipment and support for students, which creates inequality. The lack of direct contact persons in the asynchronous format is also seen negatively, which means that no spontaneous adaptation of the lessons is possible in case of problems or questions from the learners.

**Research question 1b**: **Successful cooperation? Answer: YES**: In both groups, the conditions for successful cooperation were perceived as predominantly fulfilled. Joint lesson planning, communication and distribution of tasks and roles were perceived more positively in the interdisciplinary group. However, this difference cannot be attributed to the composition of the participants, but to the number of participants in the groups. In the interdisciplinary group, two smaller groups of four people each

worked together, while the disciplinary group consisted of seven people. The different group sizes had pragmatic reasons, as different school types were represented in the interdisciplinary group and therefore one lesson plan was created for primary school and one for lower secondary school. The group size of seven people in the interdisciplinary group was felt to be too large, on the grounds that there were too many competing ideas and a lack of decision-making authority in the discussions.

**Research question 2:** Different qualities of cooperation/connection with subject composition? Answer: Partially: There are no group differences in the acceptance of the seminar and the perceived self-efficacy in implementing ESD. Group differences can be seen in the attributed relevance of one's own subject to ESD. In the disciplinary group, physics is perceived as suitable for ESD, but the students doubt the possibility of integrating ESD in normal physics lessons due to the abundance of subject content and see interdisciplinary project lessons as more suitable for this. In the interdisciplinary group, ESD is not perceived as a main focus for the subjects or lessons, but the students see good connecting points for their lessons.

**Outlook**: The aim of the further analysis is to generate hypotheses regarding the qualities of inter(disciplinary) cooperation for the integration of ESD in university teacher education.

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