

Challenging German physical education teacher educators' health-related beliefs through Cooperative Planning

Julia Hapke ^{1,†}, Clemens Töpfer^{2,*†}, and Julia Lohmann³

¹Institute of Sports Science, Eberhard Karls University Tübingen, Wilhelmstraße 124, 72074 Tübingen, Germany, ²Institute of Sports Science, Friedrich-Schiller-University Jena, Seidelstraße 20, 07749 Jena, Germany and ³Institute of Sports Science, University of Augsburg, Universitätsstraße 3, 86159 Augsburg, Germany

[†]Shared first authorship.

*Corresponding author. E-mail: clemens.toepfer@uni-jena.de

Abstract

Physical education teacher educators' health-related beliefs can impact public health. An interactive knowledge-to-action approach, such as Cooperative Planning, might challenge the health-related beliefs of physical education teacher educators, thus contributing to innovation in teacher education. We investigated what health-related beliefs physical education teacher educators had before a Cooperative Planning intervention, how these developed throughout the intervention and how teacher educators' perceptions of Cooperative Planning can explain the identified changes and continuities. We established two Cooperative Planning groups that included physical education teacher educators (university lecturers and teacher trainers), researchers, study course coordinators and prospective teachers. The data of 13 teacher educators were collected before (t_0) and after (t_1) the Cooperative Planning using two methods: observations of teaching practice and interviews. The data analysis was based on the following categories: (i) *epistemic beliefs about health* (e.g. salutogenic understanding), (ii) *beliefs about the health topic in physical education* (e.g. health-related knowledge and understanding), (iii) *beliefs about the health topic in physical education teacher education* (e.g. health-related pedagogical content knowledge) and (iv) *process-related beliefs about Cooperative Planning*. The findings revealed that teacher educators' health-related beliefs were rather stable but could be challenged through a Cooperative Planning intervention. Epistemic beliefs about health remained, whereas more practice-related beliefs about the health topic in physical education and physical education teacher education changed in individual ways. Here, a change in beliefs was more likely when the participants were open to change and when Cooperative Planning offered opportunities to engage in concrete lesson planning.

Lay Summary

The health-related beliefs of physical education teacher educators are assumed to play an important role in fostering and implementing the public health agenda. In this article, we report on a Cooperative Planning intervention in which physical education teacher educators (university lecturers

and teacher trainers), physical education teacher students, study course coordinators and researchers worked together to develop health-related courses for physical education teacher education. Specifically, we investigated what health-related beliefs teacher educators had before a Cooperative Planning intervention, how these developed throughout the intervention and how teacher educators' opinions of Cooperative Planning can explain how their beliefs changed. Based on interviews and observations, we analysed teacher educators' epistemic beliefs about health, that is, their general understanding of health, their beliefs about the health topic in physical education and physical education teacher education and their process-related beliefs about Cooperative Planning. The findings showed that teacher educators' health-related beliefs were rather stable but could be challenged through Cooperative Planning. Epistemic beliefs about health remained, whereas more practice-related beliefs about the health topic in physical education and physical education teacher education changed in individual ways. A change in beliefs was more likely when the Cooperative Planning participants were open to change and when the Cooperative Planning offered opportunities to engage in concrete lesson planning.

Key words: physical education, teacher education, beliefs, health

INTRODUCTION

Physical education teacher educators¹ are 'those educators based in higher education institutions who educate, and support the on-going professional development of, future and practising teachers of school PE [physical education]' [McEvoy *et al.* (2015), p. 163]. Teacher educators are responsible for the teaching–learning processes in PE teacher education (PETE) programmes, which depend on the respective education system. In Germany, for example, initial teacher education in higher education is divided into two phases: (i) a 5-year theoretical and practical study programme at the university level and (ii) a 2-year practical traineeship in a regular school. The responsibility for PETE in each phase lies with different teacher educators. For phase one, these are the *university lecturers*, whose jobs usually include teaching and research. For phase two, these are the *teacher trainers*, who teach prospective teachers and also work as schoolteachers themselves.

Teacher educators are considered important 'multipliers' (Maaß and Doorman, 2013); that is, they convey their beliefs and teaching strategies to generations of future PE teachers, who, in turn, may convey these beliefs to the pupils in their PE lessons. Teacher educators' health-related beliefs are assumed to constitute a crucial factor for promoting active and healthy lifestyles and, therefore, may contribute to public health (see Figure 1), even though it is a long way from teacher educators' beliefs to public health. However, although the relevance of PE for public health has already been widely studied

(Palmer and Behrens, 2017), the context of PETE and the role and nature of teacher educators' health-related beliefs is a rather neglected aspect in both public health and teacher education research (McEvoy *et al.*, 2015; O'Sullivan, 2021). Therefore, the current article draws attention to teacher educators' health-related beliefs, asking how these beliefs could be challenged.

In the following, we unfold our assumption regarding the role and importance of teacher educators' health-related beliefs based on a heuristic chain model (see Figure 1). This model illustrates how teacher educators can be seen as multipliers and how their beliefs can potentially impact public health, which is done by tracing the links between teacher educators, (prospective) PE teachers and pupils (Brandl-Bredenbeck and Sygusch, 2017). We explain the links (a–f) in more detail and highlight the importance of teacher educators' beliefs for physical activity–related public health. In doing so, we begin with the intended outcome—(a) public health impact: physically active lifestyle—and then work our way through the model to our central research object—(f) teacher educators' health-related beliefs—as a crucial influencing factor. Thereby, we will work out those aspects that have guided our empirical investigation as deductive categories.

- a. *Public health impact: physically active lifestyle:* Increased health problems, such as obesity and cardiovascular and mental diseases, have led to a growing emphasis on how people can maintain and promote health (World Health Organization (WHO) Regional Office for Europe, 2008). PE has a unique and specific role in achieving this public health agenda. To empower children and adolescents to

1 In the following, physical education teacher educators are termed teacher educators.

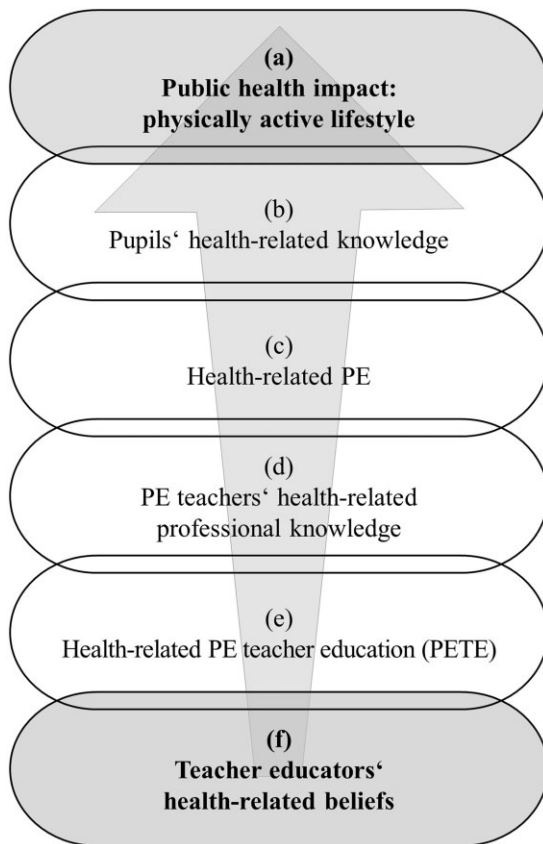


Fig. 1: Heuristic chain model (adapted from Brandl-Bredenbeck and Sygusch, 2017). CK, content knowledge; PCK, pedagogical content knowledge; PE, physical education; PETE, physical education teacher education.

lead active and healthy lifestyles, PE should enable pupils to care for their own health at an early stage (Palmer and Behrens, 2017; Ptack and Tittlbach, 2018). To act as physically literate human beings, children and adolescents need physical (e.g. motor skill competence), affective (e.g. motivation) and cognitive capabilities (e.g. health-related knowledge and understanding) (Edwards et al., 2017).

b. *Pupils' health-related knowledge:* Health-related knowledge² helps pupils develop a physically active lifestyle that includes practising physical activity, exercise and sports in a healthy way; assessing the health effects of their own sports activities; making

2 In the following, we use the term health-related knowledge to bundle together the categories of health-related knowledge and understanding which are a part of physical literacy (Edwards et al., 2017; Cale and Harris, 2018.)

healthy choices; and modifying their activities to live healthier (Brandl-Bredenbeck and Sygusch, 2017; Cale and Harris, 2018; Töpfer, 2019). For this reason, the acquisition of health-related knowledge is regarded as an essential prerequisite for performing a variety of physical activities and maintaining a healthy lifestyle; therefore, it is perceived as a central learning goal of PE (Cale and Harris, 2018). Health-related knowledge comprises not only the principles of movement and performance, but also the requirements, antecedents and values of following a physically active lifestyle (Edwards et al., 2017; Cale and Harris, 2018). Ptack and Tittlbach emphasize that health-related PE should primarily develop pupils' health-related knowledge instead of (only) targeting direct health outcomes (Ptack and Tittlbach, 2018).

c. *Health-related PE:* Studies show that the learning goal of health-related knowledge can be achieved in PE if teachers consider certain content and teaching didactics in their lessons (Demetriou et al., 2015; Strobl et al., 2020). To develop comprehensive knowledge in this field, it is recommended that pupils learn about diverse health-related content, namely the objective (e.g. endurance training), subjective (e.g. mood management), global (e.g. ambivalence of sports) and complementary (e.g. nutrition and sports) aspects of health (see Supplementary Material S1) based on a salutogenic and holistic understanding of health (Ptack and Tittlbach, 2018; Töpfer, 2019). Furthermore, health-related knowledge may be best promoted by teaching didactics that focus on higher-order thinking (e.g. pupils evaluate their activity behaviour) and learner participation (e.g. pupils create circuit training; Brandl-Bredenbeck and Sygusch, 2017; Strobl et al., 2020). For this purpose, PE teachers need specific health-related professional knowledge.

d. *PE teachers' health-related professional knowledge:* To implement appropriate goals, content and teaching didactics in health-related PE, teachers need appropriate content knowledge (CK) and pedagogical content knowledge (PCK; Shulman, 1986). Teachers' CK and PCK have been shown to be significant predictors of pupils' learning success (Kunter et al., 2013). CK is knowledge about a subject matter and is also defined as a deep understanding of the content to be taught and as one of the knowledge bases that informs PCK (Kim et al., 2018). Thus, for fostering health-related knowledge, PE teachers need profound and interdisciplinary academic knowledge on the topics of health, physical activity, exercise and sports (Brandl-Bredenbeck and Sygusch, 2017).

Going beyond subject matter knowledge, PCK is conceptualized as the knowledge necessary to make content accessible and comprehensible to pupils (Ward and Ayzazo, 2016). For providing quality health-related PE, teachers need PCK about health-related goals (e.g. health-related knowledge), content (e.g. objective or subjective) and adequate teaching didactics (e.g. higher-order thinking; Cale and Harris, 2018; Prack and Tittlbach, 2018). (Health-related) CK and PCK can be acquired in formal, profession-specific learning environments and, therefore, are the key outcomes of institutionalized teacher education (Ward and Ayzazo, 2016; Herold and Waring, 2017). However, the development of CK and PCK does not occur automatically; this depends on the arrangement of content and teaching didactics of corresponding courses in a (health-related) PETE context (Iserbyt and Coolkens, 2020).

- e. *Health-related PETE*: To target health-related CK and PCK, PETE should offer learning opportunities that include objective, subjective, global and complementary health content (CK), as well as health-related goals, content and teaching didactics for PE (PCK), as outlined above. Additionally, higher-order thinking (e.g. analysing and discussing instructional sequences) and learner participation (e.g. project-oriented learning) are adequate teaching didactics in PETE when it comes to fostering health-related CK and PCK (Bulger *et al.*, 2001; Brandl-Bredenbeck and Sygusch, 2017; Ward *et al.*, 2018). As the creators of educational offerings in PETE, teacher educators and their beliefs play an important role in the professionalization of prospective teachers (Lawson, 1991).
- f. *Teacher educators' health-related beliefs*. Special attention should be paid to teacher educators' professional beliefs because they are the main determinants of their teaching practice, hence exerting a major influence on their students' learning outcomes in (health-related) PETE (Tsangaridou, 2009; Steinmann, 2015). Beliefs are conceptualized as a set of interrelated cognitive perceptions about the nature of something or how it works (Pajares, 1992; Fives and Buehl, 2012). Beliefs also include emotional individual judgements of the truth or falsity of these propositions (Pajares, 1992). They can be both implicitly and explicitly represented (Fives and Buehl, 2012). As mostly unquestioned personal truths, beliefs provide structure, support and orientation to professional actions and thinking (Skott, 2015). Moreover, beliefs can be individually or collectively shared. Shared beliefs among various teacher

educators are considered supportive of prospective teachers' learning outcomes (Steinmann, 2015).

Regarding the health topic, the literature on teacher educators' beliefs is limited (Tsangaridou, 2009; McEvoy *et al.*, 2015). Based on a literature review (Rueß and Wessels, 2020), teacher educators' beliefs may be structured into three areas:

- *Beliefs about the topic*, which include epistemic beliefs (i.e. individual ideas about the nature and genesis of discipline-specific knowledge, e.g. a salutogenic understanding of health)
- *Beliefs about educational processes in school*, such as health-related goals (e.g. health-related knowledge), content (e.g. subjective) and teaching didactics (e.g. higher-order thinking) in PE
- *Beliefs about educational processes in teacher education*, such as health-related goals (e.g. CK and PCK), content (e.g. subjective) and teaching didactics (e.g. higher-order thinking) in PETE

Beliefs are based on individual biographical experiences and are mostly acquired in implicit learning processes (Levin, 2015; Skott, 2015). The development of educators' beliefs is a lifelong process, beginning in childhood and based on one's experiences in school (Pajares, 1992). In the case of PE teachers and teacher educators, experiences of participating in competitive extracurricular sports have a significant impact on one's beliefs (Tsangaridou, 2009; Merrem and Curtner-Smith, 2018). Beliefs are considered relatively stable; they usually only change when educators develop meta-cognitive awareness of their beliefs (Levin, 2015) and through social practices that are found to be relevant (Skott, 2015).

Interactive knowledge-to-action approaches offer a promising approach to challenge beliefs (Rütten *et al.*, 2019). They provide the opportunity to actively engage in a social practice that is immediately relevant to the teacher educators' profession and that have been shown in other studies to be successful for teacher educators' professional development (Meijer *et al.*, 2017). Rütten *et al.* recommend such approaches for sustainable changes, particularly in complex settings, such as health promotion and education (Rütten *et al.*, 2019).

One concrete method within the framework of these approaches is *Cooperative Planning* (Rütten, 1997), which has proven fruitful in the health-related PE context (Strobl *et al.*, 2020). The goal of Cooperative Planning is the co-creation of knowledge by relevant stakeholders—as in the case of the current study—to

enhance teacher educators' abilities to cope with the task of teaching health topics in PETE by challenging and expanding their respective beliefs. Following the introduced heuristic chain model, which assumes teacher educators' health-related beliefs as the fundamental precursors of pupils' acquisition of health-related knowledge, challenging teacher educators' health-related beliefs through Cooperative Planning might have a potential impact on public health.

Thus, in the current article, we shed light on the following main research question: *How can Cooperative Planning challenge teacher educators' beliefs regarding the health topic in PE and PETE?*

In this article, we first investigate what epistemic beliefs about health, health-related PE and health-related PETE the teacher educators had before a Cooperative Planning intervention. Second, we identify how teacher educators' health-related beliefs developed throughout the intervention. Third, we analyse how teacher educators perceive the Cooperative Planning intervention and how their perceptions can explain the identified developments of health-related beliefs.

METHODS

Study design

The current study was conducted in a qualitative pre-post research design to develop a complex and detailed understanding of beliefs and their development throughout Cooperative Planning (Olafson *et al.*, 2015). The Cooperative Planning intervention involved key social actors (Rütten *et al.*, 2019) in PETE, including teacher educators (university lecturers and teacher trainers), researchers, study course coordinators and prospective teachers. To identify continuities and changes in teacher educators' beliefs throughout the Cooperative Planning intervention, the data were collected before (t_0) and after (t_1) Cooperative Planning from two perspectives: using observations of teaching practice and interviews. The provided study 'Health.edu' was embedded in a larger research consortium (Capital4Health).

Sample

The focus of this study was to shed light on the beliefs of teacher educators. Therefore, we analysed the data collected from all teacher educators (university lecturers and teacher trainers) who participated in the two Cooperative Planning groups. The data were obtained from eight university lecturers (pseudonyms, Group A: *Anna, Bethany, Clara* and *Denise*; Group B: *Emma,*

Alex, Ben and *Chris*) and five teacher trainers³ (pseudonyms: *Fiona, Georgia, Dominic, Elias* and *Felix*). The female and male teacher educators were between 31 and 56 years old and had between 3.5 and 23 years of professional experience (see [Supplementary Material S2](#) (Sample) for details). University lecturers hold a university degree in PE or sport and exercise science and additionally hold a PhD or were PhD candidates at the time of the study. The teacher trainers all hold a university degree for PE and had several years of experience as PE teachers before becoming a teacher trainer. However, there is no formal training for being a teacher trainer.

Ethical approval was obtained from the data security official of the Friedrich–Alexander–University Erlangen–Nuremberg and the Bavarian State Ministry for Education and Cultural Affairs (reference number X.7-BO4106/459/8). The participants provided written informed consent.

Intervention

The goal of the Cooperative Planning intervention was twofold: first, to establish a common understanding of the key concepts such as health, health-related knowledge, CK and PCK and, second, the coproduction of health-related lessons for both PETE phases. These lessons aimed to help prospective teachers acquire CK about the health topic and PCK about health-related goals (e.g. health-related knowledge), content (e.g. objective, subjective) and adequate teaching didactics (e.g. higher-order thinking) for PE.

Specifically, we established two Cooperative Planning groups (A: eight stakeholders; B: 17 stakeholders) at two universities in Southern Germany. For both groups, university lecturers and students at the two universities and teacher trainers from both regions were invited to participate in Cooperative Planning. However, the teacher trainers invited to Group A withdrew from participation for practical reasons (e.g. time constraints, long travel distance). Therefore, the Cooperative Planning groups differed in size and composition; Group A was smaller, and the teacher trainers were part of Group B only. In addition to the teacher educators, the Cooperative Planning groups included further participants: *researchers* took part in their role as scientists and experts in sports pedagogy and educational science. *Study course coordinators* were responsible for the overarching tasks and structures of teacher education.

3 After the intervention (t_1), only four teacher trainers (Fiona, Georgia, Dominic and Elias) participated in the interviews and the video-based observations.

Prospective teachers were the university students enrolled in a PETE programme. The overall schedule of the Cooperative Planning meetings was similar for both groups (see [Supplementary Material S3](#) (cooperative planning intervention) for details). Each meeting was moderated by a host (i.e. project staff member or researcher) and consisted of presentations (i.e. scientific lectures about teaching didactics), group discussions (i.e. whole group and small groups) and lesson planning (i.e. formulation of course syllabus, specific learning goals and tasks) for the selected PETE courses. The content was organized around health, health-related PE (e.g. health-related knowledge) and health-related PETE (e.g. CK and PCK). Each session lasted about 2 h. However, the groups differed in their actual activities and content because they independently decided on their next steps. The first meetings were used to clarify the theoretical underpinnings of health-related knowledge as a learning goal in PE. In addition, health-related content and teaching didactics in PE and their implications for health-related PETE were discussed. The second part of the Cooperative Planning focused on existing health-related courses in PETE and their further development in terms of learning goals and teaching didactics. Finally, the groups discussed strategies to ensure the sustainability of the actions initiated during the Cooperative Planning intervention. The intervention covered 20 months (December 2015–July 2017) and consisted of eight meetings for each group. We took written minutes for each Cooperative Planning meeting. The summary of these is displayed in [Supplementary Material S3](#) (cooperative planning intervention).

Data collection

Qualitative data were collected by observing teacher educators during their lessons and by interviewing them at two timepoints. At each timepoint, teacher educators were first observed in one lesson to capture classroom practices as an indicator of their beliefs ([Olafson et al., 2015](#); for the observed topics, see [Supplementary Material S2](#) (Sample)). At t_0 , the teacher educators were asked to teach a self-selected health-related topic to their PETE students in the lesson under observation. At t_1 , the teacher educators were asked to implement the lessons they had planned during Cooperative Planning. Subsequently, following an interview guideline, teacher educators' beliefs were captured by means of combined problem-centred ([Witzel, 2000](#)) and stimulated recall interviews ([Calderhead, 1981](#)). Questions in the problem-centred part of the interview were aimed at revealing the teacher educators' epistemic beliefs about

health; about the topic health in PE and PETE; and their process-related beliefs about the Cooperative Planning intervention (only t_1). In the simulated recall part, we used selected situations from the videotaped lessons as stimuli, here combined with questions regarding the learning goals and tasks that were chosen for that specific lesson. Additionally, the stimuli were the starting point for further questions about the learning goals and tasks in health-related PETE more generally (see [Supplementary Material S4](#)). The interviews lasted between 20 and 90 min at t_0 and between 50 and 90 min at t_1 .

Data analysis

The interviews and observational data were transcribed verbatim. For the observational data, we wrote protocols focusing on lesson content and teaching didactics. The data were analysed using a qualitative content analysis using Maxqda[®] software ([Kuckartz, 2018](#)). This method involved a deductive definition of the main categories based on the theoretical and empirical backgrounds, as outlined in the introduction (see [Figure 2](#)), and an inductive definition of the subcategories based on the transcribed materials. Data analysis comprised the following steps: (i) coding of the entire data using the main categories, (ii) compilation of all coded text passages with the same main categories, (iii) inductive definition of the additional categories based on the materials, (iv) coding of the entire data using the refined category system and (v) evaluation and interpretation ([Kuckartz, 2018](#)). For the main categories, we deductively defined the teacher educators' (i) *epistemic beliefs about health*, (ii) *beliefs about the health topic in PE* and (iii) *beliefs about the health topic in PETE* ([Rueß and Wessels, 2020](#)). Additionally, we defined one main category for the teacher educators' (4) *process-related beliefs about the Cooperative Planning* (see [Figure 2](#)). The data were double-checked using a codebook with definitions of each category. The research team discussed and resolved these inconsistencies.

For the first three main categories, the data were analysed before and after Cooperative Planning. Process-related beliefs about Cooperative Planning were included only after the intervention had ended. The beliefs of university lecturers and teacher trainers were first examined separately because we wanted to determine how they differed between the respective phases of PETE. The beliefs after Cooperative Planning were then analysed according to the teacher educators' group affiliations (A or B).

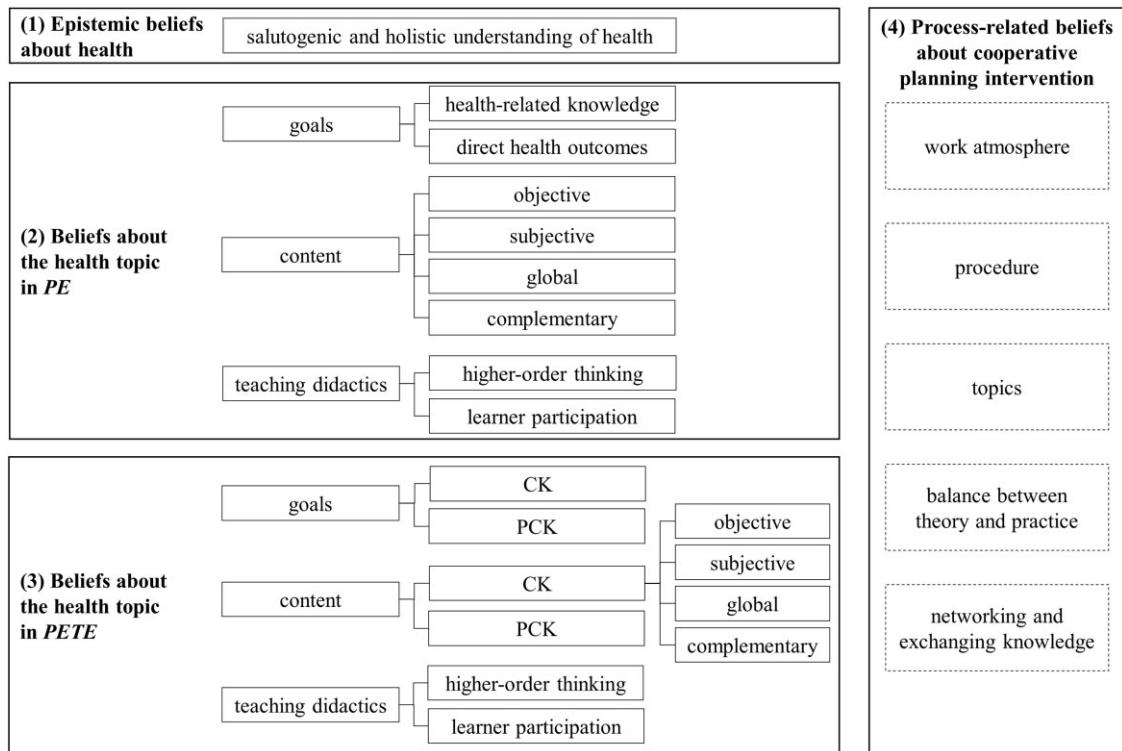


Fig. 2: Category system. CK, content knowledge; PCK, pedagogical content knowledge.

RESULTS

Epistemic beliefs about health

Before the Cooperative Planning intervention, teacher educators mostly expressed an understanding of health that was congruent with salutogenic and holistic health definitions. Generally speaking, all teacher educators stated that *health is a very broad concept* (Dominic) and *a matter of achieving psychological, physical and also social well-being* (Alex). In addition, Anna, for example, regarded health as *a dynamic equilibrium, yes a state where one is also sometimes sick but perhaps can then also come back to another state of health*. However, some teacher trainers also revealed a pathogenic understanding of health in which the *absence of disease* (Dominic) played an important role, too. The presented epistemic beliefs did not change throughout the Cooperative Planning intervention, even independently of the respective planning groups.

Beliefs about the health topic in PE

Before Cooperative Planning, all involved teacher educators regarded health as an important topic in PE. However, they were indifferent about the degree of

emphasis that should be placed on health, among other topics (e.g. performance in sports) and how explicitly it should be made a subject of PE lessons. The teacher trainers especially perceived health as an important topic for PE but as a background topic for every PE lesson, which *should be generally involved subtly* (Elias). They rarely made it an explicit subject of their lessons. Regarding health-related goals in PE, the teacher educators considered health-related knowledge—distinct from direct health effects—as important. Emma, for instance, pointed out, *It's not about training someone here and now for health, it's about getting kids to understand that they need to do something themselves*. Equally important were the direct health outcomes, for example, *by implementing endurance elements* (Dominic) and the importance of appropriate movement time. As Clara stated, *The main thing is that they move at all*. It was noticeable that the PE content was mostly related to objective aspects of health (e.g. endurance training), while the other aspects were frequently blanked out. Additionally, the teacher educators were rather general in reporting teaching didactics.

After Cooperative Planning, for some of the teacher educators, the health topic became even more

important. However, most teacher trainers still barely addressed it explicitly. Regarding goals in PE, health-related knowledge—in contrast to direct health outcomes—came to the fore throughout the Cooperative Planning, for university lecturers in particular. For example, Anna became aware that *this dealing with ... their own health ... should be at the top of the list so that the children can deal responsibly with their own health or illness*. In terms of health-related content in PE, the teacher trainers' focus on objective content (such as strength and training) remained. Regarding teaching didactics in PE, we identified an increasing awareness of higher-order thinking after Cooperative Planning, but the teacher educators' ideas remained rather unspecific. Apart from this, the teacher educators voiced doubts about the balance between enabling high movement time and facilitating health-related knowledge that involved higher-order thinking. For example, Bethany stated, *Physical education is somewhat overburdened ... because ... a lot of movement time can be lost by demanding so much knowledge input*.

Beliefs about the health topic in PETE

Health-related goals in PETE

Before the Cooperative Planning intervention, teacher educators expressed only a few specific health-related learning goals in PETE. Regarding CK, the goals mostly comprised the theoretical concepts and models of health and health promotion. For instance, Clara stated that prospective teachers should know the different concepts of health and that *they should also know how to distinguish among them*. For Georgia, it was important that *the connection to sports and exercise science [be] given* and that prospective teachers would learn how to use scientific literature (e.g. about training science) and adapt specific content to PE. Regarding PCK, the teacher trainers emphasized lesson planning and implementation according to the curriculum. For example, Fiona wanted prospective teachers to know the *possibilities of how to design a part of a lesson that would address the health topic with a fifth-grade class in a good way*. Felix pointed out, *Safety is above all. That nothing happens in PE and that they know and implement safety regulations*. Generally, and even after the Cooperative Planning intervention, teacher educators, especially university lecturers, barely formulated specific health-related learning goals for PETE.

Health-related content of PETE

Before the Cooperative Planning intervention, CK and PCK were weighted differently by university lecturers

and teacher trainers. CK, for example, knowledge about *the models of health and illness from medicine versus the salutogenesis model based on the ideas of Antonovsky* (Bethany), was emphasized in phase one of PETE but only marginally represented in phase two. In turn, PCK, especially knowledge about the requirements in the federal PE curriculum, was regarded as one of the central pieces of content of PETE by the teacher trainers, while PCK was less important for university lecturers. In terms of CK, the teacher educators mainly referred to the objective aspects of health (e.g. endurance and strength) and, to a lesser extent, global (e.g. ambivalence) and complementary (e.g. nutrition) aspects.

After the Cooperative Planning, university lecturers showed a growing awareness of the importance of PCK regarding a more sophisticated understanding of health-related knowledge as a learning goal of PE. In terms of the balance of CK and PCK, we observed no changes in the teacher trainers' beliefs. Regarding the specific health-related content of CK, the university lecturers included the subjective (e.g. social well-being and relaxation) and objective aspects of health in a more balanced manner. For example, Emma stated, *The psychosocial aspect has become more and more decisive for me because I have noticed that this is behind it almost everywhere and also decides whether children become active or not*. For teacher trainers, we found different beliefs regarding the health-related content of PETE. For example, Dominic stated that he had *worked with a narrower concept of health and through the project now realised how much broader the concept of health actually [was]*. In contrast, the beliefs of a few teacher educators remained focused on the objective aspects of health (e.g. specific training methods for endurance and strength or general fitness). For example, after the Cooperative Planning intervention, Elias stated that *we only deal with all the sports injuries that result from playing soccer. The cardiological and cardiopulmonary effects, which only really take effect at a much later stage, are not really part of our school life*.

Health-related teaching didactics in PETE

Before the Cooperative Planning intervention, the teacher educators showed a variety of teaching didactics in their observed health-related lessons. These ranged from theory-focused educator-oriented seminars (e.g. sports medicine) to project seminars and teaching experiments (see [Supplementary Material S3](#) (cooperative planning intervention) for an overview). Higher-order thinking and learner participation appeared mainly in the project seminars and teaching experiments. Generally, the use of

specific teaching didactics depends heavily on the structure of a particular programme. For example, in project seminars at the university level, prospective teachers are supposed to carry out a project directly at the school ... to combine and apply everything they learned at university (Chris). Phase two of PETE is generally organized around teaching experiments, meaning that learner participation is high because *the prospective teachers have to design lessons and teach, and subsequently, they are given feedback ... and then changes are made*, as Dominic reported. Overall, regarding the observed lessons, teacher educators applied learner participation and higher-order thinking in a rather broad and unspecific manner, here without using particular learning tasks to foster them.

After the Cooperative Planning intervention, we found an increasing awareness of learner participation and higher-order thinking. However, we recognized a variety of beliefs. Regarding the observed lessons, the university lecturers in Group A showed specific changes. Those who formerly followed an educator-centred approach displayed a shift to more learner participation and higher-order thinking by specifically implementing learning tasks with an explicit focus on health. Some, as expressed by Anna, also realized throughout the Cooperative Planning intervention *that it is very profitable for the prospective teachers if they simply reflect on what they have experienced*. Others, particularly Georgia, remained less impressed by Cooperative Planning regarding their teaching didactics: *It did not change my teaching, no, not at all*.

Process-related beliefs about the cooperative planning intervention

Generally, the teacher educators regarded the *work atmosphere* in the Cooperative Planning group as positive and appreciative. For Fiona, it was particularly important that *honesty ... [would] play a role with every Cooperative Planning participant and that one [would] really not [be] judged in the end*. However, some university lecturers reported that the researchers did not really have an open-minded attitude because they primarily insisted on their points of view. Thus, the principle of meeting as equals and considering the expertise of all stakeholders was not always realized. Additionally, the teacher trainer Georgia (Group B) rarely felt involved in decisions about the Cooperative Planning procedure and topics and sometimes thought the following: *What does that have to do with me?*

Several teacher educators described the Cooperative Planning *procedure* as a strenuous yet worthwhile process. Some expected it to be less time-consuming, and Denise remarked, *There has been some resentment*. However, Dominic said, *I like it. It's very tedious, it's*

very exhausting; it takes an incredibly long time. But I don't think there is a better alternative. Regarding the Cooperative Planning intervention itself—especially for those in Group B—Georgia found the structure and goals to be fuzzy: *I think it would be beneficial if the goal is somehow clearer and if everyone knows what it boils down to*. Additionally, in her eyes, the different settings of PE and PETE had *often been muddled up*.

Regarding the *topics* of the Cooperative Planning intervention, the teacher educators expressed different opinions. Although they considered health an important part of PE and PETE, we observed a certain level of saturation related to this topic. The university lecturers especially saw little need for detailed discussions on health-related terms because they already had profound knowledge before the Cooperative Planning intervention: *We don't need to discuss this at length. ... the meaning is clear to everyone* (Chris). Regarding teaching didactics, the teacher trainers sometimes saw little added value in detailed reflections about higher-order thinking and learner participation because in their eyes, *that's what we do anyway* (Georgia).

The teacher educators also evaluated the *balance between theory and practice* in the Cooperative Planning intervention. On the one hand, the teacher trainers, such as Fiona, reported being *generally interested in scientific questions*. They appreciated their participation in the academic discussion *because in practice, you get a little away from it ... now I have more terms present* (Georgia). On the other hand, the teacher educators partly criticized the extensive academic discussions about the scientific terms, definitions and concepts. This took a lot of time, which could then not be used for planning new lessons. Additionally, some teacher educators, such as Georgia, found the academic discussion *too brain-headed* and did not see its practical relevance. Although lesson planning played a minor role (especially in Group B), the teacher educators appreciated the discussions and (further) developments of existing or new lesson plans. For example, Dominic reported, *We looked at how we actually put this into practice ... and we came up with ideas for this*.

Both the university lecturers and teacher trainers expressed a common desire for *networking and exchanging knowledge* between the two phases of PETE. Emma, a university lecturer in Group B, missed *the input from teacher trainers about what they were doing in the end*. The teacher educators from both phases wanted to learn more about the content and teaching of the other phase; they would also have liked to cooperate more between the two phases to coordinate goals, content and teaching didactics. For example, Fiona emphasized, *A basic understanding can only be created if you talk to each other*.

DISCUSSION

What health-related beliefs did teacher educators have before the cooperative planning intervention?

Teacher educators' *epistemic beliefs* showed a holistic and salutogenic understanding of health and, thus, were considered very similar to common academic concepts of health. This is not surprising because teacher educators are highly qualified academically and work with these concepts in their everyday teaching; some university lecturers even conduct research activities in these fields (McEvoy *et al.*, 2015; O'Sullivan, 2021).

However, the teacher educators' beliefs regarding health in PE and PETE also showed inconsistencies, which can be contrasted with the above epistemic beliefs about health. First, the teacher educators reported a variety of possible learning outcomes of PE, including health-related knowledge and direct health outcomes (e.g. movement time for obesity prevention), which revealed a rather pathogenic view on health. Thus, in our study, the teacher educators' beliefs before Cooperative Planning slightly differed from the intended goals for health-related PE, as reported in the literature. According to the literature, the challenge of health-related PE is not to facilitate more movement time to achieve direct health outcomes but to promote high-quality learning to gain health-related knowledge (Cale and Harris, 2018; Ptack and Tittlbach, 2018). Furthermore, McEvoy *et al.* discovered that teacher educators from different countries shared the belief that young people should be prepared for a lifetime of physical activity by fostering health-related knowledge instead of maximizing in-class physical activity (McEvoy *et al.*, 2017). Second, on the content level, the teacher educators did not directly follow their holistic understanding of health. They mostly referred to the objective aspects of health, which can easily be set in line with fitness- and performance-oriented content, while neglecting the subjective, global and complementary facets. Especially for teacher trainers, a traditional sports-focused teaching orientation, one that mainly emphasizes the training of endurance and strength, seems to be influential for the culture of PE and PETE and can be assumed to be the main reason for inhibiting innovation here (Mordal-Moen and Green, 2014; Merrem and Curtner-Smith, 2018). The identified inconsistencies are in line with other research findings that educators' beliefs are not always consistent with how they teach and that educators may hold different (conflicting) beliefs simultaneously (Levin, 2015; Cale and Harris, 2018).

Additionally, our participants' PETE-related beliefs revealed some potential for improvement. First, our results showed different priorities of CK and PCK in the two phases of PETE, as well as the underrepresentation of PCK in phase one. This is in line with the theoretical-

and empirical-based assumption that CK is a prerequisite for PCK (Ward and Ayzazo, 2016; Kim *et al.*, 2018). At the same time, evidence about situated learning suggests that the processes of learning and application are linked because knowledge is context-specific (Mandl *et al.*, 2002). To empower prospective PE teachers, PETE should aim for the integrated teaching of CK and PCK in both phases and combine learning CK with the application of PCK (Brandl-Bredenbeck and Sygusch, 2017). This also demands a more balanced relationship and stronger coordination between the two phases of PETE. Second, the structure of learning modules in PETE (especially project seminars and teaching experiments) seemed appropriate for facilitating teaching didactics, such as higher-order thinking and learner participation (Bulger *et al.*, 2001; Brandl-Bredenbeck and Sygusch, 2017). However, the teacher educators could promote this even better if they were more aware of these teaching didactics and used them more systematically to shape their PETE lessons.

How did teacher educators' health-related beliefs develop throughout the cooperative planning intervention?

Generally, the health-related beliefs of the teacher educators appeared rather stable. This finding could have been expected because epistemic beliefs do not change quickly or easily (Levin, 2015). Nevertheless, we also observed certain changes in PE- and PETE-related beliefs throughout the Cooperative Planning intervention. First, we noticed a reduction in the identified inconsistencies between epistemic beliefs, on the one hand, and PE- and PETE-related beliefs, on the other hand. The university lecturers in Group A especially increased their awareness of health-related knowledge as a relevant learning goal in health-related PE. This was coupled with a better balance between the subjective and objective aspects of health as the content of PE and PETE. Furthermore, PETE-related beliefs changed slightly. After the Cooperative Planning intervention, the university lecturers highlighted the importance of PCK and reported more specific ideas about teaching didactics. Regarding the heuristic chain model, the Cooperative Planning intervention might have challenged teacher educators' beliefs in a way that could positively contribute to the public health agenda by fostering prospective teachers' health-related CK and PCK (Brandl-Bredenbeck and Sygusch, 2017). This underlines the potential core function of teacher educators being multipliers (Maaß and Doorman, 2013), who reach several prospective

teachers who in turn later teach many pupils in becoming physically active people.

However, the development of beliefs throughout the Cooperative Planning intervention occurred individually in different ways. Some teacher educators showed greater changes (e.g. Anna), while others' beliefs appeared rather stable (e.g. Georgia). Thus, individual prerequisites based on personal background (e.g. interest in personal development or readiness to integrate new knowledge into practice) may play an important role in a change in beliefs (Levin, 2015). Additionally, an awareness of one's beliefs and how they influence one's practice seems important for changing beliefs because they act as filters and frames when processing new information (Fives and Buehl, 2012). Therefore, the change in beliefs is a product of not only the context (i.e. Cooperative Planning), but also how reflective, open and self-conscious someone is about the development of one's beliefs.

In our investigation, the university lecturers seemed more open to changes and innovations than the teacher trainers. Besides individual factors, 'the powerful influence of [the] professional context' (McEvoy et al., 2015, p. 170) of university lecturers and teacher trainers, respectively, should be considered. University lecturers are normally involved in research, which usually means working with innovative practices and creating new knowledge (O'Sullivan, 2021). In contrast, teacher trainers work as schoolteachers and, thus, are more dedicated to the practice of teaching PE without being confronted with research and innovation as part of their daily job. Therefore, they may find it more difficult to question and change their own beliefs and practices because they are not used to doing this. The different changes among teacher educators may also be linked to the varying procedures in Groups A and B, as discussed in the following section.

How did the teacher educators perceive the cooperative planning intervention, and how can these perceptions explain the identified developments in health-related beliefs?

Generally, teacher educators valued Cooperative Planning as a worthwhile strategy for involving various stakeholders to exchange knowledge and develop actions together. The findings showed that Cooperative Planning could be used as a method to foster networking and the exchange of knowledge and that teacher educators were willing to take this opportunity. Such collaborative projects can help in adjusting the goals, content and teaching didactics between the two phases of PETE (McEvoy et al., 2015). According to Steinmann, shared beliefs among various stakeholders in teacher education

(e.g. university lecturers and teacher trainers) are considered supportive of prospective teachers' learning outcomes (Steinmann, 2015). Hence, Cooperative Planning, in general, seems to have the potential to foster the continuous professional development of teacher educators (Ward and van der Mars, 2020).

However, for some teacher educators, especially in Group B, the Cooperative Planning intervention was unable to challenge health-related beliefs. Besides the influence of individual prerequisites and the professional context, another reason might be that the implemented Cooperative Planning did not always meet the requirements to foster 'interactive knowledge-to-action' (Rütten et al., 2019). Some doubts and points of criticism were mentioned in the interviews, which might have played a role in understanding the observed changes and continuities observed. The teacher educators' reflections on Cooperative Planning, especially on the work atmosphere and procedure, indicated that the stakeholders did not always feel as actively co-creating participants of the Cooperative Planning intervention, which would be assumed to be a crucial condition for success (Rütten et al., 2019). The researchers in particular seemed to have taken a superior role in the Cooperative Planning intervention. Because they initiated the project and developed the corresponding goals, the predominance of academia is plausible but can be perceived as an obstacle. In line with the recommendations of Rütten et al., our study reinforces the notion that a Cooperative Planning process should guarantee the interactive participation of all members by allowing for their meeting as equals (Rütten et al., 2019).

Furthermore, the role of academic knowledge in the Cooperative Planning intervention appeared ambivalent. On the one hand, we know that changes in beliefs can be initiated through the acquisition of academic knowledge. However, the teacher educators' comments showed that some were convinced of having enough knowledge of certain topics (e.g. health concepts) and did not consider it necessary to acquire new knowledge. On the other hand, modifications in beliefs are only possible if it is feasible to integrate such knowledge into existing beliefs, which depends on how it can be linked to existing beliefs (Fives and Buehl, 2012). Especially in Group B, the Cooperative Planning intervention did not always provide an appropriate balance of theory and practice. This might have been a reason why some teacher educators missed the links to their own professional practice; therefore, academic knowledge had no impact on their beliefs.

Because the overall changes were more evident in Group A, the assignment to the planning group may

have played a certain role in the development of teacher educators' beliefs. Group A was smaller, comprising stakeholders only from phase one of PETE, and this group dedicated more time to specific lesson planning (see [Supplementary Material S1](#)). Therefore, Group A's members might have experienced more facilitators of changing beliefs; they might have felt more involved in the planning process, had more opportunities to engage in lesson planning immediately relevant to their professional practice, and had more chances to learn with and from peers by 'looking into each other's kitchen' ([Skott, 2015](#); [Meijer et al., 2017](#), p. 19). Based on the teacher educators' reflections on the Cooperative Planning intervention and the identified changes, the practical implications for the facilitation of Cooperative Planning in a PETE setting can be derived (e.g. clear goals, focus on lesson planning, appropriate group size).

Limitations

We could not estimate the sustainability and long-term impact of the Cooperative Planning intervention. According to Levin, it is necessary to conduct longitudinal research that follows educators for an 'extended period to confirm if and how their beliefs change, develop and get enacted' [[Levin \(2015\)](#), p. 61]. Thus, follow-up data collection should be considered an essential part of future studies. Regarding the sampling, our Cooperative Planning included only teacher trainers in Group B. Therefore, we only interpreted changes and continuities as a result of the Cooperative Planning intervention with respect to the university lecturers. Furthermore, our insights into the Cooperative Planning intervention were limited to the perspectives of teacher educators. Beyond that, the opinions of other stakeholders, such as researchers or prospective teachers, would be of interest in constructing a holistic perspective. Additionally, the analysis of the Cooperative Planning intervention was based on the meeting protocols, as well as the teacher educators' comments in the interviews. To take a closer look at specific situations in Cooperative Planning, audio recordings of the meetings would be beneficial for understanding the participants' beliefs and interactions.

CONCLUSION

Our study showed that teacher educators' health-related beliefs were rather stable but could be challenged and changed through a Cooperative Planning intervention. Epistemic beliefs about health remained, whereas more practice-related beliefs changed in individual ways. We found evidence that the way in which the Cooperative

Planning was planned and realized and the openness to change of individual stakeholders might have influenced the probability that a change in beliefs could be initiated.

Most studies about the factors facilitating health promotion through the school subject of PE have focused on movement time ([Hollis et al., 2017](#)) rather than on the quality of health-related PE and its preconditions. We have contributed to the relevant research by shedding light on teacher educators' beliefs as crucial prerequisites for high-quality, health-related PETE and PE. With this, we have gained new knowledge on how Cooperative Planning might challenge and change teacher educators' health-related beliefs.

SUPPLEMENTARY MATERIAL

[Supplementary material](#) is available at *Health Promotion International* online.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest.

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