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Research Designs of Subject-Matter Teaching and Learning

Ulrich Riegel & Martin Rothgangel

Abstract

Research on domain-specific teaching and learning has experienced an enormous upswing in the last twenty years. For a further development of this research it would be beneficial if certain clusters or research designs would be elaborated, which are typical for research on domain-specific teaching and learning and which stimulate and orient new research projects. This article addresses this question on the basis of a study in Religious Didactics. First, it discusses the use of the concept of research design to establish a cluster of relevant research procedures (1.). Then the results of the study will be described, namely that such designs are characterized by a) the theories, they refer to, b) the subject area they address, and c) the methodologies they conduct (2.) It will be generalized beyond the field of Religious Didactics and seven potential designs of research on domain-specific teaching and learning will be sketched (3.) An invitation to reflect this question further on ends this article (4.)

1 The problem of research designs in the academic field of subject-matter didactics

In many European countries subject-matter teaching and learning are analyzed and reflected by a genuine academic discipline which is called by a compositum of the subject this discipline refers to and the term *didactics* (Rothgangel & Vollmer, 2020). For example, the discipline dealing with teaching and learning in mathematics is called *Mathematics Didactics*, the one in geography *Geography Didactics*, etc.[1] The composite structure of theses disciplines' labels corresponds with the composite nature of their academic business. For example, scholars from *Mathematics Didactics* have to be well informed in mathematics as well as in education since their subject of research is teaching and learning in mathematics. At the same time, they are neither fully integrated into the academic discourse of mathematics nor into that of education because their expertise is neither mathematics as such nor education as such. They form an academic discourse of their own (Bayrhuber, 2011; Bayrhuber et al., 2017).

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[1] We are well aware that *didactics* in the anglo-american dicsourse is stongly associated with methods of teaching. In the discourses that refer to the German concept of *Didaktik*, however, this term includes all aspects of formal learning in a professional context. In English, often the term *education* is used to express this issue, like *Mathematics Education*. Since such education might also include aspects of non-formal or even informal learning, in this text we stay to the label d*idactics* to indicate that the following considerations are valid in the context of formal learning first of all.

Sometimes the composite nature of these disciplines causes problems. One of the major ones is the question of the nature of research in subject-matter teaching and learning (Komorek & Prediger, 2013). In Germany, for example, this type of research still is not acknowledged as research sui generis by the German Science Foundation which funds a huge portion of academic research. Relevant research proposals have to be submitted via the channel of educational research. The latter, however, is predominantly engaged in general aspects of teaching and learning and subject-specific aspects of this business are not in the center of their attention. A correlate of this organizational mismatch is the fact that there is no – not even informed – consensus on distinct research designs of subject-matter didactics (Bayrhuber et al., 2012). Often handbooks of research in sub-ject-matter didactics have to refer to methods from educational sciences (cf. Krüger et al., 2014), well aware that methods are only one aspect of research designs. This di-lemma made the German *Gesellschaft für Fachdidaktik* (Association of Subject-Matter Didactics) initiate an exchange among the different subject didactics concerning their research practice and its conceptualization with the goal to reflect on such designs (Gesellschaft für Fachdidaktik, 2015).[2]

The term *research design* itself has been well-treated in methodological literature on scientific research (Creswell & Creswell, 2018; Gorard, 2013; Miller & Salkind, 2002; Spector, 1981; Vaus, 2010). Basically, a research design integrates the different compo-nents of a study in a comprehensive and coherent way to ensure that the study answers its research questions as unambiguously as possible. It ensures the quality of a project, organizes the entire program of this project, and warrants that its conclusions are relia-ble. Therefore, a research design is more than the methods of a project (Vaus, 2010, pp. 9–11). Three elements mark its character, namely the research problem, the re-search question, and the purpose of research (DeForge, 2010).

The position paper GFD call refers to this discourse without mentioning it explicitly. "A 'format of subject didactic research' (*fachdidaktisches Forschungsformat*) is defined as the totality of all content-related, methodological and organizational research aspects which can be described in the planning, implementation, evaluation and exploitation of results of a subject didactic research project [...]. These include, among other things, theory-related aspects, interest in knowledge, methods of investigation and evaluation, and procedures for using the knowledge gained." (Gesellschaft für Fachdidaktik, 2015, p. 2) Although the GFD translates the English term *design* into the German term *Format* it clearly refers to the characteristics of research designs when highlighting that such *formats* are more than just the application of a method, but encompass the whole of the research process, within which the method or methodology respectively represents one formatting element among others. The use of the term *Format* by the GFD, how-ever, does not only reflect a problem of translation. It also reflects the notion that the term research design is primarily used within an empirical context to distinguish quanti-tative designs from qualitative ones and from mixed-methods designs (Creswell & Creswell, 2018; Gorard, 2013). Adopting the term *design* for research in subject-matter didactics therefore might induce an understanding that this research is of empirical

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2   Note that the GFD uses the term *Forschungsformat* which literally translated would make up *research format*. The tricky relationship between the German term *Format* and the English term *design* in the context of research will be discussed in a following paragraph.

nature only. But research in subject-matter didactic contexts comprise more than just empirical research which is clearly addressed in the paper of the GFD by suggesting also other formats like that of historical research (Gesellschaft für Fachdidaktik, 2015, pp. 5–11). As in consequence, the GFD decided deliberately not to use the English term of *research design* in its call but to coin the new term of *Forschungsformat*.

Reflecting about *Forschungsformate* in an English text, however, causes the problem that the translation of *Forschungsformat* into *research format* has no reference in the English discourses. It would mean to establish a new term in this discourse. Translating *Forschungsformat* as *research design* is not without problems either, as previously indicated. Faced with this dilemma, we have decided to use the term *research design* nevertheless, because it refers to an established term. We are well aware of the distinct empirical background of the relevant discourse. At the same time, we are convinced that it is possible to broaden this background without losing the basic meaning of this concept, namely to identify clear patterns that can organize the entire program of a research project.[3] By staying with the term *research design* and expanding it for our context we refer to the missing gap identified by the GFD, namely that well-defined approaches, patterns or *designs* for research in subject-matter didactics are still missing.

Testing this notion by a quick scan of the few reflections on research designs existing in the field of subject-matter didactics in Germany supports this desideratum. In *Political Didactics*, for example, a distinction is made between research a) on the theoretical basics, b) on the prerequisites and conditions, c) on the processes and d) on the results of teaching and learning (Petrik, 2016). The rationale of this categorization clearly is the process of teaching and learning in politics that has been broken down into its components and uses the identified aspects as the starting point for a research design. In *Music Didactics* the three types of a) music didactic basic research, b) music didactic developmental research and c) synergetic learning field research are discussed (Rolle, 2012). Here, too, general aspects of teaching and learning are at the center of the particular designs. These general aspects, however, are situated in the particular field of research by the term of *music didactic* which of course causes some tautological effect. Coming from *Mathematics Didactics*, Leuders proposes the following three formats: a) subject-matter teaching-learning research, b) subject-related didactic development research and c) teacher training research (Leuders, 2015). This logic is based on characteristic discourses within subject-matter didactics, namely the teaching and learning processes themselves, the development of such processes and the training of the persons involved. Then, Wiesemann and Wille describe three research formats for the teaching of *Sachkunde*, a subject in German primary education that covers the various aspects of natural sciences, namely a) the reconstruction of primary school children's perspectives on subject areas, b) didactic reconstruction and c) conceptual change research (Wiesemann & Wille, 2014). All three concepts start with the children's perceptual processes and relate them to various aspects of teaching and learning. Then, in a recent analysis of self-portraits of 17 subject-matter didactical disciplines Rothgangel could not identify a list of common research designs across all these disciplines (Rothgangel, 2020,

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3   For example, tutorials of US-American universities use the term of research design to address all sorts of academic research and therefore also list research designs that are not of empirical nature (fi. https://library.sacredheart.edu/c.php?g=29803&p=185902).

pp. 535–549). Even more, it became clear that a research design in the analysis of domain-specific teaching and learning is often understood in terms of methodology only. Finally, Riegel and Rothgangel (2020a) determined the theories used in the project, the subject of research, and the methodology used in the project as three dimensions that characterize a research design in *Religious Didactics*. This quick scan of relevant reflections reveals a broad spectrum of approaches to the formulation of characteristic research designs within subject-matter didactics. Not to mention that none of the described proposals contains a comprehensive list of possible designs.

This notion is even more intriguing since such spectra of research designs seem to depend to some extent on the discipline in which the research is conducted. In sociology, for example, Leavy distinguishes the five designs of quantitative, qualitative, mixed methods, arts-based, and community-based participatory research (Leavy, 2017). In medicine a distinction between observational studies, clinical trials and assessments of medical factors is proposed (Indrayan, 2020). In economics there are field experiments, economic laboratories, program evaluations, structural estimation of behavioral models, identification of models of economic phenomena, and behavioral approaches to economic agency (Card & Ashenfelter, 2011). A handbook on educational research describes the designs of descriptive-survey research, experimental research, causal-comparative and correlational research, qualitative research, mixed-methods and action research, and program evaluation (Lodico et al., 2010). Though there are some similarities across the various lists of designs the particular spectrum of them seems to depend on the academic field in which research happens.

In summary, an informed consent on characteristic research designs in subject-matter didactics is still a desideratum. According to the discourse on research designs such designs are determined by the research problem, the research questions and the purpose of research. By expanding these three basic aspects of a project beyond the mere empirical methodology the subject areas, the theories to refer to and the methodologies to be applied are candidates of formatting dimension of research designs (Schecker et al., 2014). Given the notion that such research designs are sensitive to the academic field in which research is conducted this paper suggests an inductive approach to the described desideratum: to start the considerations on characteristic research designs within one particular discipline of subject-matter didactics, to summarize the relevant results, to generalize them in the horizon of the academic field of subject-matter didactics, and to invite scholars from other disciplines of subject-matter didactics to comment on these conclusions within the horizon of their particular discipline.

2 The discourse on characteristic research designs within the field of *Religious Didactics*

We started the sketched inductive process within our discipline, *Religious Didactics*. *Religious Didactics* is the discipline that analyzes and reflects religious teaching and learning at schools (Woppowa, 2018, pp. 20–22). In Germany, religious education is a regular subject of the school's curriculum and in most of the German federal states of denominational character (Rothgangel & Ziebertz, 2013). With about 60 chairs of religious education across the country the discourse on religious didactics is well institutionalized.

Research in *Religious Didactics*, however, is predominantly discussed in terms of theories or method(oligie)s than in terms of designs (cf. Leimgruber & Ziebertz, 2010; Rothgangel, 2012). There are only few publications that – partly – refer to designs of research in religious didactics (cf. Schambeck & Riegel, 2018, pp. 107–195). These few publications are far from offering comprehensive lists of such designs.

To get a basic idea of potential research designs within this discourse we conducted a study starting with the realm of *Religious Didactics* (Niederberger & Renn, 2019). To prepare this study we applied document analysis on the handbooks on *Religious Didactics* published in Germany since 2000 (Bowen, 2009). In a first step these handbooks have been analyzed according to their structuring principles. Comparing these principles, both characteristic research questions and typical subject areas of research in *Religious Didactics* have been identified. In a second step of comparative character nine typical tasks of the discourse of *Religious Didactics* have been concluded, namely i) historical research, ii) reflecting the scientific nature of the discipline, iii) elaborating theoretical concepts, iv) (re-)constructing the subject areass of religious learning, v) comparative research; vi) research on the profession of teaching religion; vii) analyzing the attitudes and pre-concepts of the students; viii) evaluating the effects of religious teaching and learning, and ix) design based research (Riegel & Rothgangel, 2020b). These characteristic tasks form potential designs of research in *Religious Didactics*.

For the first step of a future Delphi study we asked nine colleagues from *Religious Didactics* with particular expertise in the relevant task to discuss whether and how this task might form a research design of this discipline. The colleagues have been invited to consider the following four questions:
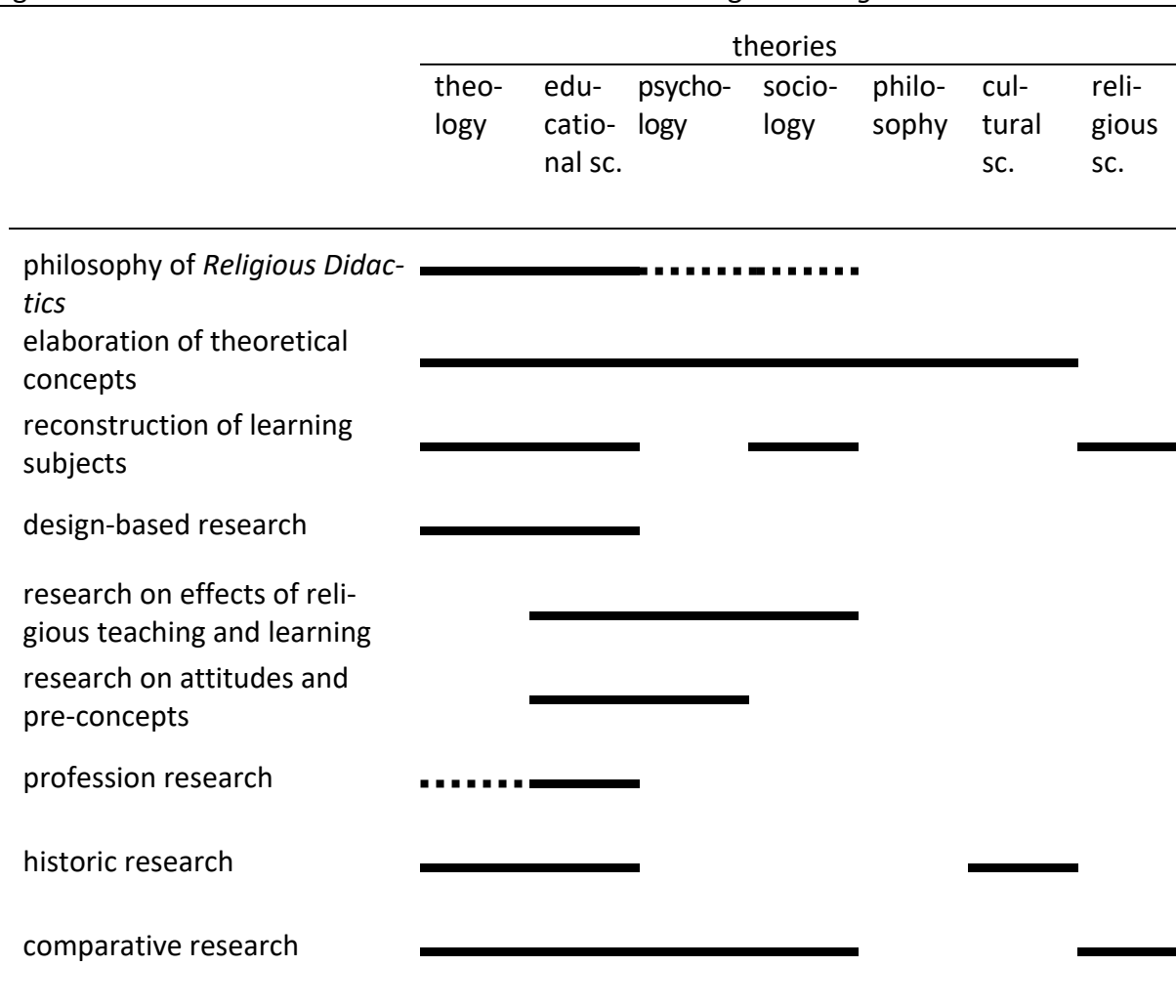
1) Which are the essential theories *Religious Didactics* refers to to accomplish the relevant task?
2) What are characteristic subject areas to be analyzed by accomplishing the relevant task?
3) Which methods or methodologies respectively are applied to accomplish the relevant task?
4) Do theories, subject areas and methodology form a particular research design?

The colleagues' answers to these questions have been published in a special issue of *Theo-Web. Academic Journal of Religious Education* (2020/1). Comparing these answers brings about that there are seven relevant theoretical frames of reference to research in *Religious Didactics*, namely theology, educational sciences, psychology, sociology, philosophy, cultural sciences, and religious sciences (see. fig. 1)[4]. Within this spectrum the educational sciences are the most relevant ones as every discussed design refers to them. Nearly as important is theology being of major relevance in six designs and on minor relevance in another one. Psychology and sociology have a major impact on four designs and a minor one in a fifth one. Finally, the cultural sciences and religious science has been referred to by two designs each. On the one hand, this result indicates the broad spectrum of theoretical references within *Religious Didactics (Ziebertz & Simon,*

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[4]   Note, the figures in this text are of heuristic nature. They do not reflect some quantitative calculus in the study. They are meant to visualize the qualitative findings.

1995, pp. 10–174). On the other hand, it matches the notion of many handbooks that research in this discipline predominantly happens at the crossroads of theology and educational sciences (Riegel, 2019, pp. 253–259; Schröder, 2012, pp. 164–179). This result further corroborates the notion of the composite nature of subject-matter didactics as previously described. In the case of *Religious Didactics* it is theology as discipline bringing in the particular subject[5] and educational sciences as common ground of all subject-matter disciplines that deal with teaching and learning.

Fig. 1: The Relevance of Theories within the Research Designs of *Religious Didactics*

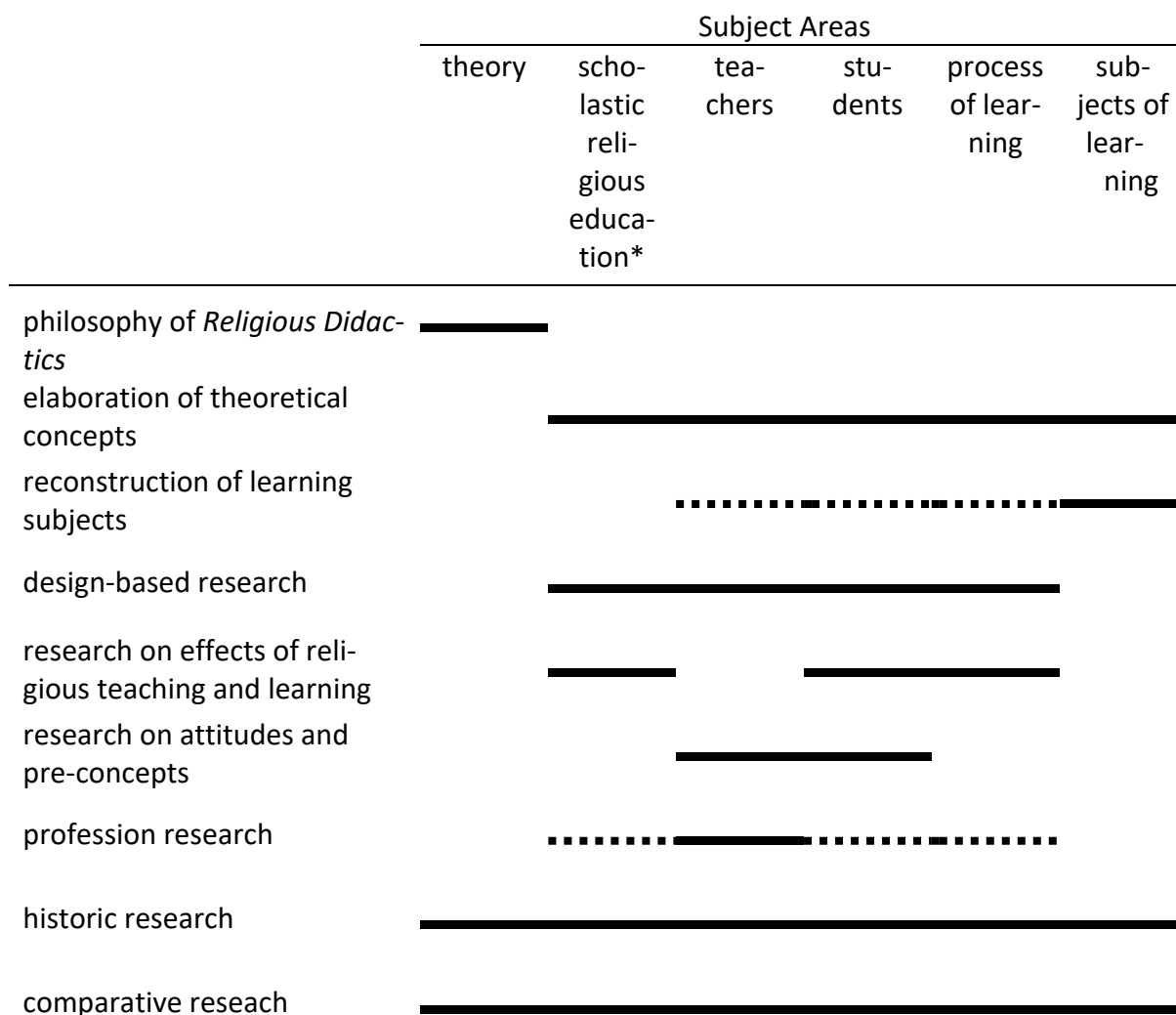|	theories						
	theology	educational sc.	psychology	sociology	philosophy	cultural sc.	religious sc.
philosophy of *Religious Didactics*	major	major	minor	minor			
elaboration of theoretical concepts	major	major	major	major	major		
reconstruction of learning subjects	major	major	major	major			major
design-based research	major	major					
research on effects of religious teaching and learning			major	major			
research on attitudes and pre-concepts			major	major			
profession research	minor	major					
historic research	major	major				major	
comparative research	major	major	major	major			major

Legend: sc. = sciences. Solid lines indicate a major relevance, dotted lines a minor one.

Regarding the characteristic subject areas of research in Religious Didactics comparative analysis of the contributions to the special issue of Theo-Web (2020/1) identifies six ones, namely scholastic religious education, teachers, students, processes of learning, subject areass of learning, and theory (see. fig. 2). The category of religious education includes the structure and nature of this scholastic subject as well as the conditions in

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5 Note that in other national contexts theology might have to be replaced by religious studies. Since religious education in Germany is of denominational character, theology is the relevant academic discipline. If religious education would be of non-denominational character religious studies would be the proper discipline.

which it is taught. Interestingly, there is no subject area that is dealt with in all the nine proposed research designs. The category of students is mentioned most often, in six designs as major aspect of research and in two further ones as minor aspect. Of similar relevance are the teachers, the processes of learning and religious education as such which are addressed in six to seven designs. Then there are two designs that might deal with every of the proposed subject areas, namely historic and comparative research. Thus, a minor sensitivity in regard of the subjects of research of *Religious Didactics* might be induced by the distinctive methodological character of both designs. Focusing pre-dominantly on methods will broaden the range of subject areas to be analyzed. The counter-design to this constellation represents the philosophy of *Religious Didactics*. By incorporating a meta-perspective on the discipline this particular design addresses only theory. A similar specialization can be seen in the designs of profession research and research on attitudes and pre-concepts which focus predominantly teachers or teachers and students respectively. Here it is the pronounced content-related character of both designs to induce this rather limited range of subjects under scrutiny.
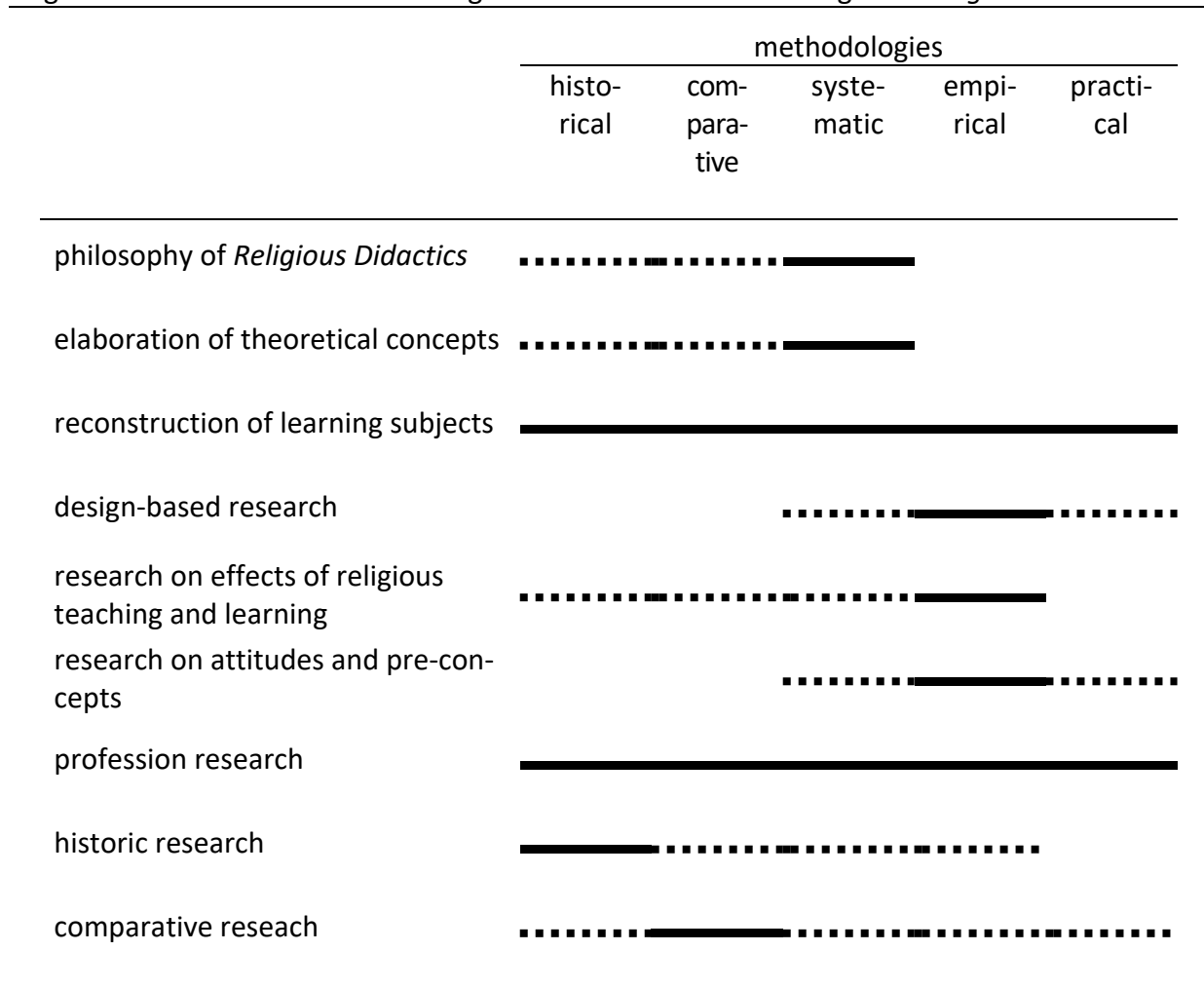
Fig. 2: The Relevance of Subject Areas within the Research Designs of *Religious Didactics*

	Subject Areas					
	theory	scholastic religious education*	teachers	students	process of learning	subjects of learning
philosophy of *Religious Didactics*	▬▬					
elaboration of theoretical concepts		▬▬▬▬▬▬▬▬▬▬▬▬▬▬				
reconstruction of learning subjects			▪▪▪▪▪▪▪▪▪▪▬▬▬▬			
design-based research		▬▬▬▬▬▬▬▬▬▬				
research on effects of religious teaching and learning		▬▬▬		▬▬▬▬▬▬		
research on attitudes and pre-concepts			▬▬▬▬▬▬▬			
profession research		▪▪▪▪▪▪▬▬▬▬▪▪▪▪▪				
historic research		▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬				
comparative reseach		▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬				

Legend: * = including the contexts and goals of this subject. Solid lines indicate a major relevance, dotted lines a minor one.

The methodologies to which the contributions of the special issue refer have been categorized according to a schema suggested by Schröder, who distinguishes between historical, comparative, systematic, empirical and practice-oriented approaches in Religious Didactics (Schröder, 2012, pp. 272–273; see also Rothgangel 2020, pp. 536f.). There are only two designs which incorporate the entire spectrum of possible methodologies, profession research and the reconstruction of learning subjects (see fig. 3). All other designs are characterized by a particular methodical approach which does not exclude a minor relevance of additional methodologies. In this regard it is a systematic approach to determine the designs of philosophy of *Religious Didactics* and the elaboration of theoretical concepts. Empirical methods are central to the designs of research on attitudes and pre-concepts, research on the effects of religious teaching and learning, and design-based research. As could have been expected, historic research predominantly refers to historical methods and comparative research to comparative ones. Focusing the methodological approaches, the empirical approach is the most relevant one coining the research of five designs in a major way. Of similar relevance is the systematic approach which determines four designs and informs five further designs. The less relevant one is the practical approach which might be seen as a fun-fact in a discipline which analyzes and reflects religious teaching and learning at school.

Fig. 3: The Relevance of methodologies within the Research Designs of *Religious Didactics*

	methodologies				
	historical	comparative	systematic	empirical	practical
philosophy of *Religious Didactics*	·············· ▬▬▬				
elaboration of theoretical concepts	·············· ▬▬▬				
reconstruction of learning subjects	▬▬▬▬▬▬▬▬▬▬▬▬▬▬				
design-based research			······ ▬▬▬▬ ·····		
research on effects of religious teaching and learning	··············· ▬▬▬▬				
research on attitudes and pre-concepts			······ ▬▬▬ ·····		
profession research	▬▬▬▬▬▬▬▬▬▬▬▬▬▬				
historic research	▬▬▬▬▬ ··············				
comparative reseach	········ ▬▬▬ ········				

Legend: Solid lines indicate a major relevance, dotted lines a minor one.

The final question of the study addressed the question of whether the colleagues would identify some research design underlying their task. Two colleagues have more or less not seen one. Interestingly, this notion refers to the two tasks that are particularly determined by a characteristic methodology, namely historic research and comparative research. Both colleagues missed an informed consent within *Religious Didactics* how to conduct relevant projects. The other colleagues tended to note a relevant research design, often with some limitations. Four of the mentioned aspects are of particular interest. First, the proposed research designs sometimes overlap. For example, the historical reconstruction of educational concepts with *Religious Didactics* is a task of both the philosophy of *Religious Didactics* and historic research. In this regard both research designs do not differ. This raises the question of how exclusive a research design has to be or how much overlap between two designs can be accepted to still distinguish between them. Second, often the colleagues ask for a category that determines the particular relationship of the formatting dimensions theory, subject areas and methodology. Some colleagues note that the research question does that job on the level of distinct projects and muse whether there could be some similar basic heuristic on the level of research design. This raises the question of which category is able to represent a basic heuristic that bridges theory, subject areas and methodology. Third, some colleagues refer to the not yet fully clarified relationship between *Religious Didactics* and *Religious Education*. Often *Religious Education* is seen as the overarching discipline and *Religious Didactics* as one of its sub-disciplines (cf. Woppowa, 2018, pp. 19–22). Similar constellations can be found in those subject-matter didactics whose educational practice does not exclusively take place at school, like music, sports or arts (Lange, 2014; Weidner, 2015). This raises the question of the institutional contexts in which subject-matter didactical research is conducted and how they determine the formulation of relevant research designs. Fourth, some colleagues address the particular nature of the subject teaching and learning refers to. For example, many aspects of religious learning cannot be determined thoroughly by educational technique. Even more, faith cannot be taught at all. Such aspects, however, are central to religious teaching and learning. Some colleagues ask whether such domain-specific particularities bring about domain-specific research designs. Others mention whether subject-matter research designs are able to cover the entire spectrum of teaching and learning in *Religious Didactics*. This raises the question of how sensitive subject-matter didactical research designs are to the particular domain in which they are conducted.

All in all, the first step of this study within *Religious Didactics* proofed the term *research design* – or the original German term *Forschungsformat* respectively – to be able to stimulate a fruitful debate on the basic structures of conducting research in this discipline. Although this study did not result in some consensus on such designs – not to speak of a comprehensive list of such ones – it brought about important clarifications of the term itself, the basic conceptual model of this term, and tentative sketches of various designs. For example, research designs in *Religious Didactics* are not restricted to empirical approaches as one could assume when scanning the proposed spectra of other disciplines like previously described. Additionally, it raised questions with the potential to bring forward the discourse on research designs.

3 Insights and consequences for the discourse on research designs in the field of subject-matter didactics

In the following paragraph we will generalize the insights from the discourse within *Religious Didactics* with the goal to further stimulate discussion about research designs in the field of subject-matter didactics. This will be done according to two steps: First, we will delineate some insights into the nature of research designs when being elaborated in the context of characteristic tasks of subject-matter didactics. Second, we will sketch some preliminary designs that might have the potential to be applied within each domain of this academic field.

3.1 Characteristics of research designs in the field of subject-matter didactics.

Generalizing the lessons learned from the study within *Religious Didactics* one may conclude:

1) The three dimensions of i) theories referred to ii) subjects of research, and iii) methodologies applied proofed to be able to determine the basic structure of a research design. They can be understood as formatting dimensions that establish the space in which research designs can be formulated. Each dimension delineates the spectrum of possible options according to its particular perspective. We suppose that the basic characters of these three dimensions (theories, subject area, methodologies) represent generic features that can be applied to every subject-matter didactics. It is the particular set of options on these dimensions that refers to the academic discourse in which research designs will be formulated.

2) Given the importance of these three formatting dimensions it might be worth analyzing whether the relevant categories found in *Religious Didactics* can be identified in other domains of subject-matter didactics, too, or whether additional categories emerge. Perhaps different historical backgrounds or domain-specific ratios result in alternative categories. In the long run of iterative comparative analysis across the various domains of this academic field a comprehensive categorization of each of the three formatting dimensions should be possible.

3) Focusing the dimension of theory, educational theories on the one hand and the subject-related academic disciplines on the other hand should form the two basic theoretical frames of references within each domain of subject-matter didactics. The correlation of each domain with educational theories might be used to look for common grounds across all domains of this academic area. The subject-matter disciplines might enter some difference in this discourse. Baumert's categorization of typical approaches to the world, however, could indicate sets of domains which at least share a common perspective on how to do things (Baumert, 2002).

4) The three formatting dimensions are significant in reconstructing the character of a research design, but their importance varies from design to design. Some designs are predominantly determined by the theories they refer to, others by the subjects of research, others by the methodologies in use. It might be interesting to check whether the importance of these formatting dimensions for a particular research design varies across the domains of subject-matter didactics. If so, the difference should be caused by

domain-specific factors. Otherwise a general reassessment of the idea of characteristic research design within the field of subject-matter didactics is needed.

5) The three formatting dimensions are necessary to describe the character of research designs, but they are not sufficient to do so. There is the need of an additional category that determines the correlation between these three categories within a research design. On the level of projects, the research question works accordingly. On the level of general approaches to reality the respective term might be Habermas' concept of *Erkenntnisinteresse* (1968). Research designs represent a meso level being more general than research projects and more particular than general approaches to reality. Therefore, a relevant category on the level of research designs is still needed. Perhaps one might call that category *basic purpose of inquiry*. Such purpose would be typical for all projects being realized within a distinct research design and would format the correlation between its basic dimensions, namely theories, subject areas and methodology. In this regard, however, further discussion is needed.

6) Research designs are sensitive to their historical, societal, political and institutional environment in which they take place. Like the denominational character of religious education qualifies theology as important theory to refer to in *Religious Didactics*, other subject-matter didactics might face similar conditional effects. There is for example a fair chance that the existence of clusters of excellence like the Leibniz-institute at Kiel influences the way research is done in the relevant domains. It might be worth to systematically look for such conditional effects across the domains of subject-matter didactics to get comprehensive insight into the factors that condition research in the field of subject-matter didactics and how they do so. First steps to answer this research question have been taken already (Rothgangel, 2020, pp. 469–494).

7) Research designs are of temporal character. They emerge over time and will also fade away when the conditions of research change.

3.2 The contours of potential research designs in the field of subject-matter didactics.

Based on these conclusions from this study we finally generalize those designs which have been acknowledged by the scholars within *Religious Didactics*. These contours are meant to stimulate the discussion across the various domains of subject-matter didactics about relevant designs which is intended to be the next step in the planned Delphi study.

Philosophy of the relevant domain of subject-matter didactics: This design serves to reflect the scientific foundations of the discipline. Its basic purpose of inquiry are epistemological and evaluative. Its tasks are the reconstruction of the historical development of the discipline, the modelling of its self-understanding in the relationship between theory and practice, the determination of its relationship within other subject-matter didactics and other scientific disciplines, and the explanation of the methodologies by which didactics in the relevant domain gains its insights. The research subject of this design therefore is the theory about the scientific practice within the relevant domain. In terms of methodology it follows above all a systematic-theoretical heuristic approach, but also applies historical and comparative approaches to the field of research.

Elaboration of theoretical concepts: This design is about theory building. Its basic purpose of inquiry is conceptual. The task of this design is to develop models of teaching

and learning in the relevant domain of subject-matter didactics. It elaborates concepts and determines the relationships between these concepts. The span of subject areas in this design is rather broad because it addresses all aspects of the domain which might be the relevant scholastic subjects as well as the conditions in which the subject is taught as well as the actors of teaching and learning as well as the processes of teaching and learning. Methodologically it is above all set up – at least within *Religious Didactics* – systematically-theoretically and thus in principle uses the same spectrum of methods as the philosophical design. The most important disciplines to refer to in this design are educational sciences and the discipline that addresses its.

Reconstruction of learning subjects: This design processes the elaboration and the editing of the content to be taught or learned respectively. Its basic purpose of inquiry is didactical. The tasks of this design are to determine the subject areas to be learned in the relevant scholastic subject and to reconstruct them in a way that they can be grasped by the students according to their possibilities of understanding. In terms of methodology, this design takes in experiences with teaching and learning as well as the results of research in the academic discipline that addresses the relevant subject matter. Both sources of insight will be transferred to presentations of the research subjects that are applicable in the relevant scholastic context. The reconstruction of learning subjects is thus located at the intersection of empirical and systematic-theoretical heuristics. The research subjects of this design is the content to be learned. In this regard this design is very focused. The most important disciplines to refer to in this design are, again, educational sciences and the discipline that addresses its subject matter.

Design based research: This design determines the evaluation and further development of teaching programs or processes of learning respectively. Its basic purpose of inquiry therefore is evaluative and developmental. In terms of research subjects this design can refer to the subject areas of the relevant scholastic subject as well as to aspects of the teaching process. Methodologically it follows the cycle of so-called design research, in which the construction of learning scenarios and their experimental testing alternate until the desired effect is achieved among the students (Prediger et al., 2015). The methods used to carry out these cycles are based on empirical heuristics. In doing so, reference theories from the qualitative spectrum of empirical social research are used above all. Development research is thus process-oriented and produces local theories, i.e. its insights apply exclusively to a clearly defined subject area.

Research on the effects of religious teaching and learning: This design checks the effects of the processes of teaching and learning by providing information about the processes themselves and about what these processes stimulate in the teachers' and students' minds. Its basic purpose of inquiry is descriptive. From the perspective of research sub-jects it can refer to the acquisition of knowledge and competence as well as to different learning settings that are compared with each other. Methodologically, it follows an empirical heuristic approach, which usually works with pre- and post-tests, but also selectively asks for experience and assessment values. The basic reference disciplines of this research design are empirical social research and educational psychology.

Research on attitudes and pre-concepts: This design is about the students and focuses their mind-sets. Its tasks are to describe how the students think about teaching and

learning in the relevant domain, which attitudes towards the subject areas they have, which concepts guide their process of acquisition, etc. Its basic purpose of inquiry is descriptive, too. The research subjects of this design include attitudes, motives, pre-concepts and scripts, insofar as they are relevant to processes of domain-specific teaching and learning. The methodological framework of research on attitudes and pre-concepts is thus empirical, i.e. it collects and examines data using the various means of empirical social research or psychological research respectively. Its central reference theories are of empirical educational nature or educational psychological nature respectively. Depending on the subjects of investigation, other theories of various kinds come into view, but always framed by empirical heuristics.

Profession research: This design is dedicated to the analysis of the profession of subject-matter teaching in scholastic context. It therefore focuses the teachers, their teaching, and the conditions of teaching. In this regard that design is rather comprehensive in terms of research subjects. The latter cover the attitudes, motives, competencies and scripts of the teachers as well as their teacher training and further professional development on the job as well as the various ideals of the good teacher across time. Accordingly, this design is comprehensive in terms of methodology because studies on the profession of teaching may be of historic nature as well as of systematic-hermeneutical nature as well as of empirical nature. The focusing dimension of this design is the theoretical dimension. All research in that design is based on profession theory within educational sciences, no matter whether this theory is of structural character (Helsper, 2002), competencies-related (Baumert & Kunter, 2006), or of biographical interest (Hericks & Stelmaszyk, 2010). Its basic purpose of inquiry therefore is both descriptive and developmental.

4 Outlook

The evaluation of research in subject-matter didactics has shown that there are hardly any well-treated research designs that particularly address this type of research. Additionally, it is not trivial to transfer research designs from other disciplines to this area of scientific discovery. The GFD therefore has published a call to work on such research designs. The first step of this study described in this article is a reaction to this call. It represents an inductive approach as it starts with the discourse within a particular domain of subject-matter didactics, namely *Religious Didactics*, with the goal to broaden the process step by step. This article is meant to stimulate a relevant discussion across the various domains of subject-matter didactics by sketching both some characteristics of research designs in general and the contours of selected designs that emanated from this study. Colleagues from other subject-matter didactics are invited to react on this article on the basis of their particular domain.

A relevant discussion will bring further the methodological discourse within the field of subject-matter didactics in several more aspects. First, it will test the conceptual set-up that research designs predominantly are formatted by a) the theories, they refer to, b) the subject areas they address, and c) the methodologies they conduct. Moreover, these dimensions will be correlated via the basic purpose of inquiry that characterizes the relevant design. Still, this conceptual set-up is a theoretical deduction from the methodological discourse on research designs and needs further corroboration, perhaps even

some evaluation or correction. Second, the list of suggested research designs is not comprehensive. The discourse across the various domains of subject-matter didactics might bring about further designs. Third, this study within *Religious Didactics* found that research in this domain is not primarily based on empirical methodologies. The list of research designs therefore includes also designs with a distinctive hermeneutical character. This marks a clear difference to the previously described methodological discourse on research designs. Regarding the research in subject-matter didactics this raises the question of whether this finding characterizes the entire field of subject-matter didactical research or rather reflects the particular nature of the domain in which the designs have been elaborated. For example, the task of elaborating theoretical concepts should be central to each domain in our field. Theory building, however, can be done by deductive-hermeneutical means as well as by inductive-empirical means. Without neglecting the importance of both approaches their relevance may vary across the domains of subject-matter didactics. Fourth, the possible difference in referring to hermeneutical and empirical approaches may even condition the use of theory within subjective-specific didactical research. As previously elaborated the educational sciences form the common theoretical basis of all domain within this academic field. This common platform might work well in regard of the inter-disciplinary discourse in between the various domains. That platform, however, is not as coherent as it might look like. For example, there seems to be a huge divide between those scholars with a background in humanities and those colleagues that refer to empirical sciences like educational psychology (Tillmann, 2016). Therefore, the question raises of what nature the educational theories and concepts are that predominantly will be applied in the relevant domain of subjective-specific didactics.

This article is meant to bring further the discussion on research designs within the realm of domain-specific teaching and learning. At its best this discussion will end up in a tentative list of relevant designs which work well in the various disciplines of this realm. Colleagues are invited to reflect this issue in reference to their domain of teaching and learning. This reflection would establish the next step of the planned Delphi study on research designs within subject-matter didactics.

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Ulrich Riegel

is full professor for Religious Education at Siegen University.

Martin Rothgangel

is full professor for Religious Education at the University of Vienna.