Journal of Social Science Education
Volume 10, Number 3, 2011, pp. 53–73

ISSN 1618–5293

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Metaphors as a Tool for Diagnosing Beliefs about Teaching and Learning in Social Studies Teacher Education

Do domain specific teaching/learning beliefs and epistemological beliefs exist and do they explain a domain specific approach to teaching and learning the social sciences? This paper reports on the first stage of an exploratory qualitative study carried out at the University of Bielefeld in 2010/11 on pre-service social studies teachers (PSST, n=61). It has a threefold aim: First, providing a very short overview of relevant trends in recent research on epistemological beliefs and teaching/learning beliefs and presenting some plausible hypotheses on if and how these belief dimensions are related to each other in the field of social studies education; second, presenting and discussing metaphors as a suitable qualitative research method for diagnosing and analysing the teaching and learning beliefs in the field; third, presenting the general outline of the Bielefeld project and a comparison of two emblematic cases of the project to evaluate the potential advantages and shortcomings of the research design and methods, especially of metaphor analysis.

Keywords
Metaphors, epistemological beliefs, teaching and learning beliefs, teacher education

1. Introduction

Recent studies on the development and on the enhancement of teacher competencies attach special attention to pre-service and in-service teachers' beliefs. They mainly focus on two dimensions: First on the attitudes to teaching and learning (See Hofer 2001; Sing-Chai 2009), second on the beliefs about the nature of their discipline and on domain knowledge (epistemological or epistemic beliefs, see Mason, Bromme 2010). As these beliefs are major independent variables explaining the success and failures of specific classroom practices, they may ultimately account for learning outcomes and students' academic achievements in different knowledge domains (Hofer 2001; Blömeke 2008; Brunner 2006). Finally teachers' beliefs are seen as critical for teachers' openness to student centered classroom-management and to their learners' alternative conceptions (Hashweh 1996).

Qualitative and quantitative inquiry on teaching and learning beliefs of teachers is abundant in the field of science and mathematics (see e.g. Köller 2000) and there are recent insights in the fields of history and geography. But still VanSledright underlines the limitations of existing research with regard to epistemological beliefs and states that a lot of research has to be done "to clarify the connections and their implications for teaching and learning." (VanSledright, Limón 2006, 551). Social studies teacher education and teacher beliefs research in the narrower social and civic education domain (mainly associated with the academic disciplines sociology, economy and political science) stay even behind the existing analysis[1] and keep on being terra incognita, even in the international social studies education research community (Adler 2008).

But how to overcome the methodological challenge of detecting and diagnosing deeply rooted beliefs and attitudes about domain knowledge and teaching, that may have decisive impact on what happens in classrooms and on what and how students learn when they tackle social studies topics in school contexts?

By tradition the research on personal epistemologies is commonly based on large-N-surveys, open questionnaires and on interviews (see below). Newer analyses question the suitability of certain data collecting strategies i.e. when it comes to the study of pre-service teachers' attitudes: Novice teachers often use the same wording as teacher educators and researchers, but they don't signify the same concepts (see Hammerness, Darling Hammond et al. 2005, 368). This is called the over-assimilation-problem in teacher education and teacher education research, which is extremely prone to produce biased research results: Hofer and others call for more research addressing these notorious contradictions between expressed attitudes and the actual classroom practices (Hofer 2006, 90). Hence the uncertain relationship of epistemological beliefs (as thought processes) and observable behavior (as teaching practices) generates increasing scientific interest (Brownlee 2006; Fives, Buehl 2008; Chen, Chang 2009), but: "Assessment of epistemological be-

1 The existing insights on epistemological thinking in history (VanSeldright 2006; Wineburg 1991; Wineburg 1996; van Drie, van Boxtel 2008) cannot be generalized to the social studies domain, because they focus on quite subject-specific issues such as the use of historical sources, historical empathy and contextualization.

liefs requires one to identify and uncover what lies well beneath the surface" (Buehl, Alexander 2001, 388). Exploring new ways of gathering and interpreting relevant insights seems therefore to be crucial for the detection of tacit beliefs. This would further enhance a deeper and qualitatively trustworthy understanding of teaching and learning in the social studies domain. In recent times the metaphor analysis is discussed being a pertinent instrument for revealing those beliefs in different contexts of the educational sciences, namely in teacher education research (See for a very recent overview of relevant results in the field: Patchen, Crawford 2011).

This paper reports on the first stage of an exploratory qualitative study carried out at the University of Bielefeld in 2010/11 on pre-service social studies teachers (PSST, n=61).[i] It is a synchronic comparative case analysis comparing a moderate number of cases. The project asks if and how domain specific epistemological beliefs may be connected to specific beliefs about teaching and learning the social studies. It aims to describe and to inductively designate different types of epistemological beliefs in the social studies domain and elaborates then on potential relations with certain teaching and learning beliefs using the metaphor analysis. This paper documents the theoretical background of the project and an initial stage of its evaluation: I discuss first relevant trends in recent research on domain specific epistemological beliefs and on teaching and learning to frame the research question. I aim then to present some plausible hypotheses on if and how these belief dimensions may be related to each other in the field of social studies education (2.); secondly, I present and discuss metaphors as a suitable qualitative research method for diagnosing and analysing the teaching and learning beliefs in the field (3.); finally, the paper reports on a comparison of two emblematic cases of the project in order to thicken the description of possible belief configurations and to evaluate then the potential advantages and shortcomings of metaphor analysis (4.).

2. Beliefs about Knowledge and about Teaching and Learning in Social Studies Education

Teacher epistemology- and teaching-beliefs-research is a fast expanding field of scientific inquiry, where educational researchers reframe and extrapolate the existing research on teacher knowledge (Shulman 1988) and the teacher beliefs and attitudes research (see e.g. Calderhead 1996; see in Germany 'personal theories'-research, Mandl, Humber 1983; Koch-Priewe 2000; Dann 1989; Groeben 1988). In a way it is a metatheory to teacher-knowledge-theories in the Shulman-tradition: Personal epistemic variables such as the individual preconceptions about the nature of the discipline (cf. *content knowledge*), about knowledge for teaching the discipline (cf. *pedagogical content knowledge*) (Bendixen et al. 2010) as well as the preconceptions about teaching and learning in general (*pedagogical knowledge*) play a major part in teacher epistemology research. They are therefore critical elements of some newer models of teachers' professional development (Blömeke 2008). In a teacher education perspective, researchers argue that the reflective work on individual beliefs, preconceptions and values of teachers should be a mandatory element of any teacher training (of pre-service and of experienced teachers), given the undisputed impact of epistemic beliefs on the choice of cognitively activating instructional strategies (Brownlee 2004) – and thus on students' performance (see the COACTIV-project: Brunner 2006). The treatment of personal beliefs should play a major part as Leavy states: "While changes in beliefs have been found to occur, and often as a result of education programs, pre-service teachers are not seen to develop new perspectives during teacher education courses unless they are confronted with their held beliefs" (Leavy et al. 2007, 1219).[2]

This seems especially required for pre-service social studies teachers, whose prior experiences and deeply rooted attitudes towards the discipline and the school subject are fairly often surprisingly negative. They are frequently shaped by perceptions of citizenship education as an educational venture that is too consensus prone and excessively 'politically correct' (See the so called 'political correctness backlash' in Britain: Wilkins 1999, 223, see also Besand 2006). Empirical research about how social studies teacher beliefs and students' achievements are related to each other at the aggregate level is virtually nonexistent apart from a follow-up analysis of the IEA Civic Education Study 1999 on US social studies teachers' professionalization and the role of beliefs about standards and citizenship education as a school topic (this study was not yet inspired by epistemological research approaches, see Torney-Purta et al. 2005).

In educational research "epistemological beliefs" is a construct which is multi-faceted and calls for further definition. In the following sections I introduce some pertinent definitions and typical research perspectives developed over the past 20 years, which are

i I gratefully acknowledge the extremely helpful comments of two anonymous reviewers and of Reinhold Hedtke (Bielefeld) and Birgit Weber (Köln), as well as the excellent research assistance of Stephanie Matthias M.A. and a financial support provided by BISED/University of Bielefeld.

2 Recently teacher education programs in the United States focus carefully on the monitoring and enhancement of teacher beliefs namely in the social studies domain (VanSledright et al. 2011).

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relevant for the investigation of teacher beliefs in the social studies domain. I then discuss the problem of domain specificity of epistemological beliefs and connect the state of the art to the teacher beliefs discussion aiming to present some hypothetical considerations that motivated the Bielefeld project analyzing the teaching and learning beliefs and the epistemological beliefs of future social studies teachers.

2.1 Definitions

American educational psychologists discuss the role of epistemological metacognitions for cognition and learning since the early seventies. This strand of research is rooted in pragmatism with Dewey being one of the first scientists asking how schooling may change knowledge beliefs and personal attitudes (Dewey 1933). Today most of the basic conceptualizations of epistemological beliefs research have been replicated in numerous *large N*-studies and are generally acknowledged by the educational research community (See for thorough recent overviews, Bendixen et al. 2010; Muis 2006; see also the journal Metacognition Learning, spec. issue 5/2010). *Epistemological beliefs*[3] in general are beliefs about the study of knowledge. At a micro-level the concept of *personal epistemology* has commonly been conceptualized as an individual's "set of beliefs organized into theories, operating at the metacognitive level" (Hofer 2004, 46). Individuals reflect upon the epistemic qualities and the sources of their knowledge and may ask themselves: What do I know? How do I know what I know? Those beliefs are seen as functional for bridging the gap between knowledge and action: They are thus conceived as an "apprehension structure through which the knowledge to be learnt is anticipated" (Bromme 2010, 12), stimulating learners to cognitively "calibrate" to characteristics of their learning tasks (*Calibration hypothesis*, Ibid.) or to serve as an opportunity structure for domain specific self-regulated learning because beliefs "translate into epistemological standards that serve as inputs to metacognition" (*Consistency Hypothesis*, Ibid., see also Muis 2010, 28). Therefore epistemic beliefs theories are in close relationship to theories of *metacognition* and *metacognitive processing* (Veenman et al. 2006, 4). Metacognition itself has a twofold character: On the one hand metacognition is pure knowledge because of its declarative knowledge components about e.g. the interactions between person, task, and strategy characteristics (Veenman citing Flavell 1979, Ibid.). On the other hand metacognition is also a skill, because its procedural knowledge components refer to self-knowledge, self-regulation and the planning of individual learning activities, which are processes that have built-in feedback mechanisms. As Veenman puts it: "Either you are capable of planning your actions ahead and task performance progresses smoothly, or you don't and your actions go astray" (Ibid. 5). Nonetheless it is still not evident where "beliefs" finish and where "knowledge" begins, the problem of conceptual borders is an old brainteaser of cognitive psychology that contains key methodological complications (Limón 2006, 20, referring to Sinatra 2001).

Even so epistemological beliefs are generally assumed to fulfill quite a number of subsequent functions for learning and more general for the use of specific cognitive strategies. In very recent educational research colleagues try to show how and when they may influence motivation, conceptual change (Stathopoulou, Vosniadou 2007) and the capacities for self-regulated learning (Muis 2009; Bromme et al. 2010). The most basic assumption about the effects of epistemological beliefs is that "advanced (or more sophisticated) beliefs about knowledge and knowing are prerequisites for the development of essential thinking skills and for learning in general"(Greene 2008, 124).

2.2 Two Research Positions in Epistemological Beliefs Research

Since the early years of research on epistemological beliefs researchers like Perry (1970) and others have posited different models on how people (mostly college students) interpret their educational experiences. Since then two central positions on how and what learners think about the study of knowledge have emerged: the *ontogenetic* and the *structural/analytical position*.

The former approach consists of works in a post-piagetian tradition that focus on the genealogy of epistemic thinking ("Genetic Epistemology", Baxter Magolda 2004; Belenky et al. 1986; King, Kitchener 1994; Kuhn 1991). Epistemological development refers to the progressing accommodation of the objective and subjective dimensions (*objectivism-subjectivism*) of knowing: The authors stress the

3 Terminology in the field is controversial and there is a lot of mislabeling (Buehl, Alexander 2001, 415), since numerous colleagues use the terms „epistemic cognition" and „epistemologic(al) beliefs" as quasi synonyms (Hofer 2002, 3) or use the term "epistemologic(al)" as a catch all category (Schommer, Baxter Magolda et al.). Some philosophers and educational researchers – like Kitchener (2002) and Hofer (2004) – put an accent on the difference between the beliefs about knowledge (epistemic beliefs) and about the beliefs about the study of knowledge and knowing (epistemological beliefs). I basically subscribe to this distinction, but I shall nonetheless report the original terminology of individual researchers to avoid a distortion of the scientific sources. A further thorough presentation of this terminological discussion would be far beyond the scope of this paper: A priori JSSE is interested in educational perspectives (epistemic cognitions and epistemological beliefs) and not so much in epistemology as a philosophical enterprise ("epistemic" beliefs about knowledge more generally).

consistent change of epistemic cognition over time and associate respective developments with educational experience and/or age differences. Hence these approaches follow the general line of reasoning that epistemological growth is sequential and moves e.g. from simplistic (e.g. "dualist") to relativistic positions (Perry). Educational psychologists like Kitchener/King (proposing the seven stage reflective judgment model, RJM, 1994) and Kuhn (1991) mirror Perry's early conceptualizations of intellectual development at different points in the life span or at different educational levels. But even if this research typically was qualitative, mostly based on interviews (King, Kitchener 2004), the focus always was on static positions and not on how different belief dimensions develop over time: There is a lack regarding the portrayal of transitional stages and their driving forces (Hofer 2001; Alexander 2006; Greene et al. 2008).

Basically all authors describe intellectual positions from "naïveté" to "sophistication". Even though the different approaches use different labels and indicators demarcating the stages, they may commonly be labeled along three general levels (for this handy broad classification see amongst others: Hofer, Pintrich 1997).

The typical stages are represented as follows.

1. *Absolutism/objectivism*
   e.g. simple/certain knowledge about what is false and true: authorities have the answer.
2. *Multiplism/subjectivism*
   everything could be true, knowledge is pure opinion.
3. *Evaluativism/objectivism-subjectivism*
   knowledge is generated by human minds and is uncertain, but critical thinking is a vehicle for sound assertions. Therefore people have the right to their 'opinions', but some views may be 'more right' than others.

In newer analysis the evaluativist stage is associated with only very high levels of formal education since the multiplists' indifference – even to inconsistent positions – is seen as a kind of "mainstream" thinking style, an expression of postmodern intellectual tolerance (Kuhn, Weinstock 2002, 138f.).

Like other ontogenetic stage-models (e.g. the legendary Kohlberg-Model) these models have of course attracted serious criticism from several directions, namely from a methodological point of view, from sociology and from philosophy of science. Nonetheless measurement problems (Hofer, Pintrich 1997, 93), cultural biases and causality dilemmas (Moore 1994) do not alter the fact that distinct qualitative levels of epistemic thinking and of reflective judgement are empirically detectable, even if they are not only very difficult to quantify, but also not generalizable or linear.[4]

A second approach to epistemological research, the so called analytical position, is essentially represented by Schommer's, Buehl/Alexander's, Muis' and Hofer's work (Schommer 1990; Schommer 1994; Schommer 2004; Hofer 2000). They formulate heavy criticisms on the genetic epistemology and on the theoretical stances of Kitchener Perry et al. for being too unidimensional and for not capturing the multifaceted character of epistemological beliefs. They therefore reconceptualise beliefs as a system of more or less independent characteristics: Learners may be 'sophisticated' in some beliefs but not necessarily in others. Doing so Marlene Schommer has not only posited an influential basic model, but also renewed the methodological debate proposing a first standardized research inventory (SEQ[5]), which stimulated further methodological and conceptual debate. Today the Buehl's DSBQ (Domain Specific Beliefs Questionnaire, Buehl et al. 2002) and the Hofer model (2000) using the Discipline Focused Epistemological Beliefs Questionnaire (DEBQ) are most influential instruments measuring epistemological beliefs for being domain specific and for not mixing up learning and intelligence beliefs with epistemological beliefs as Marlene Schommer does (Schommer 1994; see Hofer's research report: Hofer 2009). Hofer suggests a system of four epistemic beliefs dimensions:

- Certain/Simple knowledge (beliefs about the *complexity/the structure of knowledge*);
- *justification of knowledge* (e.g. opinion based or first hand-experience based knowledge);
- beliefs in the source of knowledge (e.g. omniscient authority vs. evaluative stances);
- *attainability of "truth"* (there is one "right answers" vs. no ultimate truth).

It is important to note, that these facets are relatively consistent at the individual level (Muis 2006, 10f.): The 'systems of knowledge beliefs'-research thus provides snapshots of a person's belief configurations – or sets of beliefs – without yet providing any developmental-stage analysis. Several replicable studies assessed the validity of epistemological thinking as a

4 See the methodological critique of Muis (2006); further problems with regard to the ‚stages' and trajectories are not part of the following descriptive presentation of 'snapshots' of teacher students' beliefs since the presentation of case studies implicates a synchronic comparison, see the final publication of the BISED-research report (2012).

5 Schommer Epistemological Questionnaire (1990) tested a five factor model (structure, source and certainty of knowledge, quick knowledge acquisition, and ability for knowledge acquisition). Hofer and Pintrich (1997) report that only two factors, "quick learning" and "certain knowledge", loaded across different populations. In response to criticisms of the SEQ, Hofer developed the DEBQ (see below); Schraw et al. (2002) developed the Epistemological Beliefs Inventory (EBI).

multidimensional construct in general, but the interpretation and substantiation of causality and multidimensional contextualisation are still highly controversial (Hofer 2009; Muis et al. 2009).

It is essential to note, that not only newer approaches seek to draw sharper boundaries between knowledge beliefs and knowledge acquisition/learning beliefs (which is important for the selective analysis of domain specific teaching and learning beliefs); but that also quantitative as well as qualitative analysis seek to combine multidimensional and genetic approaches to get a more complex picture about how and when learning and intellectual development occur (see below, see Greene 2008; see for domain differences in stage transitions Kuhn, Weinstock 2002). Last but not least later conceptualisations such as the DEBQ and Schommer's embedded systemic model stress the entrenched forms and the multi-layered nature of beliefs: There are not only important differences between knowledge beliefs in general and schooled knowledge/academic knowledge beliefs, but also the academic knowledge beliefs vary significantly according to different academic disciplines, they are thus domain-specific.

2.3 Domain Generality and Domain Specificity of Epistemological Beliefs

At the beginning of quantitative research on epistemic beliefs the assumption was that beliefs about knowledge and knowing were more or less unspecific across different knowledge domains and learning tasks. Schommer promoted the view, that the most complex and influential beliefs were "domain general" as they shall not vary from one academic field or discipline to another (Schommer-Aikins 2003). This contradicted an older assumption of problem solving research (Chi et al 1981), that knowledge is predominantly context-specific and therefore domain dependent. Today there are no more disputes that domain specificity exists; nonetheless there are still a number of methodological and conceptual limitations (e.g. Muis et al. 2006).

The definition of what constitutes an academic 'domain' is not unequivocal (Alexander 1992). Buehl/Alexander define a domain as "a field of study associated with academic realm", that differ in terms of structure and content (Buehl, Alexander 2001, 401). Without doubt there is no "academic realm" lacking institutionalized disciplines and school subjects. Therefore domains are also conventions and man-made constructs: Jehng calls them social institutions for knowledge and knowledge acquisition (Jengh 1993, 24). As a result, if there are domain specific epistemic beliefs, they will undoubtedly be culturally biased and somewhat display the characteristics of educational institutions and norms. Also teachers obviously teach differently when they act in different academic domains (see below, see Stodolosky 1988). Limon opts for side-stepping the resulting methodological difficulties simply making explicit and reflecting that in most existing studies the term 'domain' is considered synonymous to the actual academic discipline and/or to the school subject (Limon 2006, 22).[6]

Domain classifications recall Biglan's classical categorization of academic domains as hard-soft/purely-applied (Biglan 1971). Many classifications in epistemic research are based on this early approach, most use the well-structured/ill-structured classification based on Spiro and Jengh (1990). Since research normally includes the easily accessible groups of students enrolled in high school and university courses, comparisons are often categorically based on differences between the actual school subjects/academic disciplines (See Jengh 1993, see Stodolsky 1991).

The social studies domain categorization habitually suffers from the many-sided character of the field. When research points to the 'social studies' it may indiscriminately allude to disciplines like psychology (a soft, pure, ill-structured domain) and education (a soft, applied, ill-structured domain). Muis citing this example – recommends a narrow domain focus when collecting data, because: "Comparing students' beliefs about broadly defined domains diminishes the power to detect similarities and differences along various dimensions" (Muis et al. 2006, 25). However most of the disciplines belonging to the social sciences are classified as loosely and/or ill-structured domains. This general classification scheme implies that knowledge acquisition in the field always requires a greater flexibility of thinking (Buehl, Alexander 2006, 700), because in these domains one has to deal with conflicting assumptions and evidence. Whether a solution is right or wrong remains time and again open to debate; the definition of problems is part of the answering process. In contrast, well-defined problems share two essential features (Schraw 1995, 523): "(1) There is only one correct solution that can be determined with total certainty; and (2) there is a guaranteed procedure available to reach this solution." That is why Schraw and others draw the conclusion that advanced epistemic

6 Space constraints do not allow me to present the sociological debate on the notion 'domain'. The differences between academic knowledge domains and schooled knowledge domains is not so much highlighted in epistemological beliefs research, which is mainly U.S.-based, where researchers seemingly don't pay much attention on too sharp distinctions between high school and college-students, when debating theories of knowledge beliefs, see for that perspective Hofer criticizing the lack of research including graduate students: Hofer 2006, 68.

thinking skills are a necessary precondition to successful problem-solving in ill-structured domains, but are not vital for coping with highly structured problems (Ibid.). Jengh emphasizes this assumption claiming that one person's epistemic cognitions vary across domains (Jengh 1993). Thus he states for the social studies: „Especially in complex and ill-structured situations, there is reason to believe that epistemological beliefs influence how individuals understand the nature of intellectual tasks and decide what kinds of strategies are appropriate for dealing with them [...] (Ibid. 24). [...] The intellectual climate in the social sciences and arts/humanities is full of uncertainty and contradiction. After being involved in such learning environments for years, students become convinced that the nature of knowledge is uncertain, solutions to problems are sometimes impossible to reach within a certain time frame, learning a subject has no prescribed sequence, and knowledge takes time to accumulate." (Ibid. 34)

Those domain specific beliefs about the social studies as a school subject are replicated in several studies, Stodolsky being one of the first researchers to talk about students' views of the school subject and its archetypical classroom activities ("What is social studies?", Stodolksy et al. 1991, 96ff.). Finally there is an obvious consistency of core facets of domain specific beliefs in the social science domain (Buehl, Alexander 2005): Presenting a cluster analysis Buehl/Alexander find that epistemic belief dimensions such as the beliefs in the certainty of knowledge and in authorities providing right answers are highly consistent and specific within domains but also consistent across domains: thus epistemological beliefs have a dual character, they are domain general and domain specific (Ibid. 721). In their ANOVA-analysis Buehl/Alexander bunch 'profile groups' of students showing qualitatively different belief contours in social studies and math, which are connected to robust variances in performance and in motivation patterns. As many other researchers they provide reliable (quantitative) descriptions of belief configurations, but they fail to explain the epistemological trajectories and thus ways to qualitatively enhance the epistemological understanding.

The conceptual approach of Greene et al. (2008) provides last but not least a very first – not yet fully satisfying – three-dimensional hypothetical sketch of how genetic, domain specific and structural analysis of students' thinking about knowledge in an ill-structured domain like the social studies may be theoretically modelled (compared to the hard sciences; see Fig. 1). The Greene-Torney Purta-Project thus attempts to fill an important gap in epistemic cognition research connecting both the dimensional and the positional/genetic aspects of personal epistemology in a domain specific perspective. Since there isn't yet any empirical evidence for this assumption, that may help us to clarify levels and trajectories of domain beliefs, our own analysis takes this genetic-systematic-domain-analysis as a conceptual foundation for exploring inductively and comparatively the domain-specific character of epistemic configurations (and their association with certain teaching beliefs).

Fig. 1 Multidimensional Ontogenetic Model of Domain-Specific Epistemological Beliefs (Greene et al. 2008)

Epistemic and Ontological Cognitive Development Model								
	Ill-Structured Domains				*Well-Structured Domains*			
Age/Educational Level[a]	*Position*	*SC*	*JA*	*PJ*	*Position*	*SC*	*JA*	*PJ*
4–12	*Realism*	*Strong*	*Strong*	*Strong*	*Realism*	*Strong*	*Strong*	*Strong*
12-early college	*Dogmatism or*	*Weak*	*Strong*	*Weak*	*Realism*	*Strong*	*Strong*	*Strong*
	Skepticism	*Weak*	*Weak*	*Strong*				
Middle to late college	*Rationalism*	*Weak*	*Moderate*	*Moderate*	*Dogmatism or*	*Weak*	*Strong*	*Weak*
					Skepticism	*Weak*	*Weak*	*Strong*
Postundergraduate education	*Rationalism*	*Weak*	*Moderate*	*Moderate*	*Rationalism*	*Weak*	*Moderate*	*Moderate*

Note: SC = Simple and Certain Knowledge dimension; JA = Justification by Authority dimension; PJ = Personal Justification dimension.

[a]We have used both age and educational level terms in this table given their predominance in the personal epistomology literature but acknowledge that they are not ideal, particularly because the latter are not inclusive of individuals who do not attend college.

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2.4. Teacher Epistemological Beliefs in and Across Domains

Today in-service and pre-service teacher beliefs on teaching and learning a discipline are progressively investigated in an epistemological beliefs' perspective, since teacher effectiveness research has shown the vital impact of beliefs on classroom activities and learning outcomes (see introduction). The Bielefeld project on pre-service teachers' beliefs in the social studies domain attempts to show if and how certain domain specific epistemological beliefs (*beliefs about the content knowledge regarding the academic discipline and the school subject*) may be connected to beliefs about teaching and learning the school subject. At the outset it aims to inductively designate different types of pre-service teachers' epistemological beliefs typical for the social studies domain[7] and explores then the potential connections to certain teaching and learning beliefs (using the metaphor analysis, see fig. 3). Several recent contributions in educational research point towards this line of reasoning clarifying the potential connections between epistemological beliefs and teaching beliefs in a domain specific perspective.

Basically Sinatra and Kardash (2004) state that pre-service teachers' beliefs about knowledge (beliefs about the complexity of knowledge mixed up with learning beliefs such as beliefs about speed of knowledge acquisition) predict the openness of teacher candidates to complex and constructivist perspectives on teaching and learning. Patrick and Pintrich (2001) as well as Brownlee (2001, 2006) in her newer research underline the necessity to destabilize the traditional notions of teaching and learning to make teacher education programs more effective. Fives and Buehl (2010) present a new quantitative research design (n=351) to uncover the pre-service teachers' conceptions about the knowledge they need for teaching and their beliefs about the nature of that knowledge as well as their beliefs about the origins of the ability to teach. They summarize that beliefs about these different facets of teacher knowledge and about teaching skills are "likely to be interrelated" (Ibid., 501). Yet they are unable to determine, if certain beliefs are most prevalent or influential on pre-service and practicing teachers' cognitions and behaviors (Ibid., 502).

However there is strong evidence that domain specific knowledge beliefs affect the teaching and learning beliefs, despite the somewhat contradictory relation between the manifest teaching practices, disciplinary content knowledge beliefs and the professed teaching beliefs. Amongst others Olafson/Schraw report *blended beliefs* – defined as inconsistencies within the epistemological beliefs structure – since teachers "chose to blend beliefs from different world views in order to mix and match specific assumptions of these world views ... we suspect that a blended epistemological world view has more to do with naivety than reflective selection" (Olafson, Schraw 2006, 79). They endorse other researchers' stances such as Levitt's (2001) and White's (2000) who present similar findings. Nonetheless teachers may have relatively clear cut epistemic cognitions about academic knowledge domains, they may show tendencies to blur and/or align them to a lower (e.g. realistic/behaviorist) instructional standard. They pay tribute to the imagined softer school subjects' epistemological norm, see Olafson/Schraw referring to a science teaching example: "Alignment between beliefs and practices ... also illustrates how a traditional model of science instruction is consistent with a more naïve belief about knowledge" (Olafson, Schraw 2006, 81). These findings paradoxically confirm the assumption that epistemic cognitions about a domain and the domain specific teaching and learning beliefs are interrelated – be it in a joint "race to the bottom"-dynamic. This observation points to an important causality problem of belief research, since especially in-service teachers' disciplinary epistemic stances seem to be dependent on their pedagogical content knowledge beliefs and not vice versa. This confirms a newer analysis of Deborah Loewenberg, who calls for a further differentiation of Shulman's concept of pedagogical content knowledge as being pedagogical and disciplinary in a twofold way (Loewenberg et al. 2008).

Insights about the interconnectedness of teaching beliefs and domain specific curricular beliefs are only occasional (see for the sciences: Van Driel et al. 2007). Thus analyses of domain specific beliefs about teaching and learning the social sciences in a narrower sense (not including history and geography) and their interconnections with domain beliefs about knowledge are still exceptional. Research perspectives are restricted to the analysis of disciplinary cultures and school (subject) cultures, that provoke that teachers sharing the same environment share the similar teaching beliefs and metaphors for teaching (see below, see Alger 2009 in her meta-analyses of several studies in the field). Kreber/Castelden (2009) examined the "disciplinary teaching styles" and their connection to epistemological understanding in university teaching using the Mezirow classification of teaching styles (Mezirow 1991). They draw the conclusion that faculty from soft fields show a greater variety of teaching methods, a greater variety in premise reflection and a greater involvement in communicative learning than faculty in hard disciplines (Kreber, Castelden 2009, 526). These findings would enhance a basic premise

7 In this context one should bear in mind that the term 'Social studies' labels an interdisciplinary school subject that is anchored in several German Länder school and teacher education systems with Sociology, Economy and Political Science as academic reference disciplines.

that teachers who are used to deal with epistemic uncertainty are more inclined to question themselves and their pedagogical practices being more student-centered and adopting constructivist teaching and learning stances without difficulty.

Even if this research report suggests that the epistemological analysis is still an emerging field of inquiry in teacher education research, the following tentative hypotheses on how teachers' epistemological beliefs may be related to teaching and learning beliefs in the social studies domain frame the following analysis. Since the research methods of the Bielefeld-project are purely qualitative, these assumptions shall not be 'tested', but they may provide a conceptual framework for grounding a first descriptive sketch of qualitative domain beliefs and their potential impact on teacher education and professionalization processes:

1. *Domain specific beliefs about social science knowledge exist.* At an advanced academic level they should have a tendency towards evaluativist stances. Therefore the facets of the epistemological beliefs concept, that are related to the ontological qualities of domain specific knowledge in a 'soft' field ("justification of knowledge", "certainty of knowledge" and "source of knowledge"), should show consistent selective belief configurations (this hypothetical position qualitatively condenses and thus replicates the domain-specific 'levels of epistemic cognition'-assumption reported in studies from Buehl, Alexander, 2005 et al.);
2. *Domain specific beliefs about schooled knowledge* should vary according to the degrees of sophistication of epistemological beliefs about (social) scientific knowledge (qualitative replication of the assumption that teachers with relativist positions with regard to the academic discipline tend to adopt relativist epistemological views about schooled knowledge, see Brownlee, Berthelsen, 2006; Chan, Elliott, 2004).
3. *Beliefs about teaching and learning should vary according to epistemic levels:* The more a personal domain epistemology is relativistic – the more constructivist the individual beliefs about teaching and learning; the more the epistemological beliefs are absolutistic – the more behavioristic the teaching beliefs (this hypothetical position replicates newer research results in epistemological beliefs such as those presented by Benedixen et al. 2010).

3. Metaphors as a Theory and a Method for Analyzing Beliefs and Deeply Rooted Conceptualizations about Teaching and Learning

Given the methodological limitations of the above mentioned approaches the Bielefeld project suggests to use metaphor analysis as a way to balance the quantitative belief research on teaching and learning. The metaphor analysis thus complements our open ended questionnaire collecting data about the epistemological beliefs about knowledge for teaching (*beliefs about the pedagogical content knowledge as specialized content knowledge for teaching*) and about the disciplinary content knowledge (*beliefs about content knowledge/domain knowledge*)[8]

Qualitative educational researchers suggest that metaphor analysis is a unique heuristic tool for bringing implicit beliefs and tacit knowledge to awareness (Patchen, Crawford 2011). It is an instrument to circumvent the unlucky impact of ubiquitous "received ideas" discourses in the sphere of teacher education and pedagogy that are entirely disconnected from the reality of the teaching profession and from a faithful diagnosis of what future teachers actually really feel and think (Ibid.). This causes great harm because without a trustworthy knowledge base teacher educators cannot intervene effectively to promote a transformation of unproductive teaching beliefs and futile classroom practices. But there is a clear cut trade off: On the one hand our empirical findings will be of only explorative value and they are therefore not replicable. On the other hand a first "thick description" may stimulate future quantitative and qualitative research about the effects of epistemic beliefs in teaching and learning the social studies – and about suitable methods for diagnosing and offsetting fruitless attitudes.

How to define the term 'metaphor'? Generally speaking a metaphor is "any comparison that cannot be taken literally" (Bartel 1983, 3; Bowman 1998-1999, 1). Bowman states that a metaphor is "to be understood as a global term meaning a comparison between two unlike things which serves to enhance our understanding" (Ibid.). Metaphors facilitate the understanding of "relatively abstract or inherently unstructured concepts in terms of more accessible, concrete subject matter" (Lakoff 1994, 251), but they do not substitute one term for another as the antique theories of metaphor suggested (Aristotle, Poetics 21, 1457b9, 20-22).

Since the first wave of modern metaphor theory researchers like Black (1962) highlighted the argument that there is not substitution but interaction between two metaphoric ideas (*interaction theory*): Describing the use of metaphors, Black distinguishes between metaphorical focus (metaphorically used term) and framework. 'Source' and 'target' of a metaphor are thus irreversible, as metaphors express "an asymmetric process of interaction between a structure and data" (Indurkhya 2006, 140). Finally a metaphor enhances the understanding of the cognitive roots of

8 See for the project-documentation: Annex 1. Translation of the open ended questionnaire used in the BISED-project; Annex 2. Instruction Metaphor-Analysis.

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a semantic field: It is not just a 'figure of speech' but a 'figure of thought'. But then again there are indeed exclusively linguistic metaphors that have lost their original conceptual resonance in peoples' minds, the so called "dead" metaphors (Traugott 1985).

Basically the modern cognitivist understanding of metaphors is grounded on the assumption that metaphors are conceptual in nature and inherent to the human mind. Metaphor analysis methodologically reflects the "interpretative turn" in educational studies. Metaphors are seen as thick or rich summaries of interpretative frameworks that project characteristics of one structured experience to another. "Conceptual metaphors" therefore motivate a system of associated metaphorical terms that appear on the "surface" of language. They are symbolic frames ("schemes") that provide an inferential base for understanding more discrete attitudes and behavior and thus capture an underlying world view or frame. They thus represent cognitive frames of concepts about social realities. Doing so they usually take a more abstract concept as *target* and a more concrete or physical concept as their *source*. Example: Teaching and learning is like walking or travelling. The "source" consists of an image scheme that is based on a representation of a real life experience: E.g. making a way from a starting point to a goal line. "Metaphors highlight ... certain aspects of our experience [...] metaphors may create realities for us, especially social realities " (Lakoff Johnson 1980, 156). Metaphors may thus as well hide certain aspects of our social reality and create coherence with regard to the representation of social facts: A representation of learning processes as journey excludes other representations such as the container metaphors about learning (see below "stamp album").

Since the early 1990s it has been evidenced that conceptual metaphors are not only based on bodily experience but that even our most fundamental ideas (time, causation, morality etc.) are almost completely composed of systems of conceptual metaphors (Johnson, Lakoff 2003, 249). Even the most basic understanding of morality seems to be grounded in conceptual metaphors. Lakoff and Johnson point out that there are about "two dozen metaphors that arise spontaneously out of common, everyday experience in cultures around the world" (Lakoff, Johnson 1999, Chapter 15). Theorists therefore assume that individuals also use metaphors as filters to crystallize core ideas or to reduce information in smaller adaptable packages (Scott Mio 1996, 130). This may especially apply to the information and actuality driven domain of social sciences. In addition metaphors are capable of linking the rational and the non-rational, implying cognitive and emotive elements (Jamieson 1985, 73; Scott Mio 1996, 133), which are important characteristics of the social, political and economic sphere and its conceptual frames.

During the past decades metaphor analysis was largely used for applied teacher education purposes. Afterwards existing metaphor collections about teaching constituted an important starting point for educational researchers to study the beliefs that future teachers bring with them to teacher preparation programs. Teacher beliefs research has hugely benefitted from the progress made in this domain and metaphors about teaching and learning became one of the most prominent research fields of qualitative research with metaphors. The works of Martinez (Martinez et al 2001), Leavy (Leavy et al 2007), Saban (2007), Mahlios (2010) and others highlight the methodical advantages of metaphor analysis of teaching and learning beliefs. As Mahlios states resuming existing research: "Preservice teacher candidates have definite beliefs about pupils and classrooms, as well as, distinct images of themselves as teachers" (Mahlios 2010, 50). Cortazzi and Jin (1999) find 236 metaphors of teaching distillate 10 comprehensive metaphorical leitmotifs that guide pedagogical imaginations of future teachers. Sfard (1998) constructs metaphorical maps and clusters "acquisition metaphors" vs. "participation metaphors". An influential German position suggests a classification of metaphors (Schubert 1986) differentiating three important root metaphors for teaching and learning: the 'production',' journey' and 'growth'.

A basic classification for organizing metaphors has been put forward by Martinez et al. (2001), which since than channeled numerous metaphor analysis a an initial classification scheme:

Martinez et al. organize metaphors as falling into a three-dimensional categorical scheme- following a position from educational psychology (Greeno et al. 1997) they do not embrace a "grounded theory"-approach but operationalize learning theory clustering behaviorist/empiricist, constructivist and situated/social-cognitivist perspectives. They base their assumptions on pertinent research in educational pedagogy (Dubbercke et al. 2008) and on the subsequent metaphor analysis using very similar organizing principles (see Alger 2009). The following paragraph paraphrases the pertinent categorical clusters (see overviews Alger 2009, 745, and Aguado et al. 2009; see categories Martinez et al. 2001, 967f.):

Metaphors that fall into the *teacher centered category* view of social studies teaching. Teaching is knowledge transmission, (including extremely behavioristic stances such as "teaching is like tuning an instrument" Martinez et al. 2001 Ibid. 970); but also education ('guiding', 'nurturing' and 'molding', Alger 2009, 745). Teacher has control over the classroom processes; there is no actual teacher-student interaction.

Constructivist metaphors fall into a *student centered category:* They conceive knowledge acquisition as a constructive process: Students actively build their own

perspectives by interpreting their experiences. The teacher is a facilitator promoting highly self-regulated learning processes, anchor: "Learning is like setting the bricks of a house. The student is the mason and the house at the same time. S/he is also the owner of the house. The teacher is the site foreman." (Ibid. 971) The teacher is seen as a person, who just provides a tool box, students have more or less full control over their learning process.

Situated/socio-cognitive metaphors see knowledge as a social, collective product of interaction between individuals who negotiate identities and understandings. Essentially, this assertion points to knowledge as socially produced, but different form purely constructivist stances: "does not see this as compromising the possibility of rational objectivity in knowledge." (see Moore 2007, 29) Anchor: "A teacher is like a tourist guide who negotiates a route with the tourists." (Ibid. 972). Students and teachers share control over the learning process, teachers encourage the adoption of multiple viewpoints, negotiation of meanings amongst the members of a community of learners (Alger 2009, 745).

It is important to note that most of the works based on the above cited analyses used metaphors as a tool for diagnosing concepts in a general pedagogy perspective; only few contributions identified subject specific perspectives (school subject "cultures" and specific disciplinary contexts) furthering specific beliefs towards teaching and learning. The present analysis aims to distillate domain specific teaching beliefs oriented towards social studies education programs.

4. "Teaching Social Studies Reminds Me of Collecting Stamps…": Using Metaphor Analysis for Exploring Student Teachers' Beliefs in Social Studies Education (the BiSEd Project at the University of Bielefeld)

The Bielefeld-Study on "Epistemological Beliefs and teaching Beliefs in the social studies" took place at the department of sociology of the University of Bielefeld.

In advance a 'large n'- analysis of students' epistemological beliefs using Schraw's Epistemological Beliefs Inventory had been done in the context of an empirical Master-thesis project investigating the epistemological beliefs of 168 social sciences students at the Bielefeld faculty (see for a thorough research report: Matthias 2010). At the aggregate level this study had yielded significant effects with two epistemological dimensions when comparing freshmen, sophomore and seniors in social studies teacher education: It was established that pre-service students tended to believe more in the simplicity of knowledge at the beginning of their university career than advanced teacher students (junior and senior students, Ibid.). But the general picture was quite consistent with the above mentioned theories of domain beliefs: Most of the students hold "typical" domain specific views on humanities' knowledge being oriented towards a more relativistic epistemological position. Furthermore, freshmen have been found to have a strong belief in innate ability while senior students tended to believe that the ability to learn can be acquired. The comparison of students studying a science subsidiary with students exclusively enrolled in social sciences' subjects revealed that "hard" science oriented students believed significantly more in innate ability than students studying topics in the field of humanities (Ibid.). A methodological conclusion drawn from this analysis was that at this point it was very difficult to substantiate the specific character and content structure of the domain beliefs and attitudes when using domain general instruments like EBI. It seemed that for teacher education as well as for research purposes is was necessary to learn more about the consistency of the different levels of sophistication and the possible effects of epistemological beliefs on prospective teaching and learning attitudes.

As a result we decided to choose a more qualitative approach for the Bielefeld-Study, although data gathering and evaluation is challenging when research aims at comparing diversity in a not only small but moderate number of cases. We agreed then to create case sets to asses typical configurations, which will be administered (using the qualitative data analysis software MAXQDA) for constructing a comparative case analysis following the Configuration Frequency Analysis CFA (the presentation of this part of the analysis is beyond the scope of the present paper). Due to organizational restrictions the project had to be organized using professional accesses to a group of students the author worked with on a weekly base during the winter term 2010/2011. The instruction consisted of two separate classes, 45 hours/15 weeks in total, 15 of which were framed as a classical lecture and 30 hours as teaching sessions featuring exercises, discussions, games/experiments and student presentations. Answering the paper and pencil questionnaires was part of the ECTS-teaching portfolio.[9] Students' majority was enrolled in a BA teaching cycle, most of them in sixth semester. Only very few students had first teaching experiences in the social studies domain, more than half of the students intended to be a teacher at German Gymnasium/Gesamtschule. The socio-demographic structure of the group was quite representative for the clientele of the Bielefeld polyvalent study cycle in social studies education, so that at this level most of the students were novices with regard to social education didactics, had a good academic content knowledge base and fewer teaching and school experience.

9 Anonymity and student data integrity were observed since the administration of data was carried out by a third person not involved in this teacher educator-student-relationship.

Fig. 2 Overview of the Survey

N =	61
Gender:	
Male	37
Female	24
Average Age	24,3
Average number of semesters at university	6,9 (SD=3,30)
Average number of semesters in social sciences	4,22 (SD=2,10)
Section of Studies	
BA GHR	18
BA GY/GE	35
MA GHR	3
MA GY/GE	4
Majors and Minors	
BA Subsidiary Social Studies	24
BA Major Social Studies	27
New Subject MA	4
Third Subject	5
Teaching Practice Social Sciences	4
General Teaching experiences	42

After having split up the basic group in two subgroups a kind of 'intervention study'-research design could be established: The entire group participated at the lecture while only half of the students participated at the author's teaching sessions that highlighted metacognition and accompanying reflection tasks about own learning processes, about preconceptions on social studies teachers and students and more. All activities intended to enhance self-regulation and motivation in order to reflect on the social studies education program. The control group participated at a conventional teaching format on the same topic, the basics of the social studies education didactics.

In order to gain a multi-dimensional assessment about what an individual pre-service teacher in social studies education beliefs about teaching and learning as well as on his epistemological stances with regard to academic knowledge and schooled knowledge, a set of different paper and pencil methods were used combining different qualitative research tools.

1. A questionnaire with open ended questions aimed at assessing (see Annex 1):
- epistemological beliefs about social science in general (beliefs about social science content knowledge);
- epistemological beliefs about social science schooled knowledge (beliefs about specialized content knowledge for teaching);
- the perception of the qualities of a teacher, which are essential for being a "good" social studies teacher (pedagogical knowledge of content and teaching).

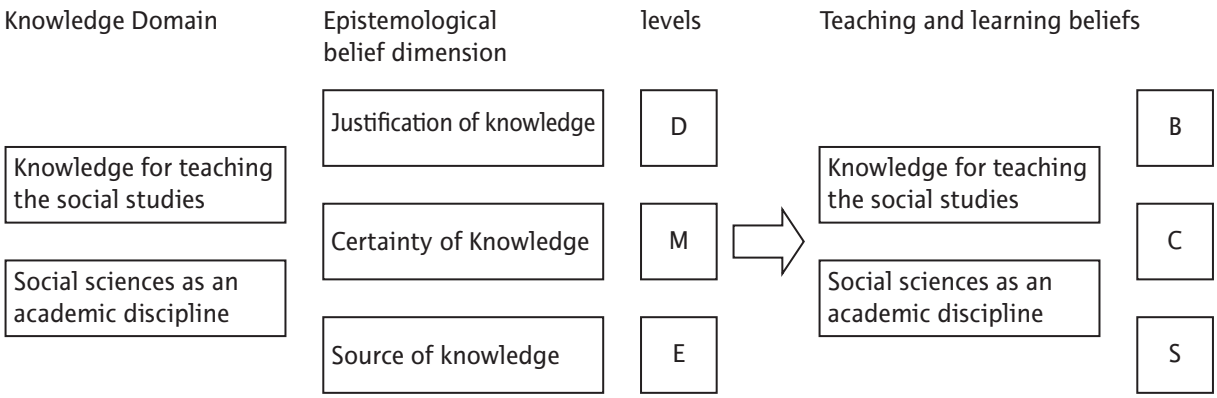
2. Metaphors to assess pre-service teachers' beliefs about teaching and learning social studies (see Annex 2, domain specific teaching and learning beliefs);
3. A questionnaire with open-ended questions assessing prior school experiences (as students) about striking school experiences during a social sciences class: Description and analysis of a "critical" situation in a social sciences class which the students have experienced during their school career or - if they cannot remember - an artificially constructed "problematic" situation; for the assessment of preconceptions and biographical experiences in the domain of social sciences (see for a methodological discussion of this research tool: Fischler 2001);
4. we combined then these assessment tools with a diagnosis using a concept map (Ritchhart et al. 2009), asking how the social sciences classroom knowledge materializes through learning processes (beliefs about learning the social sciences);
5. finally we explored some socio-demographic basic data like age, gender and enrollment and tested the development of declarative pedagogical content knowledge of students enrolled in the author's study group.

The assessment took place twice, at the beginning and at the end of the winter-term.[10]

The first step of the analysis (uniquely presented in this paper) consisted of an exploration of epistemic beliefs and the characterization of descriptive anchors for confining different levels of dogmatism-multiplism-evaluativism of teacher students with regard to the social science scientific knowledge and schooled knowledge. We focused on the dimensions such as asserted by Hofer et al. certainty of knowledge, source of knowledge and justification of knowledge (see for the substantiation of beliefs' facets 2.2).

10 This research design will last but not least allow assessing the learning dynamics of students exemplifying different types of epistemological and teaching beliefs structures at the individual level in different university teaching contexts (the final results of the entire project will be presented in 2012).

Fig. 3 Model for Analysing the Association of Domain Specific Epistemological Beliefs and Teaching and Learning Beliefs



epistemological belief levels
D – dogmatism
M – multiplism
E – evaluativism

domain specific teaching and learning beliefs
B – behaviorism
C – constructivism
S – cognition as a social process

The second step consisted of analyzing the innate beliefs on teaching and learning in the social studies domain. At this point the first classification process was oriented on the Martinez et al. approach as a basis scheme for a first sorting of metaphors and on the knowledge beliefs dimensions following the scheme (as presented in Chap. 2.2, p. 55) for a first categorization of teaching and learning beliefs. After that, even though I wanted to explore the potential relations between epistemological beliefs and beliefs about teaching and learning I effected a case selection on the dependent variable: What are the eminent metaphors characterizing different groups of students at different levels of their university career? It was quite surprising to see – at any educational level – a vast amount of metaphors showing a relatively pure orientation on behaviorist beliefs about teaching and learning. This was completely contra-intuitive and challenged the first assumption, that our students should be constructivists oriented, given the relativistic epistemological beliefs found when their epistemological beliefs – admittedly based on a different students' population – were first analyzed in 2010 by Stephanie Matthias (see above).

It seemed to be adequate then to continue theoretically sampling the 61 instances to find anchors for very typical and very atypical patterns of relations between epistemological beliefs and teaching and learning beliefs in social studies education. The classification efforts enhanced the ordering and clustering of cases presenting specific features and combinations of categories relevant to a verification of the initial theoretical assumptions. Following Silverman (2006: 308) I focused on special features: 1) choosing cases in terms of our initial assumptions; 2) choosing "deviant" cases; 3) changing the scope of the present set, including *all* dimensions, I initially wanted to consider at the end of the research (preconceptions and crucial school experiences as well as concept maps on knowledge acquisition in social studies) process. Presenting the entire procedure and results is definitely beyond the scope of this article that focused on domain beliefs' theory and on the pertinent methods for diagnosing the teaching and learning beliefs. I will therefore just present two configurations as emblematic examples for a freshman ("Julia") and a senior student ("Alexander"). Figure 4 displays selected core features of the two emblematic cases: Due to space restrictions I focus on a few anchors and on the analysis of the teaching beliefs gathered round the metaphors "stamp album" (senior student") and "gardener" (freshman).

Fig. 4 Alexander (Advanced Student): "Teaching Social Studies Reminds Me of Collecting Stamps…" (The Stamp Collection Metaphor)

	Senior Student (Alexander)	Freshman (Julia)
I Epistemological beliefs		
I.1 Academic knowledge	*"Social science knowledge comprises topical issues and societal phenomena and echoes theses and models of classical sociologists like Max Weber or Niklas Luhmann, as their knowledge is of enduring and universal relevance."*	*"Social science knowledge has a strong practical orientation (e.g. everybody has to deal with economics in one's life course). It is marked by topicality and constant change (e.g. media constantly update our knowledge, topics like politicians and elections can change when a politician resigns from office) […] Knowledge emerges from the daily confrontation with topics reflecting social sciences issues in the media, within the family, at school etc."*
Anchors		
Source	*_ knowledge is canonical and uncontroversial; authorities have the right answers.*	*_own experience echoed in the media: a scientific comprehension is not yet anchored*
Justification	*_ there is a need to justify knowledge: using theories is a decent way to get valuable answers*	*_knowledge is experience, not reasoning; there is no need to justify knowledge*
Certainty/Structure	*_social science knowledge is structured, stable and universal: social reality is subordinate to scientific perspectives*	*_social science knowledge is malleable, changes constantly, definition from ones owns perspectives, media relate reality*
Categorization	*dogmatism: social science knowledge is fixed knowledge*	*realism: knowledge is a photographic picture of reality, no epistemic awareness*
I.2 Knowledge for teaching	*"Social studies teacher knowledge originates from personal experience and from experiences related by others. Moreover, it originates from academic knowledge which is taught at the university."*	*"Studies in social sciences, internships, own learning by means of newspapers, news and specialist literature. A sound domain knowledge (e.g. theories etc.). Permanent teacher training to be able to discuss current issues. Essentials in didactics, so that a teacher is able to transmit knowledge.*
Anchors		
Source	*_ restricted autonomy: own experience plays a role, experiences of others and from books are more valuable*	*_ training and knowledge acquisition, valuable academic sources and media; own experience as second order experience/observation (internship)*
Justification	*_ knowledge is experience and academic education*	*_ knowledge is above all skills, legitimized by a professional function: transmission*
Certainty/Structure	*_ experience and education remain unrelated, no specific content knowledge or pedagogical knowledge for teaching*	*_content knowledge for teaching is based on actuality; teaching knowledge is based on learning 'theories' and on training*
II Teaching beliefs	*"stamp album" – container metaphor*	*"garden" – growth metaphor*
II.1 Teaching beliefs	*teacher – "philatelist"* *student –" stamp collector"*	*teacher – "gardener"* *student – "plant"*
Anchors	*"Learning and teaching is like a stamp collection, it is never complete and must always be updated […]. The teacher presents the "Michel" catalogue – this catalogue contains almost all the stamps which have ever been published – to the students so that they get an impression of their range of motives and diversity. […]The teacher tells the students which are the fundamentals of philately by presenting the stamps which should be part of everybody's collection. Based on this instruction, each student develops his or her own interest in specific stamps; in the course of their collector's career."*	*"Students in a class can be compared with a garden of flowers. The students represent the bulbs which need care and attention in order to become flowers. The teacher is the gardener who takes care of the flowers and gives them all they need for existing. But the environment influences the students, namely their family, their peers (for the flowers the sun, wind) […].".*
Categorization	*teacher centered metaphor: teaching is helping to accumulate, to value and to display knowledge; learners have to acknowledge the value of knowledge*	*extremely teacher centered metaphor: getting control/influence and caring play major roles, knowledge and learning are of minor importance*

The first case represents a freshman, Julia. Julia is enrolled into the second year of the social studies teacher education program. She has thus made first steps into the academic world studying the "disciplines" (sociology, economy and political science) and is now entering the genuine teacher education program, namely the social studies didactics. Interestingly, she has not yet adopted any metacognitive position with regard to her most recent educational experiences. It is curious to note that there isn't any cognitive anchor reflecting a prior initial propaedeutic science work either, which would be typical for the higher secondary education in Germany ('Gymnasium'). Julia focuses entirely on her own "real world" first and second hand ('media-related') experiences to delineate the field of social science and its related knowledge domains. In her view people 'know' economics because they have to take economic decisions through the course of their life. For her 'economic learning' matches 'economic socialization' and has less to do with academic knowledge acquisition. The academic as well as the educational dimension are strikingly absent in her first vision of knowledge related to the socio-economic and the political sphere. Therefore the metacognitive level of reasoning and cognitive processing are not fully activated. There is no epistemic awareness vis-à-vis the university teaching and learning: Since her knowledge emerges from current day-to-day experiences and media evidence, she has a fairly unstable/multiplist vision of the sources and the structure/certainty of social science knowledge. Since these qualitatively different kinds of knowledge-sources remain strictly implicit, a core dimension for epistemic reflection ("justification of knowledge") is thus deficient. The first academic experience is not at all part of her reflection about the different kinds of "knowledge" essential for being a social studies teacher. This is especially true for the epistemological beliefs' dimensions with regard to the disciplines and to schooled knowledge. Concerning the pedagogical teacher knowledge dimensions her perspective is uniquely focused on the practical implications of knowledge production (procedural knowledge for teaching, theories helping to develop teaching skills for transmitting knowledge). Hence, the pedagogical knowledge facets reverberate the academic context of knowledge acquisition, whether the disciplinary content knowledge acquired since school is absent or overlaps with day-to-day experience in the field. Do these not yet fully developed epistemological beliefs link to specific teaching and learning beliefs? For illustrating her perspective on teaching and learning the social studies Julia activates the "gardener"-metaphor, which counts among the teacher-centered metaphors. The "gardener"-metaphor points to the nurturing and caring aspects of the teaching profession. It develops around the vision of a benign educator, who emotionally takes care of his students and tends to develop the "whole person". The learner perspectives as well as the teacher-learner-interaction are blurred since the metaphor implies a great deal of pedagogic control over the student and his development: The metaphor entails the passivity of learners, who cannot move, but only grow. They are static and in a way have to surrender to the teacher-gardener. It is no coincidence that the domain specific dimension is completely absent in the metaphorical vision of Julia. Leaving out the domain learning and teaching, the gardener metaphor mirrors the pedagogical impetus of new pre-service teachers with very few academic experiences. This typical vision emulates the lacking epistemic awareness of Julia, who is not yet able to reflect her academic educational experiences metacognitively. Basically she is not yet "arrived" at the university while she is quite sure of her professional choices and orientations. The gardener metaphor generally contains no domain specific vision of teaching and learning – and therefore no epistemic stances –, because the instructional dimensions of the teaching profession aren't dominant facets of this metaphor. Finally Julia's vision of the teaching profession is a stance that is typical for a beginner at a teacher education program (female teacher students frequently choose the gardener metaphor, see further examples Alger 2009).

The second case, the 'Alexander'-case, is chosen for being emblematic for an advanced student (fourth year of teacher education program). As Alexander has already completed a great part of his academic education studying the 'disciplines', he may serve as an emblematic case for being an advanced 'academic' on his way to being a professional teacher. Like other advanced students participating at our analysis Alexander – answering the open questionnaire – seemed to have reached a higher level of epistemological beliefs. This seems to be true not only with regard to the academic discipline (domain specific content knowledge), but above all with regard to domain specific schooled knowledge and perceptions about what makes a "good social studies teacher" (not in fig. 4). Compared to most of the freshmen participating at our study Alexander displays a consistently higher level of epistemic awareness: He is able to stress a clear cut distinction between different knowledge types, namely between schooled knowledge and scientific knowledge. He is as well able to differentiate specific characteristics of schooled knowledge, because he puts an accent on the interdisciplinary and applied character of knowledge when it is constructed in a perspective of teaching and learning objectives typical for the social studies. With regard to the purely academic knowledge he is willing and able to consider the role of theory and of methods for the creation of quite diverse/multiple perspectives on social, political and economic realities. But finally it is not fully comprehensible, how much he would be able to adopt evaluati-

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vist attitudes, when conflicting assessments typical for the unstructured social studies domain are at stake. He seems to be capable to replicate different theoretical positions, but in a way "authorities" (like the above cited Luhmann and Weber) have answers, which are difficult to assess. What about Alexander's teaching and learning beliefs as mirrored by his metaphorical narrative? The chosen metaphor strikingly reflects the very last aspect of Alexander's epistemological stances. Alexander chooses a container metaphor, "the stamp album", which equally counts among the teacher-centered metaphors. The metaphor describes teaching and learning as a process of knowledge accumulation and storage. The teacher enhances the accumulation process, first being an instructor, and then being a supervisor of students' collecting activities. Basically the album-metaphor points to the fact, that knowledge may be ranked, categorized and displayed to third persons. In Alexander's metaphor the teacher is central to this process as his evaluative stances are central to the decision about knowledge being valuable or not. The metaphor in a way reflects the authoritative vision of knowledge conveyed by authorities like Weber and Luhmann that Alexander describes in his epistemological beliefs' assessment. There is thus a latent contradiction between his statement that schooled knowledge should be of "practical" value in a student's perspective, and at the same time – see his metaphorical statements – underlining the role of the teacher as a gate keeper who decides about what students learn. On the other hand the open questionnaire confirms a special feature of Alexander's pattern of beliefs (not in fig. 4): Namely that social science knowledge is general knowledge that has a distinctive character with regard to the social value of education in general (knowledge as a precious stamp album that can be exhibited and revalues the owner). The Alexander case sheds a fairly refined light on the difficulties to connect advanced epistemological beliefs about social scientific content knowledge with the pedagogical content knowledge perspective: At a declarative level Alexander would be able to formulate positions that a teacher educator may even categorize as being more or less satisfying in view of typical standards in social studies teacher education preparation classes. Consequently Alexander's deeply rooted beliefs would remain unchallenged and therefore unchanged. This complex picture, which has lots of aspects not displayed in Fig. 4[11], highlights that the reconstruction of a pattern of beliefs including metaphors' analysis allows complex conceptualizations that illuminates aspects, which otherwise would have remained undetected.

11 E.g. Alexander's impressively negative school experiences and a concept map about learning the social studies, which confirms the distinction between academic and schooled knowledge that enhances social reputation and social/political real-world knowledge.

5. Conclusions

Especially the Alexander case (like several other case vignettes) appears to be a strikingly convincing example with regard to the methodological aspects of diagnosing beliefs and conceptual thinking using metaphor analysis. It displays a quite typical pattern which fully ratifies the methodological advantages of metaphor analysis. It would certainly be an exaggeration to proclaim a "linguistic turn" in qualitative educational research. But as the weaknesses of quantitative empirical research on beliefs and attitudes were obvious and difficult to circumvent, the metaphor analysis seems to be a promising step to complement existing approaches and to gather qualitatively deeper insights into the conceptual and/or domain specific pedagogical thinking of teachers (and learners?). There is certainly a tradeoff between the possibility to get a 'thick' description of configurations of a medium number of cases and the call for more quantitative analyses to assess the hard casualty assumptions related to teacher beliefs research and epistemological beliefs research in general. Figure 5 displays core methodological advantages and shortcomings with regard to the present approach to teacher education research in the social studies domain.

Fig. 5 Strengths and Weaknesses of Metaphor Analysis as a Tool for Diagnosing Beliefs on Teaching and Learning in Social Studies Education

Strengths	Weaknesses
Research outcomes of metaphor analysis are ?thicker? and ?truer? than those resulting from questionnaires. It is easier to 'lie' when filling out a questionnaire, above all in contexts, where participants are themselves more or less experts in empirical social research.	Data handling is a problem. Further methodological research is useful and may be unavoidable: Good theoretical sampling is a premise.
Research results are open to debate and to didactical reconstruction; the participatory research perspective is contained within metaphors' research as it builds bridges between theory and practice.	Research is not replicable; results will always be exposed to severe methodological critiques seen the substantial impact of situational factors within different research settings.
Deeply rooted beliefs can be made visible, that constitute archetypical representations of professional thinking: The contribution to professionalization research is useful even in view of future large n-analyses.	Metaphors are a spotlight on conceptual frames and for that reason may filter other important elements that would be equally important.
Metaphors can build bridges between implicit and explicit knowledge.	There are too many existing metaphors, above all in the field of teaching and learning, which makes it difficult to discriminate diverse categories and to distinguish general beliefs about teaching and learning from domain specific beliefs.

In a theoretical perspective it is striking to note and a major theoretical challenge, that in most cases the metaphor analysis (the teaching and learning beliefs assertions) and the epistemological assertions are consistent: In both cases presented in this paper, the students' metaphorical assessments reflect very important aspects of their epistemological beliefs. In the second case the beliefs were clearly domain specific, in the first case, there was a distinctive pattern of puzzling teaching and learning beliefs being extremely domain general. The metaphor analysis helped in both cases to display special belief facets that point to a deeply rooted problematic that is mirrored in the epistemic cognitions and as well as at the level of metacognitive awareness of the students, the senior and the freshman. The framework for analysis presented in fig. 3 and the methodological operationalization using the metaphor analysis seem therefore to be a promising approach to illuminate the effects of epistemic cognitions on the beliefs about teaching and learning in the social studies domain. The most basic assertions about the domain beliefs and the interconnectedness of disciplinary epistemological beliefs and beliefs about schooled knowledge/ knowledge for teaching seem to be at least very plausibly interconnected. Epistemological beliefs and teaching and learning beliefs have distinctive features that vary according to other aspects as well: First insights into the pre-service teachers' preconceptions and prior school experiences give clues that this line of research will constitute an especially promising branch of future research in the social science domain.

6. Annexes and References

Annex 1

Beliefs About Content Knowledge (Domain Knowledge) and About Knowledge for Teaching (Pedagogigcal Content Knowledge)

Instrument: Open Ended Questionnaire

1. *What are the characteristics of knowledge in social sciences? Please give examples illustrating your view.*
2. *How do you think develops knowledge in social sciences?*
3. *What kind of knowledge do you need as a teacher for the school subject "social studies"?*
4. *How does this kind of teacher knowledge develop for teaching the "social studies"?*
5. *Which qualities do you think should a social studies teacher have?*

Annex 2

Beliefs About Teaching and Learning the Social Studies

Instrument: Metaphor Analysis

Please create a short metaphor story which expresses your perspective on teaching and learning in the school subject „social studies". Your description should be as detailed as possible. The following example is supposed to demonstrate how such a metaphor could look like:

"A teacher is like a candle. He burns himself out in order to show the way forward to his students..."

"Teaching and learning the social studies is like building sandcastles on the beach. The teacher represents the ocean and its waves, while the students decide themselves the distance of their sandcastles towards the ocean."

You should take into account the following aspects when constructing your metaphor:

a. Which roles do you attribute to the figures/characters of your metaphor representing the main actors at school in your metaphor (teachers, students, etc.)? Who is very active? What is the metaphorical relationship between the subject matter and the actors?
b. What kind of tasks do you associate with the attribution of the roles (in a metaphorical sense)?
c. Which effects does the behavior of the actors have?
d. What is the possible impact arising from these effects?
e. Which role does the environment of the students play in your metaphor (parents, peers etc.)?
f. What kind of disturbances do you expect and how do the figures of your metaphor react?

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