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Professional competence(s) of physical education teachers: terms, traditions, modelling and perspectives

Introduction

The effectiveness of teachers on students' school performance as well as the effectiveness of teacher education has been studied since the 1960s within the paradigms of personality (Getzels & Jackson, 1963), process–product (Brophy & Good, 1986), cognitive–psychological (Shulman, 1986), the expert (Leinhardt & Greeno, 1986) and now more strongly within the competence-oriented paradigm (Baumgartner, 2017b; Blömeke, Gustafsson, & Shavelson, 2015; McClelland, 1973; Shavelson, 2013). The available evidence shows that the core function (to promote student development) and the core task (to teach) of teachers depend on the teacher and the quality of their teaching (Organisation for Economic Co-operation and Development [OECD], 2005). This has been explored specifically with regard to physical education (PE) teachers (e.g., Byra, 2009; Kim & Ko, 2020; Rink, 2013). Research into the effectiveness of PE teachers and the effectiveness of their (further) education (physical education teacher education [PETE]) has become a central subject of PE research (Baumgartner, 2017b; Rink, 2013). There has been a competence-orientated shift in research on the effectiveness of PE teachers and PETE over the past 15 years (e.g., Backman & Pearson, 2016; Baumgartner, 2022; Wyant, Tsuda, & Yeats, 2020).

Focusing on competence-oriented PE research, however, it becomes apparent that this is in a consolidation phase and

that the advantages of the competence construct have not been fully understood. The term 'competence' is used in different ways (Baumgartner, 2022; Blömeke et al., 2015; Tul, Leskosek, & Kovac, 2019). This diffusion of terms is not least due to the different (and complementary) traditions within competence-oriented (PE) research (Baumgartner, 2018a). Nevertheless, there are few contributions to the modelling and structuring of professional competence in the context of PE research. The present paper makes a conceptual contribution with the following four aims: (a) clarify the concepts with regard to the terms within competence-oriented PE (teacher) research and to generate a synthesis between the competence models of Baumert and Kunter (2013) and Blömeke et al. (2015); (b) present the different competence-oriented PE (teacher) research traditions; (c) generate a typology of relevant areas of performances that PE teachers need for good and effective teaching; (d) present a typology and topology model of professional *Competence of Physical Education Teachers* (Compe-PET).¹

¹ This article is a synthesis of several papers published by Baumgartner (2017b, 2018a, b, 2022). For more detail, please refer to this respective literature.

Definitions, competence-oriented research traditions and areas of performances of PE teachers

Definitions

Etymologically, the term 'competence' comes from the Latin verb 'competere', which can be translated as 'to coincide'. In this sense, a person is competent if he or she has sufficient resources to fulfill the requirements to perform successfully in professional situations. This utilitarian use of the term, which is oriented towards the quality level of expedience, has become widely accepted (Shavelson, 2013). Competence is interpreted as a construct that can be acquired and learned, which can be improved through learning and deliberative practice (Blömeke et al., 2015; Ericsson, Krampe, & Tesch-Römer, 1993; McClelland, 1973; Shavelson, 2013).

The general term 'professional competence' is used to describe the whole construct of competence within a profession and integrates different facets of competence (e.g., professional knowledge, situated skills [e.g., perception], performance; Blömeke et al., 2015; Shavelson, 2013).

The term 'professional competency'—here in singular form—of (PE) teachers represents a latent explanatory construct that is composed of individual 'aspects of competency' (Baumert & Kunter, 2013; Blömeke et al., 2015). Baumert and Kunter (2013) and Krauss et al.

(2020) use the term professional competence, but in international discourse the term professional competency is used (Blömeke et al., 2015). Aspects of competency are in this sense defined as “the knowledge, cognitive skills, and affective-motivational dispositions” (Blömeke et al., 2015, p. 4). Following Shulman (1986), the preferential aspect of competency is the professional knowledge of (PE) teachers, which can be divided into seven subdimensions. In PE research, the distinction between the three important subdimensions of content knowledge (Tsuda, Ward, & Goodway, 2021), pedagogical content knowledge (Backman & Barker, 2020; Ward & Ayvazo, 2016), and general pedagogical knowledge (Devis-Devis, Molina-Alventosa, Peiró-Velert, & Kirk, 2011) has become established. Other relevant aspects of competency for PE teachers include, for example, motivational orientations (Carson & Chase, 2009), self-regulation (Liu, Xiang, McBride, & Chen, 2020), beliefs and values (Adamakis & Zounhia, 2016; Harvey & O’Donovan, 2013), aims (Baumert & Kunter, 2013), or aspects of fitness (endurance, muscular strength, flexibility, etc.; McKenzie & Lounsbury, 2013).

It can be assumed that the descriptive construct of ‘real-world performance’ (in the sense of skill) emanates from the latent explanatory construct of professional competency, i.e., that PE teachers with higher professional competency often perform better than others. Professional competency and performance are thus (closely) related (Baumgartner, 2017b; Blömeke et al., 2015; Rossi, Sirna, & Tinning, 2008; Shavelson, 2013). However, it is problematic to draw a linear conclusion from professional competency to performance, since, for example, the implementation of the aspect of competency of professional knowledge in one’s own practice represents an additional performance. The reverse conclusion of deriving professional competency directly from performance also appears problematic because it is not clear whether PE teachers would behave similarly in comparable professional situations (Baumgartner, 2018a).

‘Professional competences’—here in pluralized form—are to be understood as the sum of the ‘can-do statements’ that (PE) teachers need for good and effective (PE) teaching (Baumgartner, 2022). Professional competences provide an orientation framework for (PE) teacher education. Professional competences can be understood as competence profiles (Blömeke et al., 2015; Oser & Renold 2006), as clusters of life outcomes (McClelland, 1973) or as core practices (Ward, Higginson, & Cho, 2020); these concepts are brought together in one expression. Professional competences and the related quality criteria are extracted from three reference systems: (a) professional situations (inductive) and/or (b) research findings about effective teaching (deductive), and/or (c) subject-specific competence models (normative). Mixed forms are often chosen for this purpose (Heinzer & Baumgartner, 2013). In the process of extracting professional competences, the results (e.g., similar professional situations) are categorized thematically and theory-based; quality criteria for measuring professional competences are set and made empirically measurable (Baumgartner, 2017b; Oser & Renold, 2006; McClelland, 1973). A single can-do statement can be interpreted as a (criterion-oriented) ‘competence area’ (e.g., competence area feedback: the PE teacher can give specific and realizable feedback to the students with adequate frequency, taking into account the task difficulty (Baumgartner, 2017b)).

If it is normatively set which quality a specific group should achieve at a specific point in time with regard to a reference system (e.g., competence area feedback), the term standard is used (Baumgartner, 2017b).

Competence-oriented traditions of research on PE teachers

If the contributions of competence-oriented (PE) teacher education research are considered, they can be subsumed into analytical (Baumert & Kunter, 2013; Tsangaridou, 2009), hybrid (Reuker, 2017), and holistic (Baumgartner, 2013;

McClelland, 1973; Ward et al., 2020) research traditions.

In the analytical tradition, the focus is on the explanatory construct of professional competency, namely, the aspects of competency (e.g., professional knowledge; dispositions). In this context, aspects of competency are conceptualized, their effects on students’ school performance are examined, and/or the development of individual aspects of competency of (pre-service) (PE) teachers is analyzed. Within the analytical tradition, fewer empirical studies have been conducted in PE research compared to other subjects. Focusing on the exploration of the relevant aspect of competency of professional knowledge, various contributions have been made to the conceptualization of content knowledge (Herold & Waring, 2009; Tsuda et al., 2021), pedagogical content knowledge (Backman & Barker, 2020; Iserbyt, Ward, & Li, 2017; Meier, 2020; Ward & Ayvazo, 2016), and general pedagogical knowledge (Ward & Ayvazo, 2016). Research findings indicate, for example, that the quality of PE teachers’ pedagogical content knowledge has a significant impact on students’ PE-related performance (Iserbyt et al., 2017; Sinelnikov, Kim, Ward, Curtner-Smith, & Weidong, 2016) and that PE teachers’ pedagogical content knowledge can be improved through focused interventions (Iserbyt et al., 2017; Sinelnikov et al., 2016). Further (quantitative) research efforts investigating the relationship between the different aspects of competency and students’ school performance in PE seem desirable. The advantage of the analytical tradition is that significant aspects of competency are extracted, which PE teachers need for good and effective teaching. Critically, however, it should be mentioned that (the quantitative) competence diagnostics in such approaches are mostly realized by paper-and-pencil assessments, whereby the reference to real-world performance in the complexity and uncertainty of teaching (Cothran & Kulinna, 2015) is not established. This appears to be problematic. Professional competence is not to be interpreted as the sum of individual aspects of professional competency, but is directly related to a behavior in a real-world situation

(Shavelson, 2013). For example, we cannot call a PE teacher competent if he or she only knows which quality criteria constitute effective feedback; we can call a PE teacher competent if he or she can give effective feedback to the students in different teaching situations. The whole represents more than the sum of the parts because the implementation of the aspects of professional competency in a teaching situation requires a specific performance, which should be integrated into assessments—but also in the (further) education of PE teachers (Baumgartner, 2018a; Shavelson, 2013). The more the diagnostics of competence is oriented towards the behavior of PE teachers, the more precisely it measures what (pre-service) PE teachers are able to do in the professional real-world (Baumgartner, 2017a; Seidel & Shavelson, 2007).

In the hybrid tradition, compared to the analytical tradition, the relationship between the aspects of competency and professional real-world situations is more strongly established. The competence diagnostic methods and the teacher education aim at measuring and improving the quality of professional vision (e.g., Erhorn, Langer, & Möller, 2020; Reuker, 2017) and the situated (knowledge-based) perception, interpretation, and decision-making (P-I-D; Blömeke et al., 2015). In competence diagnostics, the (pre-service) (PE) teachers assess the (video-based) behavior of another (PE) teacher so that the underlying aspects of competency can be inferred. This contextualized approach has the advantage that by using text- or video-based teaching cases, the ecological validity of the measurement is increased in comparison to the classic paper-and-pencil tests, or variables are collected that are closer to real-world performance (Baumgartner, 2018b). In PE research, there are only a few studies in which the quality of professional vision or the P-I-D have been measured by text- or video-based teaching cases (e.g., Erhorn et al., 2020; Reuker, 2017). In the context of the hybrid tradition, however, the question remains unanswered whether PE teachers with a better professional vision or a better P-I-D also often behave more

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Abstract

The effectiveness of (physical education [PE]) teachers on students' school performance (as well as the effectiveness of PE teacher education [PETE]) has been studied within different research paradigms. The evidence shows that the quality of students' school performance is strongly dependent on the (PE) teacher and the quality of their teaching. Consequently, research into the effectiveness of PE teachers and the effectiveness of PETE has become a central subject of PE research. In this regard, there has been a competence-orientated shift in research on the effectiveness of PE teachers and PETE over the past 15 years. Focusing on competence-oriented PE teacher research, it becomes apparent that this is in a consolidation phase and that the advantages of the competence construct is not fully understood. In addition, the term 'competence' is used differently within PE teacher research. Accordingly, this theoretical article aims to clarify the concepts within competence-oriented PE teacher re-

search, to present the different competence-oriented PE teacher research traditions, and to generate a typology and topology model of Professional Competence of Physical Education Teachers (Compe-PET model). The model assumes that the improvement of real-world performance is achieved through the following three developmental components: (1) the qualitative improvement of the aspects of competency (e.g., professional knowledge); (2) the improvement of the situated perception, interpretation, and decision-making skills (P-I-D); (3) through the deliberative practice of implementation of the quality criteria in one's own teaching practice. Results are discussed with implications focusing on PETE and PE teacher research.

Keywords

Physical education teacher education · Competence · Performance · Development of performances · Competence diagnostics

competently than others (Baumgartner, 2017b).

In the holistic tradition (Blömeke et al., 2015; McClelland, 1973; Oser & Renold, 2006; Shavelson, 2013), the competence diagnostic methods as well as teacher education are approached from the criterion-related professional competences (can-do-statements) of a PE teacher in a real-world setting (Baumgartner, 2017b; Greve, Weber, Brandes, & Maier, 2020; Ward et al., 2020). In competence diagnostic methods, which are often based on observation methods, the quality of a (criterion-related) competence area-related performance (e.g., feedback-related performance) of a PE teacher is measured, or the effect of PETE on the competence area-related development of performance is elicited (Baumgartner, 2017b; Greve et al., 2020). Research findings show that the quality of competence area-related performance of pre-service PE teachers is not particularly increased by the realization of general intern-

ships. Effective competence area-related progress of performance is more likely to be facilitated by focused interventions, whereby text- and video-based teaching cases are used to connect competence area-related theory (e.g., theory about the effective feedback of PE teachers) with one's own competence area-related behavior (Baumgartner, 2018b; Greve et al., 2020). Within the framework of the holistic tradition, further efforts are needed to investigate the connections between the latent explanatory construct of professional competency and real-world performance. In addition, the assessment of performance should be based less on self-assessments and more on observation methods or mixed-methods (external and self-assessment). Self-assessments have the disadvantage that 'competent' PE teachers underestimate the quality of their performance and 'still-incompetent' PE teachers overestimate the quality of their performance (Baumgartner, 2017a).

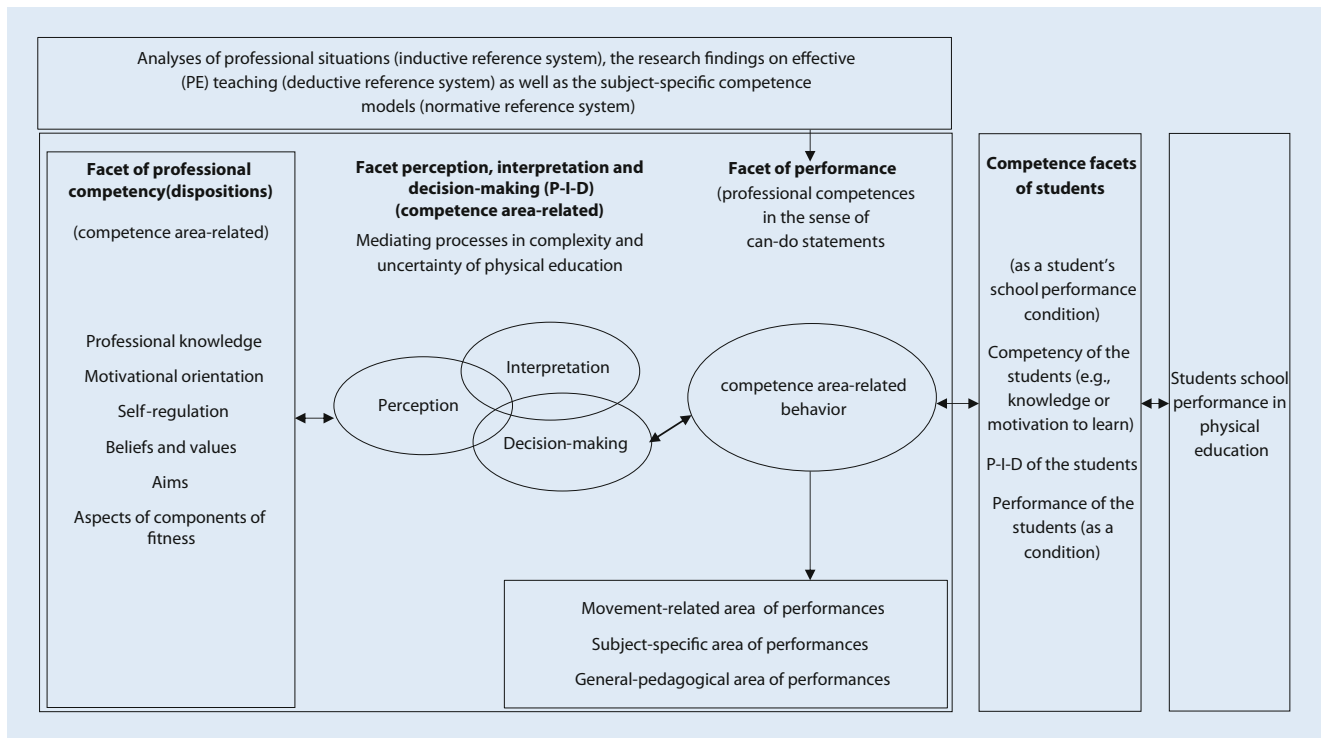


Fig. 1 ▲ The typology and topology model of professional Competence of Physical Education Teachers (Compe-PET model; adapted from Baumgartner (2017b, 2018a, 2022))

A typology of areas of performances of PE teachers

For good and effective teaching, PE teachers need different types of performances. The question arises as to whether these can be categorized into a typology of 'areas of performances' of PE teachers in the sense of the differentiation of the professional knowledge of teachers according to Shulman (1986). Considering the current research findings, it can be assumed that PE teachers should have three different areas of performances for good and effective PE teaching (Baumgartner, 2022). Because the subject of PE has the specificity of movement (Kirk, 2010), PE teachers first need to exhibit performances that refer to the 'movement-related area' (e.g., a PE teacher can realize an underarm forehand clear in badminton). Movement-related performances (or psychomotor skills) arise from movement-related professional competency (e.g., knowledge about the movement-related criteria of an underarm forehand clear in badminton). The research findings on the relevance of movement-related performances with

relation to good and effective PE teaching are inconsistent (e.g., Asún-Dieste, Romero-Martín, Aparicio-Herguedas, & Fraile-Aranda, 2020; Backman & Pearson, 2016; Tinning, 1992). On the one hand, PE teachers should have movement-related performances in order to better understand the criteria of a movement or a technique (Iserbyt et al., 2017; Nyberg, Backman, & Larsson, 2020). On the other hand, it has been shown that a high quality of movement-related performance by PE teachers is an insufficient factor for good and effective PE (Herold & Waring, 2009; Tinning, 1992) because a high quality of movement-related performance does not mean that PE teachers are good at teaching it to students (Backman & Pearson, 2016). Accordingly, a high quality of movement-related performance is desirable, but not necessary for good and effective PE teaching (Tinning, 1992).

Second, PE teachers need performances within the 'subject-specific area' of performances (e.g., a PE teacher can appropriately teach students an underarm forehand clear in badminton). For example, implementing the concept

of Teaching Games for Understanding (Oslin & Mitchell, 2006) or transforming the concept of Sport Education (Siedentop, 1994) in one's own teaching practice are performances that relate to the subject-specific area of performances.

Third, PE teachers need performances in the 'general-pedagogical area' of performances (e.g., giving effective feedback; realization of good classroom management; Cothran & Kulinna, 2015; Kulinna, Silverman, & Keating, 2000; Lavay, Henderson, French, & Guthrie, 2012). The available research findings show that this general-pedagogical area of performances is rarely mentioned in PETE (Lavay et al., 2012), but is a significant factor in classroom practice (Baumgartner, Oesterhelt, & Reuter, 2020; Kulinna et al., 2000).

In summary, it can be concluded that PE teachers need all three areas of performances for good and effective PE and that the three areas of performances are relevant components in PETE and PE teaching. An ongoing study shows that PE teachers and pre-service PE teachers assess the importance of the diverse areas of performances differently (Baumgartner,

2022). However, it is still unclear which relationship exists between the different areas of performances, which could be addressed by further studies (■ Fig. 1).

A typology and topology model of professional competence of physical education teachers (Compe-PET model)

In the following, a typology and topology model of professional *Competence of Physical Education Teachers* (Compe-PET model) is presented. In doing so, (1) the different concepts of the competence construct will be identified, (2) the diverse competence-oriented research traditions will be included, (3) the core function (to promote student development) and the core task (to teach) of PE will be considered, and (4) the three areas of performances will be embedded. The basis for this is the competence structure model by Blömeke et al. (2015), which defines the competence construct as “a continuum from traits that underlie perception, interpretation, and decision-making skills, which in turn give rise to observed behavior in real-world situations” (Blömeke et al., 2015, p. 3). This competence structure model was extended by Baumgartner (2018a, 2022), which represents the basis of the following model.

In the Compe-PET model, professional competence (general term) is constituted by the three ‘competence facets’: (1) professional competency (e.g., professional knowledge); (2) situated (knowledge-based) perception, interpretation, and decision-making (P-I-D); (3) real-world performance. Accordingly, the construct of professional competence consists of these three competence facets. It is assumed that the competence facets cannot be interpreted independently of each other, but are closely related. The key idea of the model is that professional competences—which PE teachers need for good and effective PE teaching—are generated from professional real-world situations (inductive reference system; McClelland, 1973), the available research findings on effective PE teaching (deductive reference system; Heinzer & Baumgartner, 2013) as well

as the subject-specific models (normative reference system; Siedentop, 1994). These professional competences and the related performances can be subsumed into the three areas of performances of PE teachers. Based on a competence area (e.g., classroom management), competence area-related aspects are named for the PETE and further education of PE teachers (e.g., knowledge about the quality dimensions of classroom management), which are required for the successful implementation of a competence area in one’s own teaching practice. On the basis of the aspects of competency (dispositions), PE teachers perceive (competence area-related) teaching situations, interpret them and make decisions, which results in performance (e.g., the concrete quality of a PE teacher’s classroom management). The performance of the PE teacher is to be interpreted as a learning opportunity for the students in the idea of the offer-and-use model (Brühwiler & Blatchford, 2011). Students’ school performance depends on the mediating variables of the three student-related competence facets (competency; P-I-D; performance) of the students (■ Fig. 1). With the extension of the model of Blömeke et al. (2015) by the two variables of the competence facets of the students as well as their school performance, a five-level competence structure model results (Baumgartner, 2017b, 2018a, 2022), which has recently been applied in mathematics teacher education research (Krauss et al., 2020).

The Compe-PET model is based on the presumption of development that the improvement of the performance of (pre-service) PE teachers can be achieved through the three ‘development components’, each of which is related to a competence area (e.g., classroom management): (1) the improvement of the aspects of competency (e.g., improvement of knowledge through literature work regarding good classroom management in PE); (2) the improvement of perception, interpretation and decision-making (e.g., analysis of classroom management-related instructional videos; Baumgartner, Owassapian, & Perret Guldemann, 2021); (3) through deliberative practice of implementation of the

quality criteria in one’s own teaching practice (e.g., the criteria of good classroom management in one’s own teaching practice; Baumgartner et al., 2021).

Discussion

The present conceptual contribution aimed to: (a) clarify the terms within competence-oriented PE (teacher) research and to generate a synthesis between the competence models of Baumert and Kunter (2013) and Blömeke et al. (2015); (b) present the different competence-oriented PE research traditions; (c) generate a typology of relevant areas of performances that PE teachers need for good and effective PE teaching; (d) present a typology and topology model of professional competence of PE teachers, in which the core function (to promote student development) and the core task (to teach) of PE were considered. It is assumed that professional competence with regard to a competence area is constituted by the three competence facets of (1) professional competency, (2) the situated P-I-D, and (3) the real-world performance (Baumgartner, 2022). The model assumes that the improvement of performance is achieved through the three development components: (1) the qualitative improvement of the aspects of competency, (2) the improvement of the situated P-I-D, and (3) through the deliberative practice of implementation of the quality criteria in one’s own teaching practice. The Compe-PET model has the advantage that the facet of performance becomes a significant reference system for PETE and further education of PE teachers as well as for competence diagnostics, which is required for ecological validity purposes (Baumgartner, 2017a; Ward et al., 2020; Shavelson, 2013). Critically, the Compe-PET model is based on assumptions about correlations that have only been partially researched empirically. In addition, the model does not provide information about what PE teachers need for good and effective PE, but provides a basis for extracting professional competences.

For future PE research, several questions need to be addressed. It seems desirable to generate and validate obser-

vation instruments that can validly, reliably, and objectively measure the competence area-related performance progress of (pre-service) PE teachers. This will provide a basis for measuring the effectiveness of PETE. Furthermore, research into the interrelationships of the competence facets and their impact and development is required. In the sense of use-inspired basic research and in the idea of design experiments (Brown, 1992), studies which investigate the effects of different forms of PETE interventions on the performance progress of (pre-service) PE teachers (as well as the students) would be welcome.² Higher quality does not result from measurement alone, but from effective PETE, the success of which should be determined by performance diagnostics. In terms of the education and further education of PE teachers, this means that the effectiveness of PETE can ultimately be determined by the competence area-related performance progress of the (pre-service) PE teachers.

For future PETE, various measures can be taken in consideration of the Compe-PET model. If the future PE teachers are to be authentically prepared for their later profession (Shulman, 2005), at the conceptual level of PETE this requires the integration of professional competences (can-do statements) into the PETE curriculum. However, it would be desirable if these professional competences were integrated in a more targeted and binding way, so that all those involved in PETE (pre-service PE teachers, lecturers, mentors of pre-service teachers, etc.) know what is to be promoted (Zeichner, 2010). Furthermore, at the process level of PETE, the focus should be directed more towards competence area-related performance development. After all, PE teachers entering the profession have less of a problem that they do not know what they should be able to do after PETE, but rather, that they cannot do what they know (Baumgartner, 2017b; Fuller & Brown, 1975; Shulman, 2005). In

order to maximize effectiveness, PETE should be implemented such that it enables prospective PE teachers to link the competence area-related theory with their own teaching practice in the idea of deliberative practice (targeted internships, integration of text- and video-based vignettes, etc.). The acquisition of competence area-related knowledge (e.g., knowledge about good classroom management) by (pre-service) PE teachers thus does not represent the end, but rather the beginning, because effective performance progress requires targeted theory- and (one's own) practice-linking PETE interventions (Baumgartner, 2017b; Darling-Hammond, 2000; Ward et al., 2020).

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Declarations

Conflict of interest. M. Baumgartner declares that he has no competing interests.

For this article no studies with human participants or animals were performed by the author. All studies mentioned were in accordance with the ethical standards indicated in each case.

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