



Teachers' knowledge about psychology: Development and validation of a test measuring theoretical foundations for teaching and its relation to instructional behavior



Hendrik Lohse-Bossenz^{a,*}, Olga Kunina-Habenicht^a, Theresa Dicke^b, Detlev Leutner^b, Mareike Kunter^a

^a Goethe-University Frankfurt, Grüneburgplatz 1, 60323 Frankfurt/Main, Germany

^b Universität Duisburg-Essen, Weststadttürme, Berliner Platz 6-8, 45127 Essen, Germany

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ABSTRACT

In teacher education the integration of theory and practice is extensively debated. Empirical evidence, however, is scarce. Therefore, this study presents a test tapping teacher candidates' theoretical knowledge about learning, development, and assessment. Based on an empirically defined content, 101 items were developed and administered to 3298 teacher candidates after university teacher education. After specifying a suitable item response model, structural analyses reveal that the predefined 3-dimensional provides reliable test scores. After controlling for individual characteristics, persons without university teacher education obtain lower scores for learning and development, which adds further validity evidence. Within a longitudinal design, knowledge predicts changes in instructional behavior. The results are discussed concerning future research on the interplay of theory and practice in teacher education.

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In current research on teachers and teacher education it is widely accepted that in order to foster student learning, teachers need professional knowledge, that is, knowledge which is specific to the profession and necessary to fulfill their daily tasks (Baumert et al., 2010; Cochran-Smith & Zeichner, 2005; Hill, Rowan, & Ball, 2005; Schmidt et al., 2008). Nevertheless, teacher knowledge can be further explained and differentiated. Shulman (1987) – followed by numerous researchers (e.g., Ball, Lubienski, & Mewborn, 2001; Baumert et al., 2010; Hill et al., 2005; König, Blömeke, Paine, Schmidt, & Hsieh, 2011; Krauss et al., 2008; Voss, Kunter, & Baumert, 2011) – distinguishes between content knowledge, pedagogical content knowledge, and pedagogical knowledge. Content knowledge incorporates basic concepts of the subject being taught, for example, in mathematics, science, history, or English (Ball et al., 2001; Baumert et al., 2010).

Meanwhile, pedagogical content knowledge includes knowledge of how to teach subject-specific concepts to students (Ball et al., 2001; Hill et al., 2005; Krauss et al., 2008). Pedagogical knowledge is considered non-subject specific and includes a variety of topics related to educational foundations – from history and theory of education to psychological aspects of teaching and learning and methods of instruction (e.g., Grossman & Richert, 1988; König et al., 2011; Lampert, 2012; Schmidt et al., 2008).

Although consensus seems to exist on the different aspects of teachers' professional knowledge, it remains unanswered whether or to which extent they are interrelated and specifically important to inform teaching and instruction. Additionally, related debates are mostly theoretical in nature (e.g., Anderson et al., 1995; Ball et al., 2001; Grossman & Richert, 1988; Patrick, Anderman, Bruening, & Duffin, 2011; Shulman, 1987) and empirical evidence is scarce (e.g., Borko, 2004).

This issue of lacking empirical evidence seems especially to hold for non-subject specific knowledge of teachers (e.g., Floden & Meniketti, 2005). Concerning this particular knowledge aspect, there is an ongoing additional debate in teacher education literature on the integration of theory and practice, that is, the integration of practical experiences and theoretical concepts

* Corresponding author at: Pädagogische Qualitäts-Informationssysteme gGmbH, Ordensmeisterstraße 15-16, 12099 Berlin, Germany. Tel.: +49 30 720061 15.

E-mail addresses: h.lohse-bossenz@paedquis.de, hendriklohse@gmx.de (H. Lohse-Bossenz), kunina@paed.psych.uni-frankfurt.de (O. Kunina-Habenicht), theresa.dicke@uni-due.de (T. Dicke), detlev.leutner@uni-due.de (D. Leutner), kunter@paed.psych.uni-frankfurt.de (M. Kunter).

teacher candidates are supposed to learn during university based teacher education (e.g., [Eraut, 1994](#); [Hobson, 2003](#); [Korthagen, Loughran, & Russell, 2006](#)).

With regard to psychological knowledge of teachers, we want to contribute to this debate empirically by developing a research instrument we consider suitable for application in respective research contexts. With such an instrument empirical evidence can be obtained which may support the widespread theoretical notion that a sound theoretical knowledge base helps teachers interpret daily situations and, thus, fosters their professional development (e.g., [Buitink, 2009](#); [Hobson, 2003](#); [Korthagen et al., 2006](#)). Additionally, we report first evidence from a longitudinal study which shows that theoretical knowledge predicts changes in instructional behavior.

Theoretical background

Theory and practice in teacher education

Related to the discussion about teacher knowledge is the distinction between practical and theoretical knowledge ([Eraut, 2003](#); [Hobson, 2003](#); [Korthagen et al., 2006](#)). Teacher *practice* can be considered “an explicit set or sequence of actions that can be replicated by any practitioner with the requisite competence” ([Eraut, 2003](#), p. 63). In contrast, educational *theory* comprises “concepts, frameworks, principles, and ideas which may be used to interpret, explain or judge intentions, actions and experiences in educational or education-related settings” ([Eraut, 1994](#), p. 60). [Korthagen et al. \(2006\)](#) elaborate on theory and practice in teacher education, showing that traditional approaches in teacher education tended to focus on transmitting theoretical knowledge to teacher candidates which was then supposed to be applied in school settings. However, the idea of telling teachers what educational science would suggest as best-practice is being increasingly challenged ([Korthagen et al., 2006](#)). Additionally, the authors elaborate on teacher education reforms which place more emphasis on school-based parts of university teacher education, so that teacher candidates learn to teach students as early as possible. What is more, teacher candidates themselves wish to learn more “tricks of the trade” ([Hobson, 2003](#); [Korthagen et al., 2006](#)).

Nevertheless, several authors state the danger of reducing teacher education to teaching strategies without theoretical underpinnings ([Eraut, 2003](#); [Korthagen et al., 2006](#); [O’Neill & Stephenson, 2012](#)). For example, [Berliner \(2001\)](#) argues that “learning to teach is not simply learning how to survive the first week of school. It is primarily about learning to codify knowledge in order to draw on it again. And it is probably about complexifying and not simplifying the world” (p. 477).

In the development of such a sound theoretical knowledge base for teacher candidates, university teacher education plays an important role ([Korthagen et al., 2006](#)). Ideally, teacher candidates would receive the opportunity to learn about recent theories and research results. Reflecting upon intermediate practical experiences gained so far by using their theoretical knowledge, would continuously improve their professional competence ([Cheng, Tang, & Cheng, 2012](#); [Korthagen et al., 2006](#)).

However, it seems questionable whether university teacher education can fulfill such an objective. The potentially relevant theoretical foundations of teaching are as numerous as they are diverse (e.g., [O’Neill & Stephenson, 2012](#)). In addition, educational theories do not always directly inform instructional practice and are thus sometimes considered distinct from practice (e.g., [Buitink, 2009](#); [Hobson, 2003](#)). This seems especially true for courses in educational foundations dealing with psychological aspects like theories of learning, classroom management, or assessment as well

as with instruction, curriculum, history, philosophy, and sociology of education ([Grossman & Richert, 1988](#); [Schmidt et al., 2008](#)).

Educational psychology as part of educational foundations

Historically, there is a close connection between learning, teaching, and psychology ([Berliner, 1993, 2006](#); [Hilgard, 1996](#)). Besides their important contributions to the field of psychology in general, leading psychologists like Stanley Hall or Edward Thorndike were also concerned with research on teaching ([Woolfolk Hoy, 2000](#)). Since then, educational psychologists dealing with “the development and application of psychological principles to education, as well as [with] the adoption of psychological perspectives on education” ([O’Donnell & Levin, 2001](#), p. 73) have also been involved in teacher education. For a long period of time, educational psychology perceived itself as the scientific foundation of teaching ([Berliner, 1993](#); [Hilgard, 1996](#); [Patrick et al., 2011](#)) and, thus, foundational courses in teacher education programs included mainly psychological content. However, as mentioned before, psychological courses are not the only courses running under the label of educational foundations. Usually, they compete for the limited amount of hours in a teacher education curriculum with many other disciplines like history of education or pedagogics ([Schmidt et al., 2008](#)).

With a view to such time constraints, a debate developed about the position educational psychology is supposed to take within teacher education (e.g., [Anderson et al., 1995](#); [Doyle & Carter, 1996](#); [Marshall, 1996](#)). At the end of the last century, a seminal paper by [Anderson and colleagues \(1995\)](#) demanded a shift in order to integrate psychological topics throughout the teacher curriculum and to develop a “contemporary psychological perspective useful for teaching” (p. 144). However, [Patrick et al. \(2011\)](#) state that psychological courses remain foundational courses at the beginning of teacher education and often face marginalization (p. 72).

Empirical evidence for the importance of educational psychology

The discussion about the importance of psychological knowledge for teachers and thus about the time devoted to psychological courses within teacher education programs is conducted rather theoretically. Sparse empirical evidence exists that clearly states the importance of certain aspects of educational foundations for learning and teaching. Nevertheless, some evidence stems from certain studies on the design of specific courses ([Blumenfeld, Hicks, & Krajcik, 1996](#); [Renninger, 1996](#); [Taylor & Nolen, 1996](#)). Here, the authors explicitly design courses in educational foundations around certain psychological concepts (e.g., learning or assessment) and report their positive perceptions about the courses. Unfortunately, the authors do not report results of any assessments included or even pre-post comparisons. Further evidence results from studies directly tapping knowledge aspects of educational foundations including psychology ([König et al., 2011](#); [Voss et al., 2011](#)). More specifically, [König and colleagues \(2011\)](#) measure pedagogical knowledge on four subscales, namely, structure, motivation/classroom management, adaptivity, and assessment. Similarly, [Voss et al. \(2011\)](#) in their definition of pedagogical/psychological knowledge include knowledge of classroom management, teaching methods, classroom assessment, and students’ heterogeneity. Obviously, both studies focus on aspects of educational foundations that are rather directly related to instruction and teaching. Furthermore, theoretical knowledge is not directly addressed.

In spite of this, the König and Voss studies provide evidence for the usefulness of such constructs to explain individual differences between teachers. [König et al. \(2011\)](#), for instance, explored

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