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VET Teacher Education – a Co-Constructive Design Process

Robert Hantsch & Harald Hantke

Abstract *VET (vocational education and training) teacher education is intended to foster professional competence and continuous learning for teachers throughout their careers. Even though teacher education in Germany is anchored in subject-specific sciences, subject-specific didactics (vocational), educational sciences, and practical experience, fragmentation and discontinuity persist. The article addresses these challenges in a systematic manner, integrating structures, content, and stages to achieve coherence. Using a case study from the federal state of Mecklenburg-Vorpommern, we identify, understand, and propose solutions for improving coherence in VET teacher education. Through a design-based research approach, we propose prototypes for cross-stage and cross-institutional collaboration, emphasizing the need for such partnerships to address issues of coherence.*

Title *VET Teacher Education – a Co-Constructive Design Process*

Keywords *teacher education, coherence, cooperation, case study*

1 Introduction

Often, "good" teacher education has been associated with the belief that teachers' training and continuing education are fundamental to the success of schools and teaching practices (Oelkers, 2001, p. 151; Diettrich, 2009). However, VET teacher education, especially academic VET teacher education in Germany, has come under increasing criticism for issues such as fragmentation between subject-specific science, didactics, and educational sciences; the need for more practical orientation; the lack of sufficient networks;

Robert Hantsch, M.A., & Prof. Dr. Harald Hantke (Institute of Business and Economic Education, University of Rostock; Institute of Social Science Education, Leuphana University Lüneburg);
robert.hantsch@uni-osnabrueck.de; harald.hantke@leuphana.de;
https://orcid.org/0000-0003-1980-3746;https://orcid.org/0009-0008-8343-7182;

and the inability to cooperate among stakeholders. VET teacher shortages and lateral recruitment increase challenges that call for a reevaluation of the traditional staged model (Lange et al., 2024). Because of the complexity of multiple stakeholders and the historical evolution of state-specific systems, there are no quick fixes. Considering the complexity of VET teachers' tasks and the three stages of teacher education, reforms should not be focused solely on individual stages. Innovation development, reforms of VET teacher education, and societal trends and educational policies should be addressed across stages and institutions.

In this article, we examine how coherent and collaborative structures can be established for the professionalization of VET teachers in Germany at every level of teacher education and across them (including lateral entry and alternative routes to employment). In the following chapters, we initially systematically address the criticisms of current (VET) teacher education in Germany, including fragmentation and discontinuity, and examine them in terms of stages. Following the theoretical presentation, a detailed analysis of the federal state of Mecklenburg-Vorpommern will be provided. The analysis is part of a design-based research (DBR) project that ties theory, research, and practice together. In this analysis, we present a case study in which insights into structural and conceptual problems in VET teacher education in Mecklenburg-Vorpommern are first outlined along a generic model proposed by McKenney and Reeves (2012). Based on this, prototypes as products of the DBR process are presented for developing cross-stage and cross-institution cooperation formats to promote a coherent VET teacher education. We conclude with an overview of the key findings for developing cooperative formats as well as an outlook on further implementation, transfer, and evaluation steps.

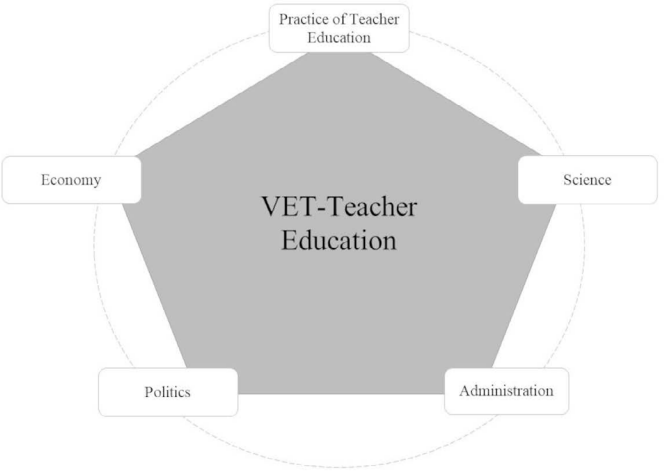
2 Criticism of Current VET Teacher Education in Germany

Teacher education in general and VET teacher education in particular faces the challenge of developing professional competence and providing learning opportunities throughout the professional biography (Kunter et al., 2011). It is expected that VET teachers are experts in their fields (i.e. engineers or business administrators) as well as educators. Moreover, they should consider their subject matter and workplace issues as non-separable domains of professional competence (Grollmann & Bauer, 2008; Kell, 2011, p. 444). As (VET) teacher education progresses through three stages (university, preparatory service, and in-service training), professional knowledge drawn from different disciplines is addressed differently. There are four distinct parts to (VET) teacher education across all stages (Nickolaus & Abele, 2008; Deissinger et al., 2018):

1. subject-specific sciences related to occupational specialization (e.g. engineering, mechanical engineering, civil engineering, computer science, business science) and subject-specific sciences related to a general subject (e.g. German, English studies, politics, sport, physics, chemistry, mathematics, religion),
2. subject-specific didactics,
3. (vocational) educational sciences, and
4. practical experience.

Interactions among these four parts are characterized by discontinuities and fragmentation (Schneider 2001; Hellman, 2019, p. 12; Schwalbe et al., 2021, p. 61). Considering this challenge, research on (VET) teacher education emphasizes coherence. Cramer (2020, p. 270) distinguished formal institutional coherence, in which institutions are in charge, and informal individual coherence, which is a subjective perception of meaning and relationship among individuals. These institutions and individual actors structurally support conceptual and temporal coherence (Cramer, 2020, p. 273; Bohl & Beck, 2020, p. 287). Therefore, it is important to understand that VET teacher education is embedded in a state-specific network of actors with overlapping and divergent interests and logics. Using Cramer's (2020) definition of coherence, five central reference systems can be derived at the macro and meso levels: practice, science, administration, politics, and business.

Figure 1: Reference system of VET teacher education in Germany



Source: adapted from Hantsch et al., 2022, p. 135.

"Practice" refers to teacher education institutions (i.e. universities, VET schools, and Studienseminar) or preparatory service at the second stage. "Science" refers primarily to the acquisition of knowledge and development of theory. As important decision makers and supervisory bodies in teacher education, school authorities, ministries, and university management are included in the administrative reference system. The fourth reference system, politics, is represented by education policy actors from trade unions, chambers, and associations as well as political parties. The former are more politically involved (e.g. in the framework of the State Committee for VET) (Landesausschuss für berufliche Bildung). The reference system "business" provides practical training for VET teachers, promotes innovations in VET teacher education, forms cooperative relationships between learning institutions (Lernortkooperation), and ultimately controls the demand for VET teachers in the respective federal state through apprenticeship programs (Hantsch et al., 2022). Among and within reference systems, expectations,

objectives, and quality standards differ. Consequently, VET teacher education is characterized by dichotomies, discrepancies, and antinomies. There is no doubt that the reference systems' structure is complex, sometimes contradictory, and not necessarily coherent (Hantsch et al., 2022).

Against this background, selected problems and challenges of the various stages of (VET) teacher education are discussed in more detail below.

2.1 First Stage of (VET) Teacher Education: Fragmentation and Lack of Practical Relevance

Often, academic teacher education is criticized for being fragmented and too far removed from practice because (VET) teacher education courses comprise several disciplines whose theories and methods are sometimes very different from one another and address different professional knowledge forms: subject knowledge, subject-didactic knowledge, and pedagogical-psychological or (vocational) educational science knowledge (Mayer et al., 2018.). The courses offered may create dissonance and redundancy among students, who perceive them as fragmented (Mayer et al., 2018). Providing a more coherent integration of the four parts, including practical experiences during internship, has long been a desideratum and desirable state of affairs for VET teacher education programs (Mayer et al., 2018, p. 10; Kremer & Weiland, 2023, p. 57).

To address concerns about fragmentation, German universities have restructured teacher education by establishing either teacher education centers or schools of education. As part of the reform, centralized, interdisciplinary institutions were created to coordinate and manage teacher education, integrating subject-specific, subject-didactic, and educational science components as well as practical experiences. The goal of this holistic approach is to enhance students' overall professionalization (Weyand & Schnabel-Schüle, 2010, p. 9; Hollenstein et al., 2020, p. 323).

As Röhner (2021) outlined, these centers or schools can be divided into two basic categories. The first type, with faculty status, enables the centralization of authority over educational research and teaching. It focuses primarily on theory and methodology of the new learning sciences as well as empirical educational research. Although this type may limit interdisciplinary orientation, it reduces fragmentation in (VET) teacher education courses (Röhner, 2021, pp. 207–209). There is a second type, which is prevalent in Germany, with a cross-sectional structure across all teacher education departments and subjects aimed at improving education quality. This type maintains the research traditions of education and related disciplines and encourages school- and teaching-related research. However, it also leads to a greater fragmentation of (VET) teacher education programs even though it promotes greater interdisciplinary orientations. This differentiation results in a dilemma: greater interdisciplinarity leads to greater fragmentation and vice versa.

Along with fragmentation, academic teacher education often receives criticism for its lack of practical relevance, which is referred to as a theory-practice gap. From a historical perspective, there has been a shift from theory-heavy teacher education courses to the opposite extreme due to increased tertiarization, academicization, and scientification (Horn, 2016, p. 158; Hollenstein et al., 2020, p. 328). This transformation is intended

to meet the demand for heightened professionalization in (VET) teacher education. Horn (2016) stressed, however, that theoretical knowledge alone is not sufficient; academic (VET) teacher education must be supplemented by experiential practice grounded in educational science (Horn, 2016, p. 161). Without explicit reference to educational science training, there is a risk that true experiential learning will be hindered during the practice phase because students may imitate mentors and overlook valuable insights from their studies (Horn, 2016, p. 161; Kremer & Weyland, 2023, p. 57; see also Chapter 2.2). To bridge the theory-practice gap, theoretical knowledge (disposition) about effective teaching and learning processes must be integrated with practical knowledge (situation-specific skills) to be applied successfully to teaching practice (performance). There is still room for improvement in the connection between academic content and practical experience in the professionalization of (VET) teachers in German-speaking countries (Hollenstein et al., 2020, p. 328).

2.2 Second Stage of (VET) Teacher Education: Lack of Theory and Dependency Relationships

The second stage of (VET) teacher education, the so-called Vorbereitungsdienst (preparatory service) – the stage of training at the Studienseminar (study seminar) – is often criticized for being disconnected from theory and characterized by dependency relationships.

Therefore, the finding outlined in the last chapter that the networking of academic content and practical experience in the context of (VET) teacher professionalization cannot be described as satisfactory also applies to the second stage of (VET) teacher education but from the theoretical remoteness viewpoint. According to Anderson-Park and Abs (2020, p. 333), the primary purpose of the Vorbereitungsdienst (preparatory service) is to reflect on practical experience at school in light of theoretical and practical opportunities for action developed in the (VET) teacher education course so that the teacher trainee's (Referendar) professional competence can be further developed. However, studies have shown that theory-based reflection is often ineffective. As Horn (2016) pointed out, schematic lesson preparations can be prepared according to the seminar lecturer's specifications, and reflections on lessons are usually made on the basis of everyday observations and language without any reference to general pedagogical knowledge. Consequently, professionalization is hindered and deprofessionalization occurs (Kunze, 2014, as cited in Horn, 2016). A similar criticism was expressed in 1998 and 1999 by a commission on behalf of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (Kultusministerkonferenz/KMK) about the current problems in teacher education. A major criticism of teacher education was the lack of coordination between the first and second stages (Schubarth et al., 2006). As described above, a tendency existed toward a lack of theoretical knowledge in the second stage of (VET) teacher education and toward a lack of practical experience in the first stage.

Besides the lack of theoretical knowledge at the Studienseminar (study seminar), there has been criticism of the strong dependency relationships between trainees and trainers. For example, the trainers are generally responsible for the organization of

the pedagogical and subject-didactic external training parts of the preparatory service, which means they also conduct classroom visits and document the trainees' training status (Anderson-Park & Abs, 2020, p. 334). Consequently, there is a risk of subjectively one-sided assessment of teacher trainees or abuse of power due to structural relationships of dependency (Heinrich, 2011, p. 89). Furthermore, structural dependency relationships may lead to affirmation of the trainers' opinions by preservice teachers in the above-mentioned commission. This problem is defined as a high level of pressure on teacher trainees, not least because of an excessive focus on grades in the recruitment of staff members (Schubarth et al., 2006, p. 20). Additionally, this prevents the development of a culture of discussion, which is important for reflective teaching development. The culture of discussion in training seminars appears to have a significant impact on the development of reflective abilities (Kunze, 2014; Decker, Kunter, & Voss, 2015, as cited in Anderson-Park & Abs, 2020, p. 336). It is considered advantageous for the development of reflection to adopt multiple perspectives and juxtapose points of view rather than just exchange experiences (Anderson-Park & Abs, 2020, p. 336). As the aforementioned commission also recommended, the predominantly school-based nature of the traineeship must be developed further into one that is predominantly adult-oriented (Schubarth et al., 2006, p. 20). A similar relationship exists between mentors and trainee teachers in training schools. For example, Braaten (2019, as cited in Bernholt et al., 2023) found that experiences in school practice were particularly productive for students who had a cooperative relationship with their mentors. In particular, lessons were planned, taught, and reflected on an equal basis rather than based on a hierarchical relationship of dependence.

2.3 Third Stage of (VET) Teacher Education: Lack of Structure and Arbitrariness

The third stage in (VET) teacher education, in-service and continuing professional development, is often criticized for its lack of structure and arbitrariness. As a result, it is considered significantly more worrying (Pasternack et al., 2017, p. 234) and is often described as underdeveloped when compared to international standards (Daschner, 2021, p. 12). Despite the legal requirement for teachers to undergo continuous professional development in all federal states, refusing to do so does not result in certain professional disadvantages, such as being placed in a lower salary grade or losing their teaching qualification in Germany. Consequently, in terms of quality, the obligation to provide further training does not lead to the exclusive use of structured learning opportunities to fulfill this obligation. Second, the obligation does not result in extensive continuing and further training. For instance, some federal states have a time requirement for continuing education, but teachers in those states do not have substantially higher participation rates (Richter & Richter, 2020, p. 346). In the IQB education trend, for example, 28 % of teachers attend no more than two in-service courses within two school years whereas 23 % attend at least five in-service courses (Hoffmann & Richter, 2016, as cited in Richter & Richter, 2020, p. 348). Training decisions are usually self-directed based on personal interests and priorities (Richter & Richter, 2020, p. 346). Therefore, further education and training for (VET) teachers do not guarantee they will work on their individual weaknesses. Additionally, there is no regular, public reporting of offers, demand, participants,

formats, costs, or effects of further training (Daschner, 2021, p. 14). Therefore, training courses cannot be organized in a systematic manner (Böttcher et al., p. 73) because no data is available on training needs.

Another systemic weakness in the German further and continuing training architecture for teachers is that there are generally no fixed times available during working hours for professional learning opportunities. As a result, the prerequisites for systematic and continuous further development of all teaching staff in Germany are only implemented to a very limited extent (Richter & Richter, 2020, p. 346).

However, this is currently more necessary than ever because to counter the shortage of teaching staff, more and more lateral entrants are entering the teaching profession who need to be qualified on the job (Puderbach & Gehrmann, 2020, p. 354). Here, we distinguish between lateral entrants who are trained in-service after being recruited and those who complete the preparatory service without having completed teacher education. The educational science and didactic content of teacher education courses, however, are dispensed with in both cases (Puderbach & Gehrmann, 2020, p. 355). Considering that (VET) teachers are not consistently developed as professionals throughout their work process, lateral entry may lead to deprofessionalization, resulting in a negative impact on teaching quality (Griese & Marburger, 2015; Puderbach & Gehrmann, 2020).

As lateral entry is increasingly implemented, the competition between stages of (VET) teacher education is escalating. In traditional (VET) teacher education, a (VET) teacher education course is completed in the first stage and a traineeship is completed in the second stage before the learner enters the third stage of (VET) teacher education. However, lateral entrants with subject-specific degrees may enter the second or third stage of (VET) teacher education directly, which raises various questions regarding the equivalence of training and professionalization standards (Puderbach & Gehrmann, 2020, p. 356).

2.4 Summary and Common Problems: Fragmentation and Discontinuity Due to a Lack of Cooperation and Networking

Based on an examination of the problems and challenges encountered during the three stages of (VET) teacher education, the following conclusions can be drawn.

The first stage of academic studies focuses mainly on theoretical knowledge and subject-specific content. Students acquire a basic understanding of pedagogical theories and in-depth knowledge of their teaching subjects. Additionally, the practice-oriented elements of (VET) teacher education remain structurally lacking, and the connection between this knowledge and its practical application remains limited.

During the second stage of study, the preparatory service, students apply the theoretical knowledge they have acquired in the classroom to practical work in schools under the guidance of experienced teachers. In reality, difficulties often occur here because there is no explicit link between the theory learned in the first stage and the practice in schools. As a result, teacher trainees face the challenge of transferring theoretical concepts to classroom practice.

In-service training serves to continually develop professional and pedagogical skills in the workplace, ensuring (VET) teachers can keep up with the teaching profession's con-

stantly changing demands. There is, however, a lack of commitment to further training at this stage as well as a high degree of arbitrariness in the services offered. Additionally, this stage is often less systematically linked to the previous stages than the first two stages of (VET) teacher education.

It appears that first, the stages of (VET) teacher education were fragmented in many ways, which mainly affected the first stage. Second, there is also fragmentation across stages in the sense of discontinuity. Due to the lack of coherent relationships among (VET) teacher education stages, students, and teacher trainees, teachers have difficulties undergoing a continuous and coherent educational process. For example, what is taught in theory may not be able to be put into practice due to the gap between what is taught and what is needed. For the purpose of ensuring more effective and simultaneously more satisfying (VET) teacher education, a greater level of cooperative integration and coordination would be desirable.

This general problem context of phased teacher education motivated a design-oriented research project on cross-stage VET teacher education in Mecklenburg-Vorpommern.

3 Design-Orientated Research Project on Cross-Stage VET Teacher Education in Mecklenburg-Vorpommern

(VET) teacher education cultures and structures vary across the federal states in Germany, so cross-state findings regarding (VET) teacher education presented in the previous chapter need to be complemented by regional, state-specific, and specific analyses. Fragmentation or discontinuity can only be understood by examining specific case studies. An analysis of this kind was conducted as part of a design-oriented research project in Mecklenburg-Vorpommern to address its specific challenges. Using design-oriented research methods, the findings on structural and conceptual challenges will be used to develop practical interventions promoting coherence in VET teacher education in Mecklenburg-Vorpommern.

3.1 Design-Based Research as Methodological Framework

Throughout this project, DBR is used as a methodological framework to integrate theory, research, and practice (Bakker, 2018, p. 7). It is not the specific method that counts, but rather how we apply it in an iterative framework to develop practical interventions and gain theoretical insight. Research and design occur continuously through design, implementation, analysis, and revision; invention, analysis, and revision occur alternately. DBR approaches all begin with a perceived discrepancy in practice. With close collaboration between educational research and practice, we can overcome this problem. The term "design" therefore refers to a creative, exploratory approach to problem solving (Johannesson & Perjons, 2021; Reinmann, 2022). In our approach, we follow the generic model McKenney and Reeves (2012, p. 77) proposed, which includes four phases: analysis/exploration, design/construction, evaluation/reflection, and implementation/dissemination. These phases are not strictly linear but include interactions (iteration) and flexible se-

quences; however, the development of an intervention is always framed by the phases of analysis/exploration and evaluation/reflection. It is generally possible to collect and analyze quantitative and qualitative data for these two phases using the entire repertoire of social science methods. Its primary objective is to gain insight into a phenomenon and, incidentally, create an intervention (Stappers et al., 2018, p. 165). In the following chapters, the analysis and data collection are limited to the first phase of the DBR process, the analysis of the problem.

It was necessary to adopt a flexible data collection process along with the iterative loops of the DBR process to contextualize and dig deeper into the coherence problem in VET teacher education in Mecklenburg-Vorpommern due to the complexity of VET teacher education and insufficient data and research opportunities. To understand how the design object needs to be shaped to contribute to problem solving, we explore formal institutional coherence and informal individual coherence in VET teacher education in Mecklenburg-Vorpommern, as Cramer (2020, p. 270) described. Exploration and analysis are guided by the following guiding questions:

> "What are the central issues surrounding formal institutional coherence and informal individual coherence within VET teacher education in Mecklenburg-Vorpommern, and how do these aspects interact to influence the effectiveness of educational practices within this context?"

The following sections are based on school statistics provided by the Ministry of Education and Child Day Care. Furthermore, the content is informed by protocols, presentations, and interviews conducted across stages and institutions during events, meetings, and workshops. During the Campus BWP MV project, which ran from 2019 to 2023, expert discussions enriched these insights. See Table 1 for a detailed understanding of data collection timeframes, settings, and methodologies.

Kuckartz (2014, p. 84) used a thematic qualitative text analysis approach to analyze and interpret the collected data. In Mecklenburg-Vorpommern, three fundamental problems in VET teacher education were identified and categorized: quantity, quality, and cooperation. The core problems were subcategorized based on inductive analysis of the data material. We present the results of the analysis and prototypes derived from them after describing the VET teacher education system in Mecklenburg-Vorpommern.

Table 1: Overview on study process

Timeframe	Setting	Data Collection Method
2019	Preparation of the project proposal "Campus BWP MV" SWOT analysis of teacher education	Expert Interviews
Oct. 2020 – June. 2021	Kick-Off meetings with 20 school principals, representatives of the ZLB; representatives of the KBS; representatives of the MBK Protocols	Protocols
April – Aug. 2022	Master thesis about Human Resource Management at Vocational Schools.	Expert Interviews
Oct. 2021	Workshop with 30 BA and MA students in Business Education	Protocols and result walls from discussions
Oct. 2021 – Jun. 2022	Topic-focused meetings with 18 school principals, representatives of the ZLB; representatives of the KBS; representatives of the MBK	Protocols
May 2022; Oct. 2022; May 2023; Nov. 2023	Cooperation workshop on teacher education for vocational schools	Protocol and presentations
April – Aug. 2023	Master thesis about Structures and Concepts of Continuing Education and Professional Development for Vocational School Teachers in Mecklenburg-Vorpommern	Expert interviews with representatives of the KBS
Sep 2023	Congress including various Workshops: "We – for strong and sustainable Vocational Schools in Mecklenburg-Vorpommern"	Result walls in task cards
Oct 2023	Public panel discussion on lateral and direct entry	Presentations
Nov 2023	Closing event of the collaborative project "Campus BWP MV"	Presentations, workshop protocols, and developed agreements

3.2 VET Teacher Education in Mecklenburg-Vorpommern

In Mecklenburg-Vorpommern, VET teacher education is mostly offered at the University of Rostock. There is a bachelor's degree program and a master's degree program in business and economic education at the Institute of Business and Economic Education, specializing in the education of VET teachers in the vocational subject of economics and business administration. Furthermore, as of 2014, students can choose from four (to be expanded to five by 2024) vocational subjects offered by the Institute of Vocational Education (Institut für Berufspädagogik): agricultural economics, electrical engineering, in-

formation technology, and metal technology. Additionally, Neubrandenburg University of Applied Sciences and the University of Rostock have partnered to provide two bachelor's degree programs at Neubrandenburg to lead to master's degrees at Rostock. It is intended to educate teachers in vocational subjects, such as nursing, social work, and health care.

In the second and third stages of (VET) teacher education, the Ministry of Education and Child Care (MBK) plays a crucial role. On behalf of the Ministry, the Competence Centre for VET Schools (KBS) coordinates, develops, and evaluates the second (traineeship service) and third stages (in-service training) of VET teacher training as well as the lateral entry paths, known as Quer- and Seiteneinstieg. An integrated traineeship service operates within a cooperative network of training schools, where teacher trainees receive practical teaching training under mentorship, and seminar schools, where theory and practice are integrated to enhance future VET educators' teaching competencies. Principals of vocational education schools appoint training supervisors (Ausbildungsbeauftragte) for pedagogical training and mentors for practical teaching training.

The third stage of VET teacher education is coordinated by a number of institutional actors. These include the MBK, with its respective departments; the Institute for Quality Development (Institut für Qualitätsentwicklung), which specializes in general education; and the KBS, which specializes in vocational education and training. Through direct engagement with schools and guidance for training planning, the KBS plays an important role. The school principal develops a training plan based on feedback from VET teachers. The plan will be evaluated to see whether it aligns with the school's specific concepts and the government's guidelines. In the KBS, a coordinator evaluates whether training sessions are feasible and then adjusts the budget based on that evaluation. In general, the IQ-MV oversees teacher education from the preparatory service, ensuring further training and in-service training are provided as well as continuous improvement in general education teaching. Additionally, the Institute is responsible for cross-cutting issues, such as inclusion, sustainability, and digitalization.

Across all stages of (VET) teacher education, the Centre for Teacher Education and Educational Research (ZLB – Zentrum für Lehrkräftebildung und Bildungsforschung) plays a critical role in Mecklenburg-Vorpommern. Its primary focus is harmonizing the various stages of (VET) teacher education, and its representatives are actively involved in the Advisory Board for Teacher Education and Educational Research at the Ministry. Its purpose is to align the content and structure of the three stages of (VET) teacher education, contributing to quality enhancement.

3.3 Core Problems of VET Teacher Education in Mecklenburg-Vorpommern

The results below capture insights pertinent to our DBR project in an exploratory manner. Therefore, they are presented in alignment with the initial DBR phases McKenney and Reeves (2012) outlined (analysis and exploration). This approach is intended to comprehend the fundamental challenges concerning coherence in VET teacher education and to contemplate them in crafting the design.

3.3.1 The Quantitative Problem: Heterogeneity of Qualification Pathways

As a result of the 2020 agreements between Mecklenburg-Vorpommern and Rostock University, the number of study places and study programs for VET teacher education has grown. Approximately 140 study places are now available for VET teacher education at the University of Rostock. Also, the study program has expanded to include information technology and metal technology. Consequently, staffing levels in the respective institutes have increased, academic staff have been given permanent positions, and two new professorships in VET teacher education have been created. Based on internal university statistics, it appears that the number of graduates from master's programs in VET teacher education fluctuated within the low double digits until 2018. Only since 2019 has the number of graduates stabilized, at around 30 per year, with half of these graduates specializing in the vocational subject of business and administration.

The Ministry of Education, Science, and Culture of Mecklenburg-Vorpommern's (2021) report on teacher demand development for the period 2021 to 2035 indicates that approximately 43 VET teachers will be needed from 2023 to 2035 to compensate for age-related departures. It is estimated that approximately 60 % of VET teachers will retire by 2035 in public and independent VET schools. These departures will peak in 2029, provided that VET teachers stay in the teaching profession until their planned retirement age. Retirements will likely peak earlier than expected (Ministerium für Bildung und Kindertagesförderung [MBK], 2021, p. 31; Prognos, 2023, p. 25). Furthermore, according to the teacher demand projections (Ministerium für Bildung, Wissenschaft und Kultur [MBWK], 2021), there will be an increasing need for VET teachers in business and administration, healthcare, and social services. There is also a similar development in specialized upper secondary schools and specialized grammar schools. The pre-vocational sector will also suffer a significant number of retirements by 2035, which will affect roughly three-quarters of teachers.

It is evident that despite these positive developments in capacity, Mecklenburg-Vorpommern still lacks a sufficient number of VET teachers. As a result of the shortage of VET teachers in Mecklenburg-Vorpommern, two new lateral-entry models have emerged, making the route to becoming a VET teacher increasingly varied. There have been two formal routes to lateral entry (MBK, 2022) since February 2023:

1. **Lateral-entry qualification (Seiteneinstiegsqualifizierung):** This lateral-entry qualification is available to individuals with non-teaching-related university degrees (bachelor's or master's) who have completed vocational training or have a master craftsman's diploma. The qualification consists of a basic pedagogical qualification and a modular qualification series. Upon successful completion and after a specified period of service, they can obtain a teaching qualification, similar to a teaching license but with lower compensation. They can also qualify for part-time preparatory service, leading to regular VET teaching positions, according to LehbildG Nr. 5 M-V.
2. **Part-time preparatory service (Berufsbegleitender Vorbereitungsdienst):** This program is open to individuals without a teaching-related university degree (master's, diploma, PhD). Generally, the university degree must fulfill the subject-specific requirements for two general-education subjects or two vocational fields. The KBS evaluates the admission requirements, distinguishing between applicants with profi-

ciency in two subjects and those with proficiency in just one. For the latter group, it is recommended that they simultaneously study a second subject. It takes 24 months to complete the part-time preparatory service.

The Ministry of Education (2023) presented at a discussion round organized by the ZLB ("Zusammenkunft Seiten- und Quereinstieg in M-V vom 27.10.2023"), stating that 60 positions will be available each year for lateral-entry qualification and 20 will be available for part-time training. Therefore, over one-third of VET teacher education is provided via non-university qualifications. In recent years, lateral entrants have accounted for a significant portion of new hires at public VET schools, according to discussions with school principals and KBS representatives. There are currently 2–3 lateral entrants for every VET teacher graduate from the university, indicating that traditional academic VET teacher education is no longer the preferred route to qualification.

University and VET school representatives report cannibalization effects in VET teacher education. VET teacher education programs at the University consistently demonstrate significant diversity among their students in terms of sociodemographic factors, educational backgrounds, and occupational backgrounds (Lange, 2024). Cohort analyses conducted by the Chair of Business and Entrepreneurship Education show that more than half of applicants have completed vocational training before entering university. This applies to all VET teacher education programs, according to university representatives. Therefore, bachelor's degree programs and lateral entry programs target similar audiences. There are two options available to potential students: unpaid full-time study or a paid lateral-entry qualification. The decision to pursue a master's degree also involves similar considerations for bachelor graduates. Once again, potential students have the choice of traditional study or lateral entry. There is a situation in which universities are expected to educate more students, but there may be a reduction in student numbers due to competing offers in the same state.

3.3.2 The Qualitative Problem: Fragmentation and Discontinuity

According to Chapter 2 in this text, VET teacher education in Mecklenburg-Vorpommern can also be fragmented and discontinuous. Mecklenburg-Vorpommern's teacher trainees (Referendare) do not perceive their training stages as coherent but rather as fragmented and loosely related. During discussions on developing a coherent curriculum at the KBS involving various experts, meetings with school principals, representatives of the KBS, and workshops on cross-stage teacher education at the "We – for strong and sustainable VET Schools in Mecklenburg-Vorpommern" congress (see Table 1), it was stressed that the lack of a coherent link between stages of teacher education poses a risk for competence acquisition. Often, stakeholders perceive the insufficient integration of knowledge across stages as a problem of theory-practice transfer. Therefore, opportunities for linking these stages effectively are often overlooked. In the data analysis, it becomes apparent that mutual accusations regarding respective shortcomings prevail, as also evident in the presentation of the cooperation problem (Section 3.1.3). In addition, fragmentation and discontinuity pose a variety of challenges for study programs and professions as well as individuals. Based on the analytical development of subcat-

egories from the given data, the following sections provide a detailed analysis of these challenges at each level.

Study-Program-Specific Challenges

The design of VET teacher education at the university level is handled by more than 16 academic chairs. Educating VET teachers in a forward-looking and demand-driven manner requires curricular cooperation among these academic chairs. However, university representatives point out that communication and cooperation structures are not systematically established and are instead confined to lose relationships between academic chairs. Based on a review of the study programs' curricula, it becomes clear that most teaching activities are handled by subject-specific scientists, who usually do not focus on VET teacher education. From discussions with students, it seems that they perceive little connection between the subject-specific science and the vocational subject (which also includes the compulsory subject).

All VET teacher education programs face these challenges, but their dimensions differ. The Institute for Business and Economic Education (Institut für Wirtschaftspädagogik) is solely responsible for vocational didactics, practical teaching exercises, and a significant portion of educational sciences (including general didactics) in the BA/MA programs for business and economic education. In the BA/MA programs for VET teachers offered by the Institute for Vocational Education (Institut für Berufspädagogik), these parts are supervised by various academic chairs, so the Institute of Vocational Education (Institut für Berufspädagogik) has less influence on curricular and didactic design than the Institute of Business and Economic Education. The ZLB in 2017 established a working group on VET Education (Arbeitskreis Berufliche Bildung) to promote interdisciplinary dialogue among VET teacher education academic chairs.

A major challenge is also presented by the structure of the cooperation model between Rostock University and the University of Applied Science in Neubrandenburg (HNB). At NHB, competences and resources have to be established, which has been partially successful (e.g. the position for health professions didactics, which has been vacant since 2021). This is perhaps one reason for the difficulty in coordinating curricular, temporal, and organizational agreements between the two institutions. The university representatives criticized the lack of subject-specific scientific experience (Fachwissenschaftler) in VET teacher education formats as well as the insufficient coordination among subject-specific science, practical teaching phases (Schulpraktische Übungs), and subject-specific didactics. Furthermore, the cooperative model poses many challenges to students, such as organizing their studies and balancing their studies with family and part-time work.

Profession-specific challenges

Aside from focusing on various university programs, quality can be viewed in the context of challenges unique to the profession. Teachers in VET have a diverse and dynamic work profile (Diettrich, 2009; Kalisch & Kaiser, 2019). It is essential to adapt training regulations and curricula regularly to technological and organizational changes. Various teaching formats in various types of schools and the student body's heterogeneity pose

demanding challenges. As versatile networkers, VET teachers collaborate with students, social workers, companies, chambers of commerce, and further VET institutions. This role contributes significantly to regional development and shapes Mecklenburg-Vorpommern's VET landscape. In spite of this, current regulations, such as the Teacher Training Act and the educational administration, may not fully meet the demands of this comprehensive profile regarding VET teacher education, lateral and alternative career paths, and staff deployment planning and performance assessment.

Having spoken to healthcare school management, for example, it is clear that in the field of teacher training for healthcare professions, the question arises of whether, given the variety of professional structures, specializations, and training paths, training for speech therapy teachers or emergency services teachers is more effective than the current education model of a "universal teacher" (Arens, 2018). Moreover, practical experience in VET schools indicates that a VET teacher for healthcare professions with a related field, such as nutrition, may be able to work more effectively in nursing and health schools than the existing qualification in general education, which is still not stipulated in nursing schools and healthcare professions schools (but will change soon). It is important to place these descriptions in the context of the current dynamic developments regarding nursing profession reform and the minimum requirements for nursing schools and teachers. A project being funded by the Federal Institute for Vocational Education and Training (BIBB) examines nursing teacher education in federal states. This will result in recommendations for improving teacher education (Bundesinstitut für Berufsbildung [BIBB], 2023).

Another example is that the KBS does not recognize Study Track I of the master's program in business and economic education as a teaching qualification. In this program, students cannot prove that they have taken another general education subject or another vocational subject. As a result of the strict interpretation of the two-subject rule, they cannot currently teach in public VET schools. There is no consideration of the fact that these students would be able to specialize in more areas by taking additional optional modules, for example in IT, project management, human resources, and service management. VET schools could benefit from such specializations, but they are ignored or not considered from the beginning. VET school and university representatives emphasize that teacher education and training cannot yet be discussed in light of this versatile work profile's meaning, purpose, and quality.

Individual-/actor-specific challenges

Data analysis revealed that fragmentation and discontinuity in VET teacher education are also discussed at a personal level, partly due to the small number of actors. At all stages, teachers, lecturers, department heads, and school administrations can be identified as direct actors in teacher education.

In teacher education at universities, academic staff play a multifaceted role. Aside from precarious employment conditions and fluctuation in university systems, they must deal with an unclear job profile combining teacher educators, VET education researchers, networkers, recruiters, and administrators. Although the measures the state of Mecklenburg-Vorpommern has taken for permanent employment at the University

of Rostock have provided a certain degree of security and continuity for the staff there, staff turnover, for example, due to the lack of formalized cooperation structures (see cooperation problem), can still result in significant expertise losses.

As individual actors, school principals hold an exceptionally challenging position, marked by a variety of tasks, frequent staff turnover, and a high vacancy rate. Dialogue with school principals highlights the challenges they face, such as a lack of time and little influence over their employees' professional development. Even though the Ministry of Education emphasizes school autonomy, VET school principals still lack autonomy in decision-making. As a result of the problematic development of teaching provision, principals recognize the importance of teacher education but often do not give it the highest priority.

During discussions with teachers, it became clear that there are no comprehensive approaches or resources for the qualitative design of mentoring during traineeships (Referendariat) or study-integrated internships (Schulpraktische Übungen). Specifically, mentors of trainee teachers criticize the oppressive regulatory framework, the lack of professionalization opportunities, and the lack of stage-specific cooperation and support networks. Due to a shortage of teachers, tasks in teacher education are increasingly shared among a few individuals.[1] Consequently, being a mentor is often viewed as a burden. In relation to important issues such as sustainability, digitalization and inclusion, which could affect staff and school development, teachers involved in these tasks note that reduction in hours (Abminderungsstunden) is available for these issues. However, the conceptual integration of these positions, such as regional sustainability advisors, into school development, quality management, or curriculum development is seen as only partially successful. In addition, the time available is perceived as insufficient, which may explain why it is currently difficult to fill these positions in VET schools.

As we examine the various actors and their framework conditions in teacher training, it becomes clear that this is a critical point for the development of quality VET teacher education and an important reason for the lack of coherence in it.

3.3.3 The Cooperation Problem: Insufficient Cross-Institutional and Cross-Stage Cooperation

VET teacher education involves a variety of stakeholders, as explained in chapter 2. Additionally, from the perspective of organizational theory, those who shape the structures in which VET teacher education occurs, such as administrators in schools, universities, and ministries, also play a role. Consequently, there are particular challenges in cooperation and communication among all these actors for VET teacher education to be successful. In the data analysis, three subcategories were identified: organizational form and autonomy, information deficits and knowledge gaps, and reproduction of biases.

1 In some VET schools, the provision of a traineeship (Referendariat) cannot be guaranteed due to a lack of originally trained teachers.

Organizational form and autonomy

According to the Teacher Training Act, the stages of teacher education are interconnected and form one whole. This formulation, however, raises the question of how the various actors in this cross-stage unit work together. The ZLB could serve as an intermediary between stages of (VET) teacher education, facilitating a coherent VET teacher education system by integrating the education stages and connecting the actors in the university. It is, however, only partially manageable given the existing resources, competencies, and multitude of challenges (e.g. qualitative problems).

According to the analysis of the data, the direct actors in VET teacher education (teachers, lecturers, professors, school management) perceive the organizational structure as bureaucratic-administrative. In this perspective, all subsequent participants are primarily considered recipients of macro-level programs. Administrations, teachers, and university members have all expressed negative experiences with the personnel development plan (Personalentwicklungskonzept 2004), the introduction of the quality development management system Q2E, the inclusion process (since 2006), and the current digitization process. Critics describe these reform processes as "raids" and "top-down processes" because they are contradictory, insufficiently participatory, lacking support, and limited in maneuverability. The staff development plan led to VET teachers being reassigned to part-time posts or teaching subjects outside their expertise. Meanwhile, Q2E was introduced as a quality management system, which was perceived as a contradiction. As a result, these processes, some of which are considered unsuccessful, continue to affect staffing structures and the general attitude of those involved in the reform processes. Although VET schools are regarded as "independent schools," they are integrated into a strict bureaucratic structure as subordinate authorities. The concept of "school autonomy" is therefore limited to pedagogical autonomy. In the case of personnel development, for example, the ministry views it as an administrative process and not under the remit of VET schools. In many ways, these experiences are similar to those of higher-education stakeholders. Frequently, they are only involved as assistants to the Ministry or excluded from various innovation processes, including curriculum committees and evaluations. Besides the lack of involvement in VET teacher education development in Mecklenburg-Vorpommern, there is a perceived lack of appreciation for academic institutions' research strengths. For example, the recent evaluation of the second stage of teacher training was not conducted in cooperation with a university or similar research institution. Instead, it was conducted by the Ministry of Education and Childcare. Furthermore, recent years have seen severe restrictions on school research, and university findings and contributions have been largely ignored.

Mecklenburg-Vorpommern does not have formal cooperation structures to review VET teacher education, identify shared action areas, or promote innovation in VET teacher education. Stages and actors in VET teacher education are currently isolated in terms of objectives, content, and responsibilities. As a result, the overall governance structure is unclear. We examine it further in the following category.

Information deficits and knowledge gap

The data analysis revealed that the reference system actors lack a clear understanding of their specific tasks and options. The objectives of VET teacher education at its various stages as well as the responsibilities of actors involved are systematically misunderstood and undervalued. For example, actors in VET schools often do not realize that a single academic chair is not responsible for all BA and MA programs. Consequently, curricular changes are not understood as well as the duration of institutional change processes. Furthermore, there is often uncertainty about who is the contact person, and there is a perception that there is uncertainty about the turnover of research staff. Therefore, school representatives perceive universities as unreliable and lacking continuity. There is also a lack of knowledge about key decision makers and committees in the VET system's governance structure. There is a lack of awareness among school leaders about the functions of the Landesausschuss für Berufliche Bildung/LAB and the Ministry of Education's Advisory Board for Teacher Education and Educational Research, resulting in a lack of recognition of the need for active participation on committees and collaboration with key actors. On the other hand, university representatives have only a very abstract understanding of the current challenges facing VET schools. The joint workshops often helped them realize the extent of the current problems in the institution of VET schools and the pressures for action in the VET teacher education field. The challenges associated with a shortage of VET teachers, such as securing certain functional positions, participating in examination committees, providing educational programs, and mentoring trainees, are often underestimated. Various actors also report that VET research in Mecklenburg-Vorpommern is marginally supported at present. As a result, there is a lack of information, for instance, about the implementation of the learning field concept, the integration of cross-cutting issues in VET schools, and the design of the second and third stages of VET teacher education. A mutual exchange only revealed that VET schools feel left alone in most innovation and transformation processes and would have appreciated university support. This is also reflected in the next category.

Reproduction of Biases

By using the two preceding content-analytical categories, researchers can form a third category in the data, which may also be interpreted as a consequence of the previous categories. In Mecklenburg-Vorpommern, teacher education is organized bureaucratically-administratively, which isolates the actors from each other. There is a lack of awareness of the overall structure of teacher education and actors' system logic, constraints, and leeway because of this structure. This then leads to the third category, "reproduction of biases"

According to the data collected, the involved actors maintain a distant relationship, attributing to each actor a kind of outsider status in the sense that "they don't understand teacher education" (own translation). Discussions, workshops, and individual conversations revealed that biases are reproduced in the reference system. Some of these biases stem from past experiences and can be attributed partly to knowledge and information gaps for which there is relatively little current evidence. However, most appear biased due to a lack of knowledge about each other. Across all actors, outside of universities,

a perception is reproduced that researchers live in an ivory tower, lack practical experience, and are unwilling to engage in it. They are not seen as experts who accompany practice, for instance, in current digitalization processes. Academia actors, on the other hand, consider VET schools theory averse and reflection weak. Rather than the educational mission, the focus is on quantitative lesson coverage, grading, and exam orientation. Several university actors critique the teacher education and teaching profession, which largely follow a conservative reproduction logic. As a result, prospective teachers have very little room for personal growth and development. The ministry is perceived as a practical and theory-averse authority that does not provide innovative impulses outside of four-year legislative cycles. Claims have even been made of a lack of interest in teacher education.

3.4 Design & Construction: Prototypes of a Coherent VET Teacher Education System in Mecklenburg-Vorpommern

The DBR project developed a variety of cooperation formats based on the refinements and differences in quantity, quality, and cooperation identified in the state-specific case study. Further, it developed existing formats in collaboration with stakeholders in the Mecklenburg-Vorpommern VET teacher education system. A cross-stage and cross-institutional dimension was added to improve VET teacher education's overall structure. To illustrate their importance in developing VET teacher education in Mecklenburg-Vorpommern, these formats will be explained in more depth below.

3.4.1 Cooperation Workshop on VET Teacher Education

The Cooperation Workshop on VET Teacher Education is a cross-stage, cross-institutional workshop held every two years starting in 2022. Concerning the cooperation problem (3.3.3) in VET teacher education in Mecklenburg-Vorpommern, this workshop will coordinate, implement, and evaluate operational measures in areas of joint focus. The strategic focus areas are quality and innovation in teacher education, recruitment and retention of students and teachers, and cross-stage and cross-institutional information flow. Among its members are six professors from the University of Rostock and Neubrandenburg University of Applied Sciences, 19 principals from VET schools, five representatives from the Ministry of Education, one representative from the Ministry of Science, two representatives from the KBS, and one representative from the ZLB. A total of 35 people participated in the cooperation workshop. Using the strategic fields of action, operational measures are defined and implemented at the subordinate level by working groups (see Work Group on Student and Teacher Recruitment; Work Group on Coherent Curriculum). Several initiatives have been implemented, such as two-day excursions to different schools each year (LehrerbildungsLANDPARTIE), peer-to-peer advertising in VET schools, meet-and-greets between students and teachers, school fairs, and a joint newsletter. The next milestone in the strategic focus, quality and innovation in VET teacher education, is the development of a vision for VET schools in 2024. This jointly developed vision will serve as the basis for defining the precise operational goals and responsibilities for VET teacher education.

This format is integral to addressing various challenges in VET teacher education through cooperative efforts. The effort can also be viewed as a collaborative lobbying effort to improve teacher training.

3.4.2 Working Group on Student and Teacher Recruitment

The Working Group on Student and Teacher Recruitment includes academic staff, study counselors, those who handle the recruitment campaign for teachers from the Ministry of Education (Ministerium für Bildung und Kindertagesförderung), and the Ministry of Science's public relations officer. Concerning the quantitative problem (3.3.1) and cooperative problem (3.3.3), this working group meets regularly to coordinate public relations to recruit students and teachers. Several measures have been jointly implemented in the working group, briefly outlined below. A format for exchange has been developed in the context of the study-integrated internship. By doing so, students and schools can get to know each other and share their ideas and expectations about the upcoming placement, teaching practice, or future profession. Additionally, BA and MA students have developed the teacher education field trips format (LehrerbildungsLANDPARTIE). Many students have participated in this excursion more than once, and it is now an integral part of the annual program. University staff also use the excursion to meet stakeholders in VET schools.

The working group represents an important format for addressing the specific characteristics of VET teacher education in relation to the heterogeneous target audience and dynamic, heterogeneous working environment in strategies for recruiting teachers. Furthermore, the working group can quickly develop and implement operational measures through short communication channels, thus promoting contact among students, academic staff, and stakeholders.

3.4.3 Working Group on Coherent Curriculum

Initially conceived to exchange ideas on introducing an e-portfolio among VET program coordinators at the university, this format evolved into a coherent-curriculum working group. Teachers and mentors involved in VET teacher education have been added to the working group and KBS staff. Regarding the problem of quality (3.3.2) and cooperation (3.3.3) in VET teacher education in terms of fragmentation and discontinuity between stages of VET teacher education, this working group aims to comprehensively understand the objectives and content of various stages of VET teacher training. Prioritizing common objectives and content is vital to proactively addressing possible structural issues, especially during subject-specific exchanges. Additionally, specific topics were discussed to improve cooperation. Among them are the analysis of interfaces and transitions in teacher education and the recognition, guidance, and co-creation of educational formats. Following the formation of the working group, a common lesson plan structure will be developed for the first and second phases. Throughout this development process, it is intended to stimulate the exchange of ideas on lesson design and education.

The working group has the potential to contribute significantly to the quality improvement of VET teacher education in the sense that it promotes coherency across different stages. Despite initial positive impressions, continuity could not be ensured due to limited time and unclear decision-making authority.

3.4.4 Working Group VET Teacher Education

Regarding the qualitative problem (3.3.2), the ZLB's interdisciplinary working group, VET Teacher Education, focuses on study programs for VET teachers. To expand the content of the working group, a closer connection will be made with the Cooperation Workshop on VET Teacher Education. A strategy circle and an extended expert group make up the working group. This strategy circle is made up of professors who are responsible for BA and MA programs. In this way, they can discuss and agree on key strategic issues related to VET research, teacher education, and student education. Among the members of the expert group are members of the strategy circle and academic staff from the Institute for Business and Economic Education (Institut für Wirtschaftspädagogik) and the Institute of Vocational Education (Institut für Berufspädagogik), as well as other stakeholders from the Neubrandenburg University of Applied Sciences and the University of Rostock.

Because the working group and the Cooperation Workshop are closely aligned, cross-study program issues, such as student recruitment, retention, transition management, university teaching quality, and networking, can be addressed and improved.

4 Conclusion and Outlook

Currently, there are no suitable verification methods or success indicators to evaluate comprehensively the success of cooperation structures and formats. Despite these challenges, we will outline critical insights for improving coherency in VET teacher education in Germany in the concluding chapter.

Through the DBR project, various actors from various structures collaborated on ideas for developing teacher education in VET. Participants' high willingness to participate in the Cooperation Workshop VET Teacher Education indicates the necessity and importance of this format. The feedback from participants confirms this impression and includes constructive suggestions for further development. Through the cooperation workshop, we developed concrete, verifiable measures that proved the work was effective and that cross-stage and cross-institutional cooperation is possible. Based on the recommendations by Künkel et al. (2019, p. 10), four core processes were identified for successful implementation and sustainability. Only one cooperation workshop has undergone all four processes:

1. Exploration and resonance or identification with the common mission of VET teacher education
3. Establishment and formalization of cooperative structures
4. Joint design, implementation, and evaluation of design and change activities
5. Further development, institutionalization, and sustainability of the collaborative relationship

Moreover, relationship promoters (Gemünden & Walter, 1995) played a prominent role in the context of these processes in promoting cross-stage and cross-institutional collabo-

ration.[2] They promoted perspective taking and facilitated the flow of information in the reference system by actively networking and bridging institutional boundaries. To build trust, relationship promoters must be willing to work for others beyond their interests – an understanding of collaboration is essential. This role contributed to the development of the above formats and the active participation of the actors.

At a higher level, it has been shown that measures to promote coherence, particularly in the federal system, must consider regional, level-specific, institutional and personnel aspects. Only with this comprehensive approach can the problems' multidimensionality be understood. Nevertheless, the development, testing, and implementation of the specific formats in the context of the four core processes listed above can be seen as a product of the DBR project, which also has a high transfer potential for realizing coherence or reducing a lack of coherence (not only) in the area of VET teacher education.

First, it is crucial to develop a fundamental understanding of the professionalization process of (prospective) teachers and to create a sensitivity to their challenges and a shared willingness to understand teacher education as a co-constructive design process. The practical findings outlined in this article on the design of formats to promote cooperation in teacher education and the case study itself can then be transferred to other federal states and regions based on this fundamental understanding to further develop VET teacher education toward coherence there, too.

The next steps would therefore be to take a closer look at this fundamentally existing supra-regional transfer potential as part of a transfer research project. Secondly, it is important to examine whether the implemented formats for cross-stage and cross-institutional cooperation and the associated short-term successes (see above) are regionally sustainable and help improve vocational education and training in the medium and long term. It is therefore important to identify success indicators regionally for the sustainability and supra-regionally for the transferability of a more coherent VET teacher education.

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2 The term "collaboration," in line with Castañer and Oliveira (2020, p. 994), goes beyond the concepts of cooperation and coordination. We understand collaboration not merely as a simple sum of cooperation and coordination (Gulati et al., 2012) but as voluntary, mutual support to achieve common and individual goals within and between the stages of VET teacher education.

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