

# What University Teachers Consider Important in Teaching Subject Didactics to Future Primary School Teachers

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Received : 12 April 2025  
Revised : 25 November 2025  
Accepted : 26 December 2025  
DOI : 10.26822/iejee.2025.423

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## Abstract

Teachers' competence has a great impact on the development of knowledge and cognition in society. In order to teach effectively, university teachers need to know the content and structure of the subject they teach, knowledge of subject didactics and principles of general pedagogy. The aim of the study was to investigate how the university teachers perceive their competence in teaching subject didactics across its domains of knowledge, their attitudes and teaching skills. Data were collected by interviewing 11 university teachers instructing Estonia's future primary school teachers and analysed by thematic analysis. The results revealed that subject content, teaching methods and goals as well as requirements of curriculum and educational legislation were important aspects for building up subject didactics courses. The university teachers aimed at developing students' core competencies for delivering lessons. According to university teachers, teaching skills, creative teaching, different learning styles and formats in subject didactics courses were seen as tools for building an inspiring learning environment. The need for more systematic and coherent cooperation of teachers of subject didactics within the university and other educational institutions was highlighted and its potential impact to facilitate the advancement of teachers' professional knowledge to enhance primary school teachers' instruction was emphasized.

## Keywords:

Teachers' Competence, University Teacher, Subject Didactics, Content Analysis

## Introduction

Subject didactics (SD) is seen as the most important component of teachers' professional competence (Meijer, 2013; Vollmer, 2021). To teach successfully, university teachers (UTs) need to know the content and structure of the subject they teach, have knowledge of SD and general didactics. This knowledge also includes individual decisions and understanding of how to present the subject in a most understandable manner (Deng, 2018; Ozmantar & Akkoç, 2017), using appropriate teaching methodologies (Vollmer, 2021). Besides good pedagogical content knowledge and



www.iejee.com  
ISSN: 1307-9298

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skills (Shulman, 1987), teaching requires teachers' understandings on how to teach SD.

Competence to teach is also related to the ability to transfer didactic knowledge and skills to students, inspiring their future development (Meschede et al., 2017). However, in real teaching situations, teachers may face a variety of complex and challenging aspects in equipping students with essential knowledge and skills. For example, coping with how to solve teaching problems requires SD knowledge that is entwined with pedagogical content knowledge, subject-specific assessment and evaluation of the teacher-students interaction (Vollmer & Klette, 2023). What teachers know, how they understand and interpret the knowledge have an impact on their actions and behaviour.

Although subject didactics has become an independent research field, not many studies focus on teaching SD courses at the university. There has been more research about school teachers' SD competence (e.g., Deng, 2018; Ozmantar & Akkoç, 2017). Much less is known about UTs' competence who work in initial teacher education (Hultman et al., 2012; Su & Wang, 2022; Vollmer, 2021). In the current study, the UTs' competence in teaching SD across its domains of knowledge, understandings and skills were examined. The study was conducted among Estonian UTs who deliver SD courses for future primary school teachers. It allows to customize UTs' competences to meet the goals of teacher education and more systematically develop teacher training for effective teaching at schools.

### ***The domains of teachers' subject didactics competence***

A teacher's competence is defined as a proven ability to use knowledge and skills, as it has an impact on the development of cognition in the society. Teacher's competence comprises the combination of domains of knowledge, attitudes and understandings, skills and behaviours, work habits and abilities (Le Deist & Winterton, 2005). The development of competence based on teacher's attitudes and understandings, which affects their knowledge and skills. Shulman (1986) was one of the first who systematically examined domains of teachers' knowledge which find their expression in teacher's actions. In frame of delivering SD to future teachers the most common domains of competence are content knowledge, pedagogical content knowledge, knowledge of students and their peculiarities, curriculum knowledge, general didactics knowledge referring to the classroom management, and knowledge of educational contexts (Sikkal et al., 2021; Vollmer & Klette, 2023). Recently, the Teaching and Learning International Survey (TALIS) indicated that teachers in OECD countries consider content knowledge and pedagogical content knowledge

more important, while curriculum knowledge is acknowledged to a lesser extent. This is why school leaders feel that teachers need professional development training in the area of curriculum development (Leijen et al., 2025). When teaching SD, teachers' knowledge is interconnected with their attitudes and understandings and anchored in their mental activities.

Teachers' attitudes are defined as unspoken and unrecognized assumptions (Richardson, 1996), which affect the quality of instructional process. Attitudes include understandings of the motives behind actions and components, directing a person to behave in a certain way (Guskey, 2002). According to this approach, knowledge, attitudes and understandings, skills and motivational characteristics are not innate, but learnable and teachable, and they form the basis for mastery of specific situations in the classrooms (Hultman et al., 2012). In this context, good pedagogical content knowledge and skills (Su & Wang, 2022; Shulman, 1987), a deep understanding of the material to be mastered by the students, and understandings of teacher-learner interaction are required (Vollmer, 2021).

From the point of teacher education, teachers' skills, level of education and length of teaching experience (Su & Wang, 2022) influence their competences (Kunter et al., 2013). The foundation of didactical skills is formed by teacher' motivation and experience (cf., Vedder et al., 2006). In addition, better knowledge on how to teach a subject as effectively as possible through varied instructional interaction leads to teachers' greater didactical competence (Busse & Kaiser, 2018; Parchmann, 2013). According to previous research, teachers with a strong didactical background tend to have more deeper understandings about didactical diversity (Dittrich, 2020) and offer more appropriate learning activities to student teachers (Uibu et al., 2023).

### ***UTs' competence to teach subject didactics***

The UTs are responsible for teaching SD courses and they perceive their competence in teaching SD across its domains of knowledge, understandings and teaching skills. They are expected to have good competencies about planning the instructional process, using instructional methods, designing the classroom environment and supporting future teachers' professional development (Euler, 2016). UTs are also expected to supervise student teachers' school practice, to observe and analyse their trial lessons and to review their assignments related to practice in university instructing sessions (Pedagogicum T.U., 2019; Uibu et al., 2023). However, the UTs carrying out SD courses and leading the curricula are a very heterogeneous group: they have different professional preparation from different subject-specific curriculum

(e.g., Linguistics, Natural Science or Mathematics). On the one hand, the heterogeneity of UTs may serve as an advantage in student instruction (Wieman, 2019), as it provides students with insights into the distinctive characteristics of teaching various subjects. On the other hand, if teaching is not supported by agreed standards, the student may fail to develop the holistic understanding that is necessary for integrated subject teaching in primary school (Coyle et al., 2010).

The expectations for UTs are high. UTs are expected to demonstrate a high level of academic and didactic competence (Li & Rubie-Davies, 2018; Vollmer & Klette, 2023), and establish a link between theory and practice (Korthagen, 2017). Studies suggest that UTs ought to examine how their own and their students' expectations of teacher education shape teaching practices and affect the knowledge and skills students develop (Li & Rubie-Davies, 2018). Since UTs are responsible for student teachers' theoretical studies, they support students via teacher education, supervise teaching practice experience in schools and instruct them for their future work (Korthagen, 2017; Lunenberg, 2010), their professional development should be supported (Cramer & Schreiber, 2018; Meijer, 2013). For this purpose, various courses are available for expanding UTs' knowledge of subject didactics by improving their teaching competences in Estonia (Pedagogicum T.U., 2019) as well as in other countries (Euler, 2016). However, similarly to other countries teacher training in Estonia lacks a complete concept for developing different SD courses. The reasons may be the simplified approach that SD knowledge mainly includes knowledge of teaching and methodologies, whereas their association with theoretical foundations and empirical development of SD knowledge remains superficial (Meijer, 2013; Sikkal et al., 2021; Vollmer & Klette, 2023).

**Aim and research questions**

The aim of the current study was to investigate what the UTs consider important in teaching subject didactics across its domains of knowledge, understandings and teaching skills. Building on theory and earlier studies (Korthagen, 2017; Kunter et al., 2013; Meijer, 2013; Shulman, 1986, 1987), the following three research questions were formulated:

1. What knowledge about teaching subject didactics is highlighted by the UTs?
2. What kind of understandings about the position of subject didactics in the teacher education are expressed in UTs' descriptions?
3. Which teaching skills do the UTs consider important in delivering subject didactics at the university?

**Method**

The following section provides an overview of the methodology, briefly describing the aspects of UTs' work in context of preparation of primary school teachers in Estonia. More specifically, it describes the selection of participants, data collection and data analysis process.

**Participants**

The study was conducted with a focus on university teachers' (UTs') subject didactics competence. Using a purposive sampling method, the participants were selected from one of the largest teacher training universities of Estonia on two criteria. First, they had experience in teaching subject didactics (SD) in teacher training. Second, they provided SD and methodology courses (e.g., didactics of Natural Science, Estonian language teaching, Mathematics etc.) for students from the primary school teacher curriculum. The sample consisted of 10 females and one male teacher, which is in entire line with the gender distribution in the teacher training of Estonia: just as teacher training students are predominantly women (over 90%) in most teacher training programs (HaridusSilm, n.d.), so are teacher trainers. UTs' average age was 53 years (min = 45, max = 72), general teaching experience was 26 years (min = 5.5; max = 34.5) and experience in teaching SD courses varied from 1.5 to 30 years (M = 14.5). Based on the length of experience in teaching subject didactics at the university, UTs were divided into three teaching experience groups based on the modified version of the Dreyfus teaching skill acquisition model (Dreyfus & Dreyfus, 1986). The Novice group involved UTs with ≤ 3 years (N = 2), the Competent group comprised UTs from 4 to 10 years (N = 3), and Expert group of UTs who had ≥ 11 years of teaching experience in subject didactics (N = 6).

**Table 1.**  
*Overview of UTs' teaching experience*

Teacher's code	Teaching experience in general (in years)	Teaching experience in subject didactics (in years)
UT 1	25	10 (Competent)
UT 2	34.5	30 (Expert)
UT 3	26	1.5 (Novice)
UT 4	5.5	3 (Novice)
UT 5	29	4 (Competent)
UT 6	23	9 (Competent)
UT 7	27.5	11 (Expert)
UT 8	25	12 (Expert)
UT 9	34	14 (Expert)
UT 10	28.5	2 (Novice)
UT 11	29	13 (Expert)

The study followed the ethical guidelines by the Estonian Code of Conduct for Research Integrity (Centre for Ethics, 2023) and General Data Protection

Regulation. All authors have extensive experience and knowledge in conducting research on education and in the ethical issues. The study also honoured and protected the participants' confidentiality. All UTs participated voluntarily in the study, they were fully informed about the nature of the research and they had the right to withdraw from the study for any or no reason, at any time. Informed consent collected from all participants and collected data were strictly confidential and were not shared for reuse after the study was completed to encourage participation and avoid any possible breach of anonymity of the participants or sensitive data. To ensure the anonymity of the UTs, all analysed data were encoded and no personal information was included. Instead of interviewees' names, specific codes were used when presenting the results (e.g. UT4, UT11). Participants were offered a chance to ask questions throughout the entire study.

**Data collection**

To ensure confirmability, the study was carefully planned by setting up a precise research schedule. Data were collected by semi-structured interviews to determine UTs' competence in teaching SD. Topics were chosen according to the research questions of the study. To ensure dependability, a pilot interview was carried out with an expert university teacher in the field of primary education before the data collection period, and the relevance and the clarity of the questions were discussed with the co-authors and with the interviewee. Appropriate questions for revealing UTs' didactic competence were identified.

The interview included 22 main questions. The first part of the interview covered topics related to UTs' knowledge of subject didactics (e.g. 'What knowledge do you consider essential to teach in the course of subject didactics?'). In the second part, the questions were focused on UTs' understandings in teaching SD (e.g. 'Please explain: 'What are the advantages and disadvantages of teaching subject and subject didactics separately or together?'). The third part explored UTs' skills to teach SD to student teachers (e.g. 'If you could change anything in teaching subject didactics, what would it be?').

All interviews were carried out via video bridge. The aims of the research were explained to the participants and background data were collected (subjects taught by the UT, general teaching experience and experience in teaching SD etc.). The average duration of the interviews was 35 minutes and 27 seconds (varying from 24.13 to 45.42 min). The total length of the interview transcriptions was 83.5 pages.

The material collected during the studies (personal information, recordings and interview transcriptions) is in the sole possession of the authors. To maintain the

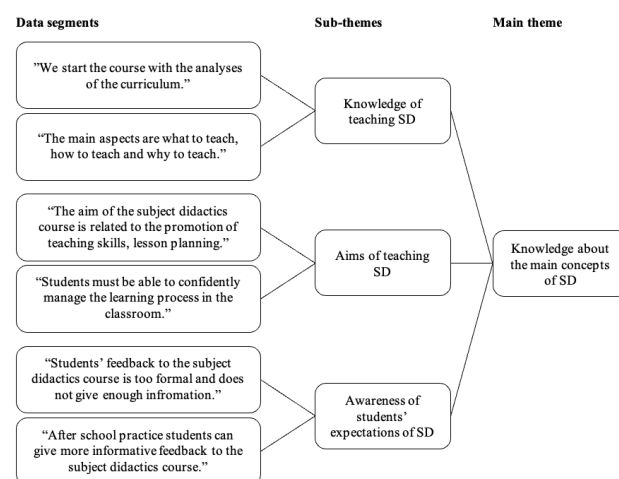
anonymity of the participants, all analysed data were encoded and no personal data will be revealed when the results of the study are published.

**Data analysis**

To examine the UTs' competence in teaching SD, thematic analysis was used, as this method is both flexible and provides a profound account of the data (Vaismoradi et al., 2013). When coding the transcribed interviews, the authors kept in mind that the reliability of the study would increase if another researcher codified the same data and if such coding yielded similar results (Bazeley, 2013). At the beginning, two authors transcribed all the interviews by verbatim, then listened to the recordings and cross-checked the transcripts to confirm their relevance to the research questions. Next, meaningful units of analysis (phrases and sentences) were identified and initial codes were generated.

To enhance the trustworthiness of the study and to ensure credible results, triangulation of authors was used (Patton, 2002). Two authors independently coded all interview transcripts and the authors developed the systematic coding system (Vaismoradi et al., 2013). Codes representing similar content were grouped under the sub-themes and main themes and were structured in relation to the research questions (see Figure 1). Some changes were made in the names of sub-themes.

**Figure 1.** Data segments, sub-themes and main themes.



**Results**

The results are presented in three parts, based on the research questions. The first part addresses the UTs' knowledge about the main concepts of subject didactics (SD). The second part presents the UTs' understandings about the position of SD in teacher education. The third part reports the UTs' teaching skills of SD.

### *Knowledge about the main concepts of SD*

The investigation of the UTs' knowledge about the concepts of SD identified main themes: knowledge of teaching SD, aims of teaching SD and the awareness of students' expectations of SD.

Knowledge of teaching SD. Almost all the UTs (UT1, UT3, UT4, UT5, UT6, UT7, UT9, UT19, UT11) defined the concept of SD through three aspects: what to teach (i.e., subject content), how to teach (i.e., methods), and why to teach (i.e., purpose). They found it necessary to expand on the importance of SD – what it is about and why it is in the curriculum. They emphasized that a more philosophical introduction to the SD should be preceded by special knowledge inherent in SD. "Subject didactic courses should supplement student teachers' general pool of pedagogical knowledge, as well as integrate it with different subject courses." (UT6)

Many UTs (UT 2, UT4, UT5, UT8, UT9, UT10, UT11) confirmed that the SD course should provide student teachers with basic teaching knowledge so that they are not only aware of what they are doing in the classroom, but why they are doing it. The majority of UTs concluded that the knowledge of SD equips future teachers with the concept of learning and the structure of teaching. Therefore, the significance of SD in the curriculum, choice of learning approaches, as well as teaching and assessment methods were described as basic knowledge provided in the SD course. "We analyse various learning approaches, focus on the variety of teaching methods and also speak about different ways of giving pupils feedback" (UT10).

Several UTs (UT3, UT7, UT6, UT9, UT10) considered knowledge of education legislation and requirements of the National Curriculum essential part of the SD course providing wider educational context, society's expectations and aims of educational policy. The need for a novice teacher to be familiar with the basic educational documents, for example The Occupational Qualifications Standard was acknowledged. This can be demonstrated by a novice UT3's quote: "I treat the topics of The National Curriculum in order to develop students' necessary competencies for teaching the themes required at school."

Aims of teaching SD. According to the UTs, one aim of teaching SD is to instruct students to deliver lessons in different subjects at school by combining a variety of skills and knowledge of subject content with SD. Several UTs (UT3, UT4, UT6, UT8, UT10) mentioned that SD should not only provide theoretical frame of teaching, but it should be practical in its essence. Therefore, a SD course should be strongly associated with promoting teaching skills, for example, how to plan a lesson set lesson aims, manage classroom, support

and assess students. Several UTs (UT3, UT5, UT6, UT8, UT10) also mentioned that SD should not only provide theoretical frame of teaching. The UTs' conviction can be illustrated by a novice teacher's opinion: "Many students might be frustrated, not knowing whether they are competent enough to teach some specific subject at school" (UT5). According to UTs, this can be achieved by introducing opportunities for making teaching process more understandable and enjoyable for students.

Awareness of students' expectations of SD. The results showed that the majority of UTs (UT1, UT2, UT3, UT4, UT5, UT8, UT10, UT11) tend to lack exhaustive data of students' expectations, however, they consider it essential to be aware of students' feedback. Several (UT2, UT3, UT5, UT7, UT9, UT10, UT11) interviewees found that students' expectations for SD change in the instructional process. This can be demonstrated by a competent UT's (UT5) "After finishing their school practice students claim to have experienced in the classroom the same things covered in their SD course" (UT5), and by an expert teacher's (UT9) viewpoints:

"First school practice also reveals which theoretical knowledge students lack in order to manage in the classroom, and we address these themes in my SD course" (UT9).

The UTs claimed that students evaluated their preparedness for teaching the themes covered in the SD course during their school practice. Practical input leads students to better comprehend the links between theory and practice and grow more confident teachers. In short, the UTs believed that students' understanding of their needs evolves during the SD course and school practice, nevertheless, they admitted that obtaining students' continuous feedback about their progress in SD should be aimed at. "Better knowledge of teaching skills makes future students more confident in the classrooms" (UT3).

### *Understandings about SD*

The analysis of the UTs' understandings about the position of SD in teacher education, two main themes revealed: the advantages and disadvantages combining subject and general didactics and integrating SD with knowledge of subjects.

Combining subject and general didactics. Most frequently, the UTs (UT1, UT3, UT4, UT5, UT6, UT7, UT8, UT9, UT10, UT11) argued that integrating SD and general didactics courses would supposedly result in students' better knowledge, whereas the teaching process might be more efficient. If UTs are aware of students' knowledge they can better focus on meeting students' needs. The following excerpt reveals an expert UT's opinion: "An integrated course allows to build up the courses in a more innovative

way, considering students' previous studies and needs" (UT11). Several UTs pointed out that integrated teaching enables to avoid unnecessary repetitions, to provide the terminology and concepts of general didactics with specific meaning and content of SD.

Most of the respondents (UT1, UT2, UT3, UT4, UT6, UT7, UT8, UT9, UT11) emphasized that the scope and focus of subject and general didactics differ so much that it would be difficult to integrate these courses. Students' unequal prior experience can be the main reason why didactics courses should be taught separately. It might complicate UTs' further coherent linking of important aspects and theories of teaching. This opinion has been summarized by a competent UT6: "More thorough theoretical approach is needed, and distinct courses make it possible." Due to variety of themes, combined didactics courses might lack sequence of knowledge which would extend students' understanding of how learning approaches are connected.

Integrating SD with knowledge of subjects. More than half of the interviewees (UT1, UT2, UT3, UT4, UT8, UT10, UT11) favoured teaching subject and SD courses together. They argued that the advantage lies in students' gaining more comprehensive knowledge, as subject content is taught in close connection with subject didactics. The following quote serves as an illustration of an expert teacher's opinion: "There are some didactics elements included in the course of subject so that it is almost impossible to teach subject knowledge without referring to didactics" (UT2).

A few UTs (UT4, UT5, UT11) claimed that teaching subjects and SD together considers students' prior knowledge of didactics and unnecessary repetition is avoided. As indicated by the UTs, integrated teaching elaborates on significant themes, giving students systematic treatment of both disciplines. "In case of an integrated course, UTs are aware of students' prior knowledge, and this allows them to build up the courses in more innovative and efficient way" (UT11).

Nevertheless, the UTs (UT1, UT2, UT3, UT4, UT5, UT6; UT7, UT10) frequently argued that teaching SD and subject together would make the subject and SD course too voluminous. Almost half of the interviewees emphasized that an integrated course might overlook some of the necessary themes. UTs felt that distinct courses give students better understanding of both subjects, keeping them motivated, whereas a combined course might bring along poorer subject content knowledge. "If we teach SD and subject together, the themes are fragmented and there is no time for the pieces of knowledge to settle in" (UT4). However, entwining some aspects of both subject and general didactics in a distinct SD course would create meaningful knowledge of how to guide learning process and achieve expected outcomes.

### *Teaching skills in SD*

The analysis of UTs' skills in teaching SD revealed two main themes: skills in building up the SD courses, and proposed changes in teaching SD.

Skills in compiling the SD course. Most respondents (UT1, UT2, UT3, UT4, UT6, UT8, UT9, UT10) relied strongly on their teaching skills in real learning situations. Only some UTs claimed to supplement their skills with principles of scientific literature. They considered evidence-based approach necessary to work with modern ideas and approaches represented in school textbooks and materials. "I consider it extremely important how to integrate different teaching skills so that the lesson would be logical and holistic" (UT1).

Almost all the interviewees (UT1, UT2, UT3, UT4, UT5, UT6, UT7, UT8, UT9, UT10, UT11) believed that one of the teacher's most essential competencies is to convey subject knowledge understandably by demonstrating its connection with everyday life. Several UTs claimed that some most treated aspects in the SD course are aiming, preparing and structuring lessons. Student teachers should be taught to analyse pupil-teacher interaction, learning activities, as well as planned outcomes. Many UTs stressed that they address teachers' communication, inclusion and feedback providing skills, as it can be exemplified by a quote:

"We have open discussion how to inspire pupils, give them appropriate challenges and arouse their interest in learning" (UT11).

The UTs (UT2, UT4, UT6, UT7, UT8, UT9, UT10, UT11) frequently stressed the importance of applying appropriate teaching methods. They consider students' essential knowledge of how and when to use different learning formats, e.g., workshops, group work, outdoor learning etc. Teaching should encourage learners to take interest in the subject, whereas enabling them to work on the zone of proximal development. The following excerpt addresses a novice UT's opinion in a detailed way: "One of the key aspects of teaching is to motivate learners, the teacher should develop the students' skill of supporting those pupils who are struggling, but also how to keep gifted pupils motivated and inspired" (UT4).

All UTs claimed that their involvement in different phases of school practice e.g. observing and supervising students' lessons at school, analyzing students' video lessons given at school as well as mini lessons instructed in the SD course, would add more opportunities for authentic teaching. UTs' claimed that in such a way they can step-by-step draw students' attention to the aspects of teaching which need to be mastered and promote students' self-reflection by considering UTs' and their peers' recommendations. For example, the analyses of video lessons enable to

focus on certain teaching methods, students' class management skills and outcomes of the lesson, whereas teaching through games in mini lessons shows how to improve students' skills in promoting pupils' curiosity. In short, the UTs believe that it is important to see students' progress in advancing their teaching skills both at school practice and in the SD course, in order to elaborate on the themes that need more attention. As one novice teacher noted: "The more I know how students teach in school practice, the better ideas I have what to stress in my SD course. I can elaborate on my own observations but I also pay attention to students' suggestions what they want to practice or study more" (UT10).

Changes in teaching SD. All the interviewees appreciated systematic cooperation between UTs which supports implementing innovative ideas. Teachers should plan series of meetings to discuss methodological and practical issues. UTs admitted sharing mutual aims of teacher training, however, it is rewarding to discuss the themes, methods and terminology of SD with their colleagues. Through cooperation, expert teachers can disseminate their good practice of teaching. In addition to well-functioning teamwork within the institution, several UTs (UT2, UT3, UT4, UT7; UT8; UT10,) appreciated learning from other institutions' experience. However, the UTs suggested taking active measures to improve ongoing collaboration. "We can benefit from cooperation between different universities since we have had joint web seminars as well as gatherings and discussions to develop new ideas and approaches." (UT8)

All the UTs emphasized the important connection of SD with school practice. For example, several UTs missed previously applied observation practice which enabled student teachers', school teachers' and UTs' joint observations of lessons and follow-up discussions.

## Discussion

The study revealed that the UTs assessed their ability to teach SD based on their knowledge of SD content, teaching objectives, and teaching methods. This knowledge enabled them to design a meaningful, goal-oriented, and well-structured SD course for training future primary school teachers. According to the UTs' understandings, there are both advantages and disadvantages of a distinct SD course compared to its integrated teaching together with general didactics or subject. The UTs emphasized the need for cooperation within the university and with other educational institutions, additionally, cross-university collaboration would improve their teaching skills.

The first research question examined what university teachers highlight in the content of knowledge, pedagogical content knowledge, and curriculum knowledge in teaching SD. The findings show that the

UTs consider content knowledge and pedagogical content knowledge as essential, while curriculum knowledge is acknowledged to a lesser extent (see Leijen et al., 2025). The UTs defined the concept of teaching SD mostly through three aspects: subject content, teaching methods, and course objectives, considering these central to providing meaningful instruction to the future primary school teachers (Schulman, 1986; Busse & Kaiser, 2018). Particular emphasis was placed on developing teaching skills, such as setting objectives, planning lesson phases, selecting appropriate methods and materials, and providing feedback to students. In this way teaching SD addresses content knowledge and pedagogical content knowledge in an integrated way (Shulmann, 1986). Our findings support prior research (Cramer & Schreiber, 2018; Deng, 2018; Meschede et al., 2017) in the point that combining subject knowledge and didactics equips future teachers with both content and structure for effective teaching. Busse and Kaiser (2018) argue that better knowledge how to teach a subject through varied instructional interaction leads to greater competence of SD.

Curriculum knowledge was acknowledged less frequently but was considered important for supporting novice teachers' understanding of the wider educational context, policy guidelines, and societal expectations. This is consistent with Dittrich (2020), Leijen and Pedaste (2018) and Leijen et al., (2025) who emphasize the role of curriculum documents and occupational standards – such as the National Curriculum for Basic School (Estonian Government, 2011/2014) and the Occupational Qualifications Standards (2025) – in teachers' professional development. However, our findings also differ from some previous studies (e.g., Vollmer & Klette, 2023), which emphasize content delivery. The UTs in this study prioritized responding to students' needs and reflecting on their teaching, although they spent relatively little time evaluating student learning, highlighting an area for potential improvement.

It appeared that the UTs have rather inadequate or superficial knowledge of students' expectation for the SD course, however, more detailed feedback to the course is obtained after students' school practice. Other research has also found that educational skills like lesson planning, classroom management, and assessment strategies lead learners to analyse their needs as well as choose appropriate teaching methods and interactions with students (Parchmann, 2013; Uibu et al., 2023; Vollmer, 2021). In our study, the UTs believed that their knowledge of students' expectations and needs before and during the SD course would allow them to support students' better copying in authentic teaching situation. According to the UTs, understanding students' expectations would enable them to support authentic teaching situations,

a principle that the UTs in this study recognized as an area for further development. This understanding of UTs is consistent with Vollmer's (2021) argument that SD should connect content and pedagogy to allow reflection both before and after instruction. In our study, the UTs strive for teaching subject didactics in a student-oriented way, enhancing both their professional growth and the effectiveness of SD teaching. This highlights both the accordance with existing research and a new viewpoint on adapting SD teaching to better prepare future primary school teachers.

The second research question aimed to describe the UTs' understandings about the position of subject didactics in the teacher education. Consistent with previous studies, the UTs noted similarities between general didactics and SD, including overlapping concepts, topics, terminology and approaches. They also recognized the advantages of combining the courses, reflecting findings by Vollmer (2021), who argues that SD has partly taken over educational tasks and goals of general didactics. Furthermore, integrating SD with general didactics was seen as a potential way to promote more efficient, aim-oriented, and comprehensive student learning, supporting arguments by Le Deist & Winterton (2005) and Sikkal et al. (2021). While the UTs saw advantages in combining didactics courses, they were still concerned that differences in students' prior knowledge and the large scope of the subjects might justify keeping the courses separate to maintain coherent learning – an issue that might be less noted in previous studies.

Our findings showed that UTs preferred teaching subject and SD courses together, noting that subject courses already include several didactic elements. This aligns with previous research suggesting that integration can enhance students' understanding and engagement (Salo et al., 2019). In addition, our results also confirmed previous findings that combining subject and SD courses might weaken knowledge in both areas, as SD courses emphasize broader range of teaching skills, methods and assessment strategies (Uibu et al., 2023). Unlike more traditional approaches that treat SD as supplementary, the UTs recognized both strengths and challenges of offering SD as a separate course (Sikkal et al., 2021; Uibu et al., 2023), highlighting the key finding of our study – the importance of student-centered evaluation and reflection. Therefore, the position of subject didactics in the curriculum should be reviewed, considering integrated teaching, students' knowledge and curriculum development. A stronger interrelation between the areas of subject and SD can benefit teacher training programs by promoting a more comprehensive approach to teaching (Cramer & Schreiber, 2018).

The answers to the third research question regarding which teaching skills the UTs consider important in delivering SD at the university, revealed that the UTs largely rely on their own teaching skills and experience. Similar to previous studies (Dittrich, 2020; Hultman et al., 2012), the UTs favour didactical diversity and gain teaching skills primarily through classroom practice and colleagues' ideas. When guiding the learning process, positive outcomes are expected to be achieved through interaction with students and modification of various learning methods. However, unlike these studies, our results indicate that principles of scientific literature are rarely applied in teaching. Mastery of teaching SD, according to Vollmer and Klette (2023), can be enhanced by combining scientific theory with teachers' practical experience in instruction, a combination that is less evident in the UT's current practice. The difference can be explained by the UTs' practice-based training, limited tradition of engaging with complex scientific articles, and their perception that students benefit more from practical approach in subject didactics courses. Nevertheless, the UTs acknowledged that deeper cooperation and participation in joint research projects with colleagues could improve their ability to interpret scientific theories in teaching.

In our study, the UTs also highlighted the importance of conveying subject knowledge clearly and connecting it to real-life examples, aligning with Hultman et al., (2012) who noted that SD often promotes interaction in the classroom. The UTs reported that participation in school practice helps them support student teachers in developing authentic class dynamics and goal-setting skills, as well as fostering self-reflection and strategies to motivate learning (Cramer & Schreiber, 2018). Furthermore, our study offers a novel perspective by showing how UTs actively link theory and practice through video reflections and mini-lessons, enhancing pedagogical skills and adaptability in real classrooms. These findings illustrate the UTs' efforts to integrate theory and practice effectively (Hultman et al., 2012; Ozmantar & Akkoç, 2017). Based on Cramer and Schreiber (2018), the overall success of teacher education depends on the capacity for dialogue of the individual elements of teacher education.

The UTs unanimously highlighted the importance of close collaboration between the university and schools during pedagogical internships, as this is the first opportunity for students to apply theoretical knowledge in real classroom. In Estonia, primary school teacher education curricula include modules of general pedagogy and subject-specific teaching embedded in school practice (Pedagogicum T.U., 2019). The UTs emphasized that effective cooperation with schools, alongside internal university collaboration and cross-university initiatives, can enhance both their teaching skills and the quality of

student learning, supporting the value of collaborative teacher preparation (Cramer & Schreiber, 2018; Sikkal et al., 2021; Salo et al., 2019). By closely observing students' progress in schools, UTs engage in reflection and continuous professional growth, in line with practice-based teacher education models (Grossman et al., 2009; Korthagen, 2017). Our study also points to a clear need for broader and more systematic collaboration among SD teachers across universities and with partner schools, highlighting a potential path to strengthen both professional knowledge and the integration of research-based insights into classroom practice, thereby ultimately improving the overall preparation of future primary school teachers.

Some limitations, related to the method, should be discussed. The sample included the UTs who teach SD in the primary school teacher curriculum. A more varied sample would have given more broad-based comprehension of the knowledge, understandings, and skills of the UTs. The sample was also relatively homogeneous in terms of gender, as it included only one male participant, which may limit the diversity of perspectives represented in the findings. Next, the interviewees focused mostly on specific aspects of the SD taught by them. More integrated, wider approach to teaching could have mapped better the situation of SD teaching at the universities.

## Conclusions

This study offers fresh insight into what university teachers consider important in teaching subject didactics across its domains of knowledge, understandings and teaching skills in primary teacher education. First, this research shows that UTs place more emphasis on student-centred and needs-based SD teaching, even though they often have only a limited understanding of students' expectations at the start of the course. This points to a gap in how feedback is collected before the course and shows the need for earlier and more systematic input from students. Second, although curriculum knowledge is usually seen as less important, the study reveals that UTs view it as mainly useful for helping novice teachers understand the broader educational context – something that earlier research might not have highlighted as clearly. Third, the study offers new evidence regarding the position of SD in the curriculum. Our findings bring forward UTs' concern that integrating these courses may risk reducing the strength of both disciplines unless students have equal prior preparation. This reveals a subtle tension that has received limited attention, involving the integration of courses and their coherence, and suggests that the curriculum should be carefully reviewed to achieve a balance between breadth and depth. Fourth, UTs rely predominantly on practical experience and use scientific literature only to a small extent, indicating

a gap between research and practice. This points to an important opportunity: more active participation in joint research projects and stronger cooperation within and across institutions could improve the UTs ability to understand and apply evidence-based knowledge in SD teaching. Finally, the study offers a new perspective on collaboration within universities. The UTs in this study specifically call for more systematic collaboration to strengthen professional knowledge and unify SDs' practices. This suggests that building long-term professional networks could support knowledge sharing and better integrate theory and practice in SD.

To sum up, our findings show how UTs deal with the connections between content, teaching methods, curriculum, student needs and institutional factors. The study not only supports earlier research but also adds new insights by identifying aspects for improvement: the need to engage with students' expectations earlier, to recognise the importance of curriculum knowledge, to use scientific theory more consistently, and to strengthen cooperation within institutions. These insights can guide the future development of SD, making teacher education clearer, more evidence-based, and more closely connected to real classroom practice.

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