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## Article

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International Journal for Research in Vocational Education and Training (IJRVET)

## Provided in Cooperation with:

European Research Network in Vocational Education and Training (VETNET), European Educational Research Association

*Suggested Citation:* Kverneggen, Kari-Anne; Schmid, Evi; Andresen, Silje (2026) : Vocational teachers' work at the boundary of school and work: A scoping review, International Journal for Research in Vocational Education and Training (IJRVET), ISSN 2197-8646, European Research Network in Vocational Education and Training (VETNET), European Educational Research Association, Bremen, Vol. 13, Iss. 2, pp. 237-260,  
<https://doi.org/10.13152/IJRVET.13.2.4>

This Version is available at:

<https://hdl.handle.net/10419/340060>

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# Vocational Teachers' Work at the Boundary of School and Work: A Scoping Review

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Received: 28 May 2025, Accepted: 02 September 2025

## Abstract

**Context:** VET programmes in most countries are organised as a combination of learning in schools and learning in workplaces, with elements of workplace learning ranging from a few hours of job shadowing to longer duration internships or full apprenticeships. While there is no doubt about the benefits of work-based learning opportunities for young people, combining school learning and on-the-job learning also poses challenges for learners. Learning in a school context and in the workplace are inherently different, with different rationales, cultures and purposes, and research has emphasised that students and apprentices often experience difficulties in their transitions between school and the workplace.

**Approach:** This scoping review aims to systematically map the international research over the last two decades on vocational teachers' work at the school-work boundary in upper secondary vocational education and training. Following a comprehensive search of seven databases, 18 studies from 10 countries were selected as eligible in line with predefined inclusion criteria. These articles were systematically screened by means of a coding scheme to identify the following information: country of origin of the study, its aim, research design and methods, theoretical framework and key findings.

**Findings:** Findings show that vocational teachers employ a range of school-specific and work-resembling activities and practices that can potentially facilitate student learning; however, there is a lack of research on the effects of teacher work on student learning and

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outcomes. Furthermore, the findings show that communication with workplace supervisors is in many ways crucial to the work of vocational teachers in their efforts to facilitate learning between school and the workplace. At the same time, however, teachers experience various obstacles to communication with workplaces, and there is a gap regarding evidence on how to address the challenges that teachers experience in their communication with workplaces.

**Conclusions:** This review presents numerous examples of how vocational teachers can play a crucial role in supporting students and apprentices in their learning between the two learning environments. However, the findings highlight the need for quantitative, longitudinal and intervention studies to analyse the effects of different pedagogical and didactic approaches on facilitating learning between school and the workplace and to identify and evaluate measures to facilitate communication between teachers and workplace supervisors.

**Keywords:** VET, Vocational Education and Training, Vocational Teachers, Workplace Learning, Youth Transitions, Apprenticeship, Institutional Cooperation

## 1 Introduction

A successful transition from school to work is crucial for young people's employment prospects and life chances (see e.g. Reinke & Goller, 2022). In many countries, vocational education and training (VET) plays an important role in providing young people with relevant skills and competencies and preparing them for working life. In this context, workplaces are recognised as favourable learning environments, as they provide authentic work experiences and can help young people gain an early understanding of the world of work. Research shows that countries in which VET is organised as a combination of learning in schools and learning in workplaces enable a smooth transition from school to employment (Organisation for Economic Co-operation and Development [OECD] & International Labour Organization [ILO], 2017). To better connect the education system with the labour market, VET programmes with a combination of school-based education and workplace-based training are therefore widely recommended (European Centre for the Development of Vocational Training [Cedefop], 2020; OECD, 2010; Sweet, 2018). According to the OECD, most VET programmes include some element of workplace learning, though this component may be small, such as a few hours of job shadowing. However, various countries make extensive use of workplace training involving longer duration internships or full apprenticeships (OECD, 2010).

In this scoping review, we investigate the research conducted on vocational teachers' work at the boundary of school and the workplace for students and apprentices in upper secondary VET. A boundary can be understood as 'a sociocultural difference leading to discontinuity in action or interaction' (Akkerman & Bakker, 2011, p. 133). While there is no doubt about the benefits of work-based learning opportunities for young people (for a discussion, see

e.g. OECD, 2010; OECD & ILO, 2017; Sweet, 2018), combining school learning and on-the-job learning also poses challenges for learners. Various studies have argued that learning in a school context and in the workplace are inherently different, with different rationales, cultures and purposes (e.g. Schaap et al., 2012; Tanggaard, 2007; Tynjälä, 2008). Learning in school is planned according to educational goals and is usually intended to produce abstract and generic knowledge and principles that can be applied in a variety of situations. Learning in the workplace is often implicit, highly contextualised and driven by workplace demands which tend to override educational goals (Fjellström & Kristmansson, 2019; Schaap et al., 2012; Tynjälä, 2008). In general, learners are expected to integrate experiences, knowledge, skills and attitudes acquired in both learning sites into a meaningful whole (e.g. Baartman et al., 2018). However, research from different countries shows that learners experience a lack of coherence and alignment between the activities at school and those in the workplace (Aakernes, 2018; Sauli, 2021; Tanggaard, 2007) and that they struggle to integrate and reconcile the different types of knowledge they encounter in these learning environments (Baartman et al., 2018). The feeling of nonalignment between school-based and workplace-based learning may go so far as to leave learners feeling that content taught at school is too abstract or even useless (Sauli et al., 2021; Tanggaard, 2007).

The integration of school-based and work-based learning, frequently termed 'connectivity' (Griffiths & Guile, 2003), may be related to and depend on aspects such as communication between school and the workplace or pedagogical practices at each learning site (e.g. Gessler, 2017; Sappa et al., 2018; Sauli, 2021). It has been emphasised that teachers and workplace supervisors can play a key role in supporting learners to integrate and reconcile their learning experiences across different learning settings (e.g. Sappa et al., 2016; Sauli et al., 2021), and they may therefore also be denoted as 'boundary workers' (Akkerman & Bakker, 2011, p. 140). In particular, the role of vocational teachers has been highlighted when it comes to helping students foster connections between school and workplaces (e.g. Sappa et al., 2018; Sauli, 2021). Vocational teachers are in a unique position to support students and apprentices in their learning at the two learning sites because of their background as both vocational workers and vocational teachers (Fejes & Köpsén, 2014; Lensjø, 2024; Sarastuen, 2020). With strong relationships with working life and strong allegiances to their former vocation, vocational teachers often have profound inside knowledge of both learning sites, sometimes even after many years of working as teachers (Fejes & Köpsén, 2014).

In their umbrella review, Gessler and Siemer (2020) identified a substantial gap of systematic reviews in the field of VET, and they argued that there is a particular need for review studies with a focus on theory generation, research methods and meta-analyses. An overview of the existing knowledge base may inform vocational teachers and school leaders, but also workplace supervisors and other actors in the field, about the potential and possibilities for vocational teachers to support students during their learning at both learning sites. Given

the fact that numerous countries make use of workplace training (cf. OECD, 2010), be it by offering internships during school-based vocational education (e.g. Finland, Sweden) or full apprenticeships (e.g. Germany, Switzerland), a comprehensive knowledge base on vocational teachers' work at the school-work boundary may provide relevant knowledge for stakeholders in the field, regardless of how VET is organised.

## **2 Aim of the Study**

As a consequence of the concerns outlined above, this scoping review aims to systematically map the international research related to vocational teachers' work at the school-work boundary in upper secondary VET. Our aim is not to undertake a full systematic review (cf. Gessler & Siemer, 2020). Rather, we seek to ascertain the extent and nature of research by investigating the following research questions:

1. What is the aim of the included studies?
2. Which research methods have been used in the included studies?
3. Which theoretical frameworks have been used in the studies?
4. What are the main findings of the studies?

## **3 Method**

This study uses a scoping review to provide an overview of research on vocational teachers' work at the boundary of school and work. Scoping reviews are used 'to map the concepts underpinning a research area and the main sources and types of evidence available' (Tricco et al., 2016, p. 2). The main purpose of a scoping review is to identify knowledge gaps in the existing research literature, provide recommendations for future research and identify strengths and limitations (Tricco et al., 2016). Scoping reviews are therefore suited for studies that explore multiple dimensions and broader topic areas (Campbell et al., 2023), as is the case in our study on vocational teachers' work between school-based and workplace-based learning environments. The flexibility of the methodology makes it possible to explore concepts without the use of predefined categories, enabling more descriptive mapping of evidence available within or across particular contexts. We used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) Checklist (Tricco et al., 2018) as a guidance and to secure methodological transparency.

### 3.1 Search Strategy

A systematic literature search of seven databases was conducted in September 2024. The following seven discipline-specific and multidisciplinary databases were included: Academic Search Ultimate, Education Source, Education Resources Information Center (ERIC), PsycINFO, Scopus, Teacher Reference Center and Web of Science. For a broad search, no language or publication year limit restrictions were applied, which is generally beneficial as it reduces the risk of missing relevant studies; we chose rather to use selection criteria to exclude irrelevant references. To better ensure the quality of the included studies, the search was limited to peer-reviewed journal articles. The search terms were developed based on the research literature on the topic of interest and modified in collaboration with a specialist librarian. A second specialist librarian peer reviewed the search terms before the final search was conducted by the first specialist librarian. Given the complexity of conducting a rigorous evidence synthesis as required in a scoping review, the authors emphasised the importance of regular team meetings throughout the process (cf. Pollock et al., 2023).

Considering the various ways of describing the combination of the two learning arenas and the role of teachers in this context, search terms were developed to capture word variants and different ways of representing them. The search is based on three concepts in order to find relevant literature that deals with teachers (concept 1), is relevant to VET (concept 2), in combination with boundaries between school and the workplace (concept 3). Boundaries between school and the workplace (concept 3) are in research literature described in different ways. Therefore, concept 3 is approached in two ways in the search strategy. The first approach captures literature that concerns school-workplace boundaries more implicitly by using a proximity operator to identify literature where school-related and work-related terms appear within three words of each other (e.g. the terms 'between school and workplace' or 'integration of school-based and workplace-based learning'). The second approach includes boundary-related terms (i.e. boundary, transition, connect) in combination with work-related terms (e.g. work or job). These different and complementary search approaches were used to broaden the search and ensure that it retrieved both explicitly framed and more contextually described studies on school-workplace boundaries, as suggested by Arksey and O'Malley (2005). Each database was searched with the following search terms in the title, abstract and/or keywords:

(Teacher\* OR educator\*) AND (Vocational OR VET OR TVET OR IVET OR technical school\* OR technical education\*) AND ((School\* OR education) NEAR/3 (work\* OR job\* OR industr\* OR apprentice\* OR employment\*)) OR ((Boundar\* OR transition\* OR connect\*) AND (work\* OR job\* OR industr\* OR apprentice\* OR employment\*))

By adding an asterisk symbol, all potential suffix variations of a word were included. For example, the term *work\** also included the terms 'workplace' or 'work-based'. In addition, the search included appropriate thesaurus terms when possible. Examples of synonyms used are vocational teachers, vocational education, vocational schools and school-to-work transitions

### **3.2 Selection Criteria**

References were included and excluded based on the following selection criteria:

1. Only studies focusing on school-work boundaries in VET at upper secondary as level 3 of the International Standard Classification of Education (ISCED) were included. This excluded articles concerned with school-work boundaries in higher education.
2. Only studies on vocational teachers' work in connection with students' or apprentices' learning between school and the workplace were included. This excluded, for example, articles on teachers' continuing professional development between school and working life.
3. Only articles offering evidence from empirical studies were considered. This excluded for example policy articles, conceptual articles and review articles.
4. The participants in empirical studies had to be vocational teachers. However, studies with empirical data from multiple perspectives were included if the study also included the perspective of vocational teachers.
5. Only articles published in English in peer-reviewed journals were included.
6. To maintain relevance for the present structure of VET, only articles published between 2005 and 2024 were included. This left us with a search period of 20 years.

The initial literature search resulted in a total of 3638 references, imported as a library in Endnote 21 for the removal of duplicates ( $n = 1504$ ) and references that did not match the year limit restrictions ( $n = 603$ ). A total of 1531 remaining references were uploaded for screening in Rayyan QCRI for manual screening of the title, keywords and abstract of all references based on the six selection criteria. All three authors individually assessed 15% of the references ( $n = 230$ ) to ensure consistent understanding of the selection criteria. Interrater reliability for inclusion/exclusion was calculated to be 93.6%. Articles that prompted a conflict were discussed by all authors until a consensus was reached. This process helped us refine our understanding of the selection criteria. The remaining 85% of the references ( $n = 1301$ ) were assessed individually by the first author. In case of doubt ( $n = 51$ ), all three

authors assessed the references individually before discussion until agreement. Most of the articles were excluded primarily because they were unrelated to the topic of interest and/or because the study participants were other than vocational teachers.

The screening process provided 34 remaining references for full-text screening, which was done by all three authors. A further 18 articles were removed because they did not meet the inclusion criteria. In addition, we included two studies found by ancestral search (i.e. records identified from the reference lists of included articles), leaving us with 18 studies that met the inclusion criteria. We also conducted a citation search, performed in Scopus and Google Scholar, but this did not yield any additional articles. The flow of the search strategy is shown in a PRISMA flowchart (Figure 1), as recommended by Peters et al. (2015).

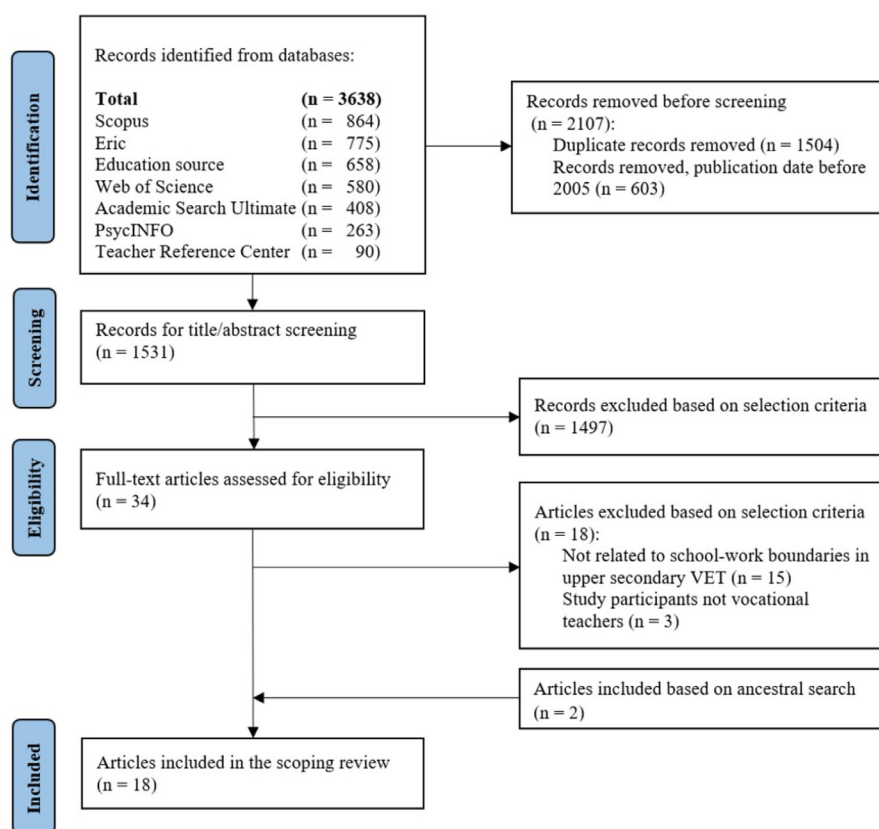


Figure 1: Flowchart of the Search Strategy

### 3.3 Coding Procedure

We developed a form to extract key information about each included study (Tricco et al., 2018), encompassing the authors' names, year of publication, country of study, aim of the study, participants, research method/design, theoretical framework and key findings. The three authors worked together to systematically analyse the 18 included articles, based on the coding scheme<sup>1</sup>.

### 3.4 Description of the Included Studies

A total of 18 articles met the inclusion criteria. Eight of the included articles were published between 2005 and 2014 and ten between 2015 and 2024. The articles included in this scoping review represent research from the following 10 countries: Sweden (6 studies), Finland (2), Switzerland (2), the Netherlands (3), Norway (2), Australia (1), Denmark (1), England (1), Germany (1) and Iceland (1). Two of the studies presented data from two countries.

## 4 Results

In the following, we present the results according to the research questions: 1) What is the aim of the included studies? 2) Which research methods have been used in the included studies? 3) Which theoretical frameworks have been used in the studies? and 4) What are the main findings of the studies?

### 4.1 Research Question 1: Aim of the Studies

To address our first research question, we first summarised the purpose of each article before categorising it using qualitative content analysis (Mayring, 2022). Qualitative content analysis is a systematic research tool for the interpretation of the content of textual data. Systematic classification through coding and categorisation helps researchers identify themes or patterns in the data and thus enables them to interpret text in a scientific manner. This analysis showed that the purposes of the included studies could broadly be categorised into the following two themes:

1. *Communication with workplaces*: Nine of the studies aimed to investigate vocational teachers' communication and/or collaboration with workplaces to facilitate learning for their students, namely their perceptions of communication and the purposes of their communication (five studies), teachers' agency in relation to workplaces (two studies) or the obstacles and gaps they encountered when using digital technology in their communication with workplaces (two studies).

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<sup>1</sup> The coding scheme is not included in the article, but can be requested from the authors.

2. *Didactic approaches to the organisation of in-school teaching*: Another nine of the studies aimed to investigate vocational teachers' didactic approaches to the organisation of teaching in school to facilitate learning, namely teachers' understandings of facilitating learning across domains and creating sameness and continuity and their experiences with fostering connectivity between learning in school and in the workplace.

#### 4.2 Research Question 2: Research Methods Used in the Studies

Most of the articles (16) used qualitative methods. Three used quantitative methods; two used an online survey (Eiríksdóttir, 2020; Choy & Sappa, 2021) and one study reported the use of both qualitative and quantitative methods (Bakker & Akkerman, 2014). In all, 16 studies were (at least partially) based on qualitative interviews, and 13 used individual interviews. While six of these studies relied solely on individual interviews (Enochsson et al., 2020, 2022; Isopahkala-Bouret, 2010; Mårtensson et al., 2019; Nore, 2015; Vähäsantanen et al., 2009), three combined individual and focus group interviews (Esmond, 2021; Mårtensson, 2020; Rapp & Knutas, 2024). In two of the studies using individual interviews, the teachers were interviewed twice (but without investigating a longitudinal change) (Enochsson et al., 2020, 2022). Three of the studies used observation in schools combined with individual interviews (Kilbrink & Bjurulf, 2013; Sauli et al., 2021; Wesselink et al., 2010). Another three drew exclusively on focus group interviews (Kilbrink & Bjurulf, 2013; Sauli et al., 2021; Wesselink, 2010). One study reported the use of both qualitative and quantitative methods, using interviews with one teacher and two workplace supervisors in combination with observation and student questionnaires (Bakker & Akkerman, 2014).

Most (17) of the included studies were cross-sectional; only one performed an intervention (Bakker & Akkerman, 2014). Three studies were based on a case study approach; two of these studies were based on a comparison of two countries (Choy & Sappa, 2021; Esmond, 2021), and one used a case study approach involving a region in rural Norway (Rapp & Knutas, 2024). In all, 11 studies included several groups of participants in addition to vocational teachers, such as vocational students, apprentices, workplace supervisors or school leaders (Akkerman & Bakker, 2012; Bakker & Akkerman, 2014; Berner, 2010; Eiríksdóttir, 2020; Esmond, 2021; Jonasson, 2014; Kilbrink & Bjurulf, 2013; Nore, 2015; Rapp & Knutas, 2024; Sauli et al., 2021; Wesselink et al., 2010).

#### 4.3 Research Question 3: Theoretical Frameworks in the Studies

The studies employed different theoretical frameworks to investigate vocational teachers' work at the school-work boundary. Ten (Akkerman & Bakker, 2012; Bakker & Akkerman, 2014; Berner, 2010; Enochsson et al., 2020; Esmond, 2021; Jonasson, 2014; Mårtensson, 2020;

Mårtensson et al., 2019; Nore, 2015; Sauli et al., 2021) used the concept of boundary crossing (some of them in combination with other theories), most frequently drawing on the work of Akkerman & Bakker (2011), Engeström (2001), Säljö (2003) and/or Guile and Young (2003). Some (Mårtensson, 2020; Mårtensson et al., 2019) used boundary crossing theory in combination with the situated learning theory of Lave and Wenger (1991) or the concept of communities of practice (Wenger, 1998).

As related to boundary crossing theory, the school-workplace connectivity model developed by Guile and Griffiths (2001) was used by three studies (Eiríksdóttir, 2020; Sauli et al., 2021; Wesselink et al., 2010); two of them used it in combination with other theoretical perspectives. Another three studies (Enochsson et al., 2022; Isopahkala-Bouret, 2010; Vähäsantanen et al., 2009) were based on theoretical perspectives on teacher agency.

The remaining studies used Gessler's (2017) framework of collaboration between educational institutions (Choy & Sappa, 2021), theoretical perspectives on transfer (Kilbrink & Bjurulf, 2013) or different perspectives on organising and communication (Rapp & Knutas, 2024).

#### 4.4 Research Question 4: Main Findings of the Studies

An analysis of the main findings of the studies suggests the following results: i) Communication with workplaces is important for vocational teachers' work yet is mostly limited to coordinative activities; ii) in their efforts to facilitate learning between school and the workplace, vocational teachers draw on both school-specific and work-resembling activities and practices; and (iii) institutional settings and educational practices shape vocational teachers' approaches to creating continuity between learning in school and in the workplace. Each of these results is described and exemplified below.

- i. Communication with workplaces is important for vocational teachers' work yet is mostly limited to coordinative activities.*

Findings from at least eight of the studies indicate that communication with workplaces is important for the work of vocational teachers in facilitating student learning, in various respects. Among others, the studies emphasised the importance of communication between teachers and workplace supervisors to match their teaching better with the needs of working life (Vähäsantanen et al., 2009), promote the transfer of knowledge and experiences between school and the workplace (Kilbrink & Bjurulf, 2013), organise work placements for students (Mårtensson et al., 2019), keep informed about students' work-based learning (Choy & Sappa, 2021; Enochsson et al., 2020, 2022; Isopahkala-Bouret, 2010), discuss and deal with problems that occur during work-based learning periods (Choy & Sappa 2021; Mårtensson et

al., 2019), secure sound assessment practices in the workplace (Isopahkala-Bouret, 2010) and ensure smooth transitions to apprenticeship training (Rapp & Knutas, 2024).

However, studies from three countries suggest that systematic communication between school and the workplace is severely limited. Choy and Sappa (2021) found that communication between Australian and Swiss teachers and supervisors in workplaces was mainly limited to coordinative activities, such as discussing student performance and specific problems they encountered during their learning. While these interactions enabled teachers to monitor progress to ensure that learning met the requirements of the curriculum, only a small proportion of teachers used communication to design collaborative learning practices to extend student learning. Communication for cooperation seemed to be related mainly to teachers' motivation to keep up to date with new trends and practices in their professional field so that they can adapt their teaching. Furthermore, teachers reported medium levels of knowledge about what students do in the workplace and believed that workplace supervisors were even less informed about learning in school. The study concluded that there was room for improvement to expand coordination and collaboration.

Similarly, the Icelandic study by Eiríksdóttir (2020, p. 14) concluded that there was a 'distinct lack of systematic communication or collaboration' between vocational teachers and workplace supervisors. The majority of the teachers disagreed with the statements that they were in regular contact with supervisors, and that they met regularly to discuss student progress. Almost half of them did not consider the programme as a coherent whole. The study concluded that the two learning venues in the Icelandic VET programme consisted of two parallel parts rather than a coherent whole, and that the system failed to assist learners in creating meaning from their experiences at each learning venue.

While the reasons for the limited communication were not analysed in these studies, three found that teachers experienced their professional role in the context of the workplace as undefined, leaving them with an unclear understanding of their work and responsibilities (Isopahkala-Bouret, 2010; Vähäsantanen et al., 2009; Wesselink et al., 2010). As a consequence, teachers enacted their agency in relation to working life in different ways, depending on their individual understandings but also on institutional settings (Isopahkala-Bouret, 2010; Vähäsantanen et al., 2009). For example, the study by Vähäsantanen et al. (2009) identified five forms of vocational teachers' agency in boundary-crossing settings: (1) Restricted agency, (2) extensive agency, (3) multifaceted balancing agency, (4) situationally diverse agency and (5) relationally emergent agency. Teachers' agency was shaped by factors such as their perceptions of their professional interests and their professional competencies but also by their understanding of their relationships with staff in the workplace and their self-perception in relation to the professional tasks defined by the school. Despite considerable differences in the way teachers exercised their agency, the study concluded that cooperation with working

life seemed to depend on teachers' individual efforts and was shaped mainly by teachers' personal contacts and contributions.

Furthermore, two Swedish studies found that even when teachers tried to use digital tools, they encountered various obstacles in their communication with workplaces. For instance, obstacles were related to material aspects (e.g. lack of mobile devices or email addresses), structural aspects (e.g. lack of time) as well as the differing attitudes of teachers and supervisors. The studies emphasised a need to move beyond attitudes and hands-on skills to better understand teachers' needs when using technology to cross boundaries in VET (Enochsson et al., 2020, 2022).

At least three studies highlighted that more communication is essential to share expectations and responsibilities and to achieve a shared understanding of the curriculum (Choy & Sappa, 2021; Eiríksdóttir, 2020; Wesselink et al., 2010).

*ii. In their efforts to facilitate learning between school and the workplace, vocational teachers draw on both school-specific and work-resembling activities and practices.*

Findings from several studies suggest that vocational teachers' task of facilitating learning between school and the workplace entails both providing real-life work situations and taking advantage of school specificities. Teachers' efforts to establish work-resembling practices at school are described in three studies, for example in reconstructing factory settings (Berner, 2010) or creating sameness and continuity between in-school training and work-based learning (Mårtensson, 2020). Arranging work-resembling practices was used to make instructional practices more relevant (Berner, 2010) but also to ensure that the students had a proper understanding of how to behave at a future workplace (Jonasson, 2014). In the Danish study by Jonasson (2014), teachers' efforts to make the school resemble a workshop as much as possible entailed, for instance, teaching students not to leave out more tedious parts of the work but to take responsibility for whole work processes. Hence, the teachers were concerned with giving students as realistic an encounter with future apprenticeships as possible (Jonasson, 2014).

However, despite efforts to facilitate learning by connecting school and the workplace, several studies also found that vocational teachers underlined the distinct characteristics of school and work, thereby acknowledging the specific contribution of school-based learning. Vocational teachers in four studies emphasised that school-based learning provided students with the opportunity to ask questions and make mistakes (Berner, 2010; Jonasson, 2014; Kilbrink & Bjurulf, 2013; Mårtensson, 2020), and school was therefore described as a safe environment for training, practice and preparation. In such a setting, teachers can act as good role models for their students by showing and explaining work practices to them as if they were in a workplace, but at the same time giving them the opportunity for trial and error, questions and mistakes. This moving between theory and practice helps students to understand and connect in-school learning with practice, with teachers taking the role of both a

boundary crosser and a boundary object (Mårtensson, 2020). However, while all the above studies emphasised the benefits of vocational preparation in a safe learning environment at school, the study by Jonasson (2014) also discussed that practice in a safe environment could come at the expense of relevance. This concerns, for instance, teachers' concerns that school does not always prepare students well enough for the pace they will encounter at a future workplace.

In addition, several studies suggest that schools have an important role to play in equipping students with a broad skill set. A broad knowledge base, for example basic skills such as how to use tools, may help students get ready for the workplace (Kilbrink & Bjurulf, 2013) and is particularly important in cases where companies equip learners with a narrow set of competencies, for example by putting them straight into production (Berner, 2010). In the Swiss study by Sauli et al. (2021), teachers emphasised that a broad perspective was required from them because they were dealing with apprentices who learn the same trade in different workplaces. The teachers acknowledged the variety of experiences as an opportunity to help apprentices develop a broader vision and to help them see 'variety in the way of doing things' (Sauli et al., 2021, p. 401). Similarly, Akkerman and Bakker (2012) found that teachers highlighted time for discussion and reflection after students' release days, which provided an opportunity to explain the how and why of the work processes in more detail. Furthermore, Bakker and Akkerman (2014) showed in their intervention study that such reflection, as part of a boundary-crossing approach, does indeed support students in integrating school-taught and work-related knowledge. The improvement in students' knowledge integration levels was statistically significant and with medium effect size, and both students and their regular teacher were positive about the boundary-crossing approach (Bakker & Akkerman, 2014).

Furthermore, Berner (2010) concluded that school-based learning is important to ensure the inclusion of all students, including shy, school-weary students or students with poor self-confidence who needed support and encouragement from teachers. What teachers in the study by Berner called a 'fostering mandate' (p. 31) relates to a notion of equality, where all individuals should be cared for and nobody left behind. In conclusion, when it comes to facilitating learning between school and the workplace, several studies highlighted that school-based training has advantages that purely work-based training does not have.

Finally, the study by Nore (2015) shows how teachers also use boundary objects, such as ePortfolios, as tools to facilitate the integration of learning in different learning environments.

*iii. Institutional settings and educational practices shape vocational teachers' approaches to create continuity between learning in school and in the workplace.*

Findings from two of the studies suggest that variations between vocational teachers' approaches to facilitating learning across the school-work divide reflect different institutional settings and/or educational practices. In her Swedish study, Mårtensson (2020) identified

three approaches, ranging from (1) teachers who did not see any need to actively address the differences between in-school training and the workplace to (2) teachers who actively made students aware of the differences between the learning sites and (3) teachers who considered it essential to help students connect in-school learning with work experiences. Teachers' efforts to create continuity between school and the workplace were related to the organisation of their teaching, with a particular need to create continuity between the two learning sites in school environments with little resemblance to the workplace. Where in-school teaching took place in a school workshop resembling the workplace, teachers did not express any need to actively create continuity. For the teachers in the first of the above groups, theory and practice go 'hand in hand' (Mårtensson, 2020, p. 9), and they therefore saw no apparent boundaries between school and practice.

In contrast to the teachers in this group, the teachers in the second group made the boundaries between school and practice visible by stressing the differences and by alternating between teaching in the theory classroom and in practice. Here, the boundaries between school and practice were also clear in terms of the institutional setting, with a physical wall or a threshold between the 'theory classroom' and the workshop. However, the different sites supported each other. The approach of the third group of teachers stands out by their efforts to help the students make connections between school and the workplace. Teachers prepared students for workplace-based learning periods by, for example, telling stories based on their work experience, and they used students' experiences after learning in the workplace for joint discussions and reflections in the classroom. Mårtensson (2020) concluded that teachers can create continuity independently of the institutional setting, but different approaches may be required, and vocational teachers may need creativity.

In a similar way, Esmond (2021) presented three different understandings of how vocational teachers can integrate learning across domains, described as integrative, complementary and implicit boundary crossing. The study found that vocational teachers in Germany and England had different understandings of facilitating learning across the school-work divide and that these variations reflected distinctive national institutions and education practices rather than being shaped by the potential or necessity for integrative approaches.

## **5 Discussion**

This scoping review documents an increase in research on vocational teachers' work at the school-work boundary in upper secondary VET since the 2010s, with a further significant increase in the 2020s. In all, 18 studies from 10 countries were included in this review, with 12 studies from Scandinavian countries and six from other European countries (one of which was a comparison with Australia). The geographical scope of the research indicates that challenges related to the boundary between school and the workplace, as well as questions on how it can

be addressed, are a concern regardless of the organisation of the VET system. Overall, the studies were based on the perspectives of 393 vocational teachers. The main findings of the studies may be summarised as follows: Communication with workplaces is important for vocational teachers' work yet is mostly limited to coordinative activities; in their efforts to facilitate learning between school and the workplace, vocational teachers draw on both school-specific and work-resembling activities and practices; and institutional settings and educational practices shape vocational teachers' approaches to create continuity between learning in school and learning in the workplace.

The findings raise four issues for discussion: (i) Vocational teachers' work at the school-work boundary entails a variety of tasks and activities that can potentially have a significant impact on student learning, but the impact of their work on student learning remains under-researched; (ii) the need to clarify vocational teachers' professional role in relation to working life and to facilitate their communication with workplaces; (iii) the concept of boundary crossing offers a conceptualisation with which to empirically study teachers' efforts to facilitate learning between school and the workplace; and (iv) the need for methodological diversity and intervention studies.

First, the findings illustrate that vocational teachers can play a significant role in facilitating learning between school and the workplace, namely prior to, during as well as after workplace learning periods. Teachers are concerned with preparing their students for future workplace learning, for example by providing them with basic skills (Kilbrink & Bjurulf, 2013) or teaching them how to behave as an apprentice (Jonasson, 2014). They use work-resembling practices to make instructional practices more relevant (Berner, 2010) but can also take advantage of the school setting that offers a safe environment for training, practice and preparation (e.g. Berner, 2010; Jonasson, 2014; Kilbrink & Bjurulf, 2013; Mårtensson, 2020). Vocational teachers can act as good role models for their students, help them connect in-school learning with practice, thereby taking the role of both a boundary crosser and a boundary object (Mårtensson, 2020). Furthermore, teachers can have a crucial role during work-based learning periods, for example by discussing with workplace supervisors' challenges that apprentices might have (Choy & Sappa, 2021), sometimes acting as a 'firefighter' (Mårtensson et al., 2019). Finally, after work-based learning periods, teachers emphasise time for reflection and discussion to help students understand work processes and develop a broader vision (Akkerman & Bakker, 2012; Bakker & Akkerman, 2014; Sauli et al., 2021).

While these findings illustrate that vocational teachers can play a crucial role in facilitating learning between school and the workplace in multifaceted ways, the findings from this scoping review provide little insight into the impact of teachers' work on student learning. Only one of the articles reported on an intervention study, showing that stimulating students' boundary crossing in terms of reflection does indeed support students in integrating school-taught and work-related knowledge (Bakker & Akkerman, 2014). Although an additional six of the

studies also comprise samples of vocational students or apprentices, all the studies are cross-sectional in nature and, hence, no inferences about causality can be drawn. Longitudinal and intervention studies on how vocational teachers' work between school and the workplace contributes to student learning and outcomes could advance research in the field.

Second, this scoping review shows that communication with workplace supervisors is in many ways crucial to the work of vocational teachers in their efforts to facilitate learning between school and the workplace. At the same time, however, teachers experience various obstacles to communication with workplaces – both structural and related to the different cultures and attitudes between school and the workplace (Enochsson et al., 2020, 2022; Sauli et al., 2021). The consequences can be diverse. While findings from three countries indicate that systematic communication between school and the workplaces is severely limited and that both teachers and workplace supervisors might have limited knowledge about what students are doing in the other learning venue (Choy & Sappa, 2021; Eiríksdóttir, 2020), another study showed that communication with working life depends largely on the teacher's individual efforts, resulting in considerable differences in how they exercised their agency (Vähäsantanen et al., 2009).

These findings resonate with findings from a recently published study on cooperation between vocational teachers, company trainers and inter-company trainers in the German VET system (Schwede et al., 2025). Communication between the different actors was largely necessity-driven, initiated mainly to resolve challenges related to apprentices, such as unexcused absences, disciplinary problems or underperformance. Proactive or sustained cooperation seemed to be largely missing. Although vocational teachers and company trainers emphasised the importance of a strong theory-practice link, efforts to integrate theoretical and practical learning were largely limited within their own institutions. Furthermore, a recurring concern of the vocational teachers in the study was the undervaluation of school-based education by company trainers and their apparent indifference to apprentices' performance in school. The study concluded that one explanation for the persistent lack of cooperation was the absence of a shared understanding of aims, roles and pedagogical strategies.

Given the importance of vocational teachers' communication and cooperation with workplaces, and in line with recent research in the field (cf. Schwede et al., 2025), findings from the reviewed articles highlight the need to clarify their role in relation to working life and to develop measures to facilitate communication with workplaces. However, none of the studies investigated how difficulties in communication between school and workplaces can be addressed. Research on how communication between school and workplaces can be facilitated and lead to more expansive coordination or collaboration is needed (Choy & Sappa, 2021; Eiríksdóttir, 2020). Based on Gessler's (2017) model of collaboration between educational institutions, the question also arises as to how far a predominantly reactive approach to communication and cooperation between schools and training companies (cf. Choy & Sappa, 2021; Schwede et al., 2025) is able to support students and apprentices in their learning between the two learning

sites. Research is therefore needed on the impact of different forms of institutional collaboration on student learning.

Third, the range of theoretical frameworks in the reviewed studies indicates that various topics are related to the work of vocational teachers at the school-work boundary and that no single theory can adequately explain their efforts to facilitate learning between school and the workplace. Nonetheless, it is noteworthy that the theory most frequently used was that of boundary crossing. Boundary crossing theory argues that school and the workplace are different and use different practices (e.g. different communication, expectations or cultures) that make it difficult to move smoothly between the two worlds or communities of practice. Yet, the theory also holds that this boundary provides opportunities for school and the workplace to learn from each other. Learning is viewed as a two-sided and dynamic process of action and interactions between contexts (Akkerman & Bakker, 2011; Tuomi-Gröhn et al., 2003), and boundary crossing research focuses on how continuity is (re)established despite sociocultural differences. Hence, the prominent use of boundary crossing theory in the reviewed articles illustrates that connecting the practices of both worlds was an underlying aim in the reviewed studies. The aim of better connecting school and the workplace is also evident in other theoretical approaches employed in the studies, such as Guile and Griffiths' (2001) connectivity framework or Gessler's (2017) framework of school-workplace collaboration. In sum, the theoretical frameworks in the articles clearly reflect that the studies aimed at understanding ways to strengthen the connections between school and the workplace, thereby contributing to student learning.

Fourth, of the 18 articles, only 3 presented quantitative results (Bakker & Akkerman, 2014; Choy & Sappa, 2021; Eiríksdóttir, 2020), and 16 reported qualitative findings (the intervention study by Bakker and Akkerman (2014) presented both quantitative and qualitative results). More specifically, all 16 studies using qualitative methods were (at least partially) based on interviews, with 13 using individual interviews. Nearly all (17) of the studies were descriptive and aimed to explore and describe different aspects related to teachers' work rather than the facilitation of student learning or improvement to communication between teachers and supervisors. Only one study presented an intervention (Bakker & Akkerman, 2014). The methodological priority given to qualitative interviews may reflect the need for exploratory and context-sensitive approaches in order to capture the complexity and nuances of teachers' experiences and understandings of their work at the school-work boundary. However, the predominance of qualitative methods and descriptive studies suggests that future research could benefit from more methodological diversity, for example by including quantitative methods and longitudinal or intervention studies. Quantitative methods (or a combination of qualitative and quantitative) could enhance the generalisability of findings. Longitudinal studies could provide information on how the role of vocational teachers is evolving in the wake of policy and labour market changes, while intervention studies could analyse the effect of measures to facilitate learning at the school-work boundary.

## 6 Limitations

This review has several limitations. The scope was limited since we included only English-language peer-reviewed journal articles, excluding potentially relevant research published in other languages or formats. In addition, the focus on vocational teachers means that the perspectives of other key actors, such as vocational students, apprentices and workplace supervisors, remains underexplored. However, learning at the school-work boundary depends on interactions between the various parties involved and should therefore be considered in connection with other actors. Furthermore, we restricted our search to publications on vocational teachers' work between school and the workplace, thereby using search terms such as 'boundary', 'transition' or 'connect'. Other studies on the didactic work of teachers that less explicitly addressed the boundaries between the two learning sites or the goal of connecting them may have been ignored. Therefore, this scoping review does not provide a complete overview of the work of vocational teachers, their didactic strategies or digital tools. Finally, the quality of the studies was not assessed. While only peer-reviewed articles were considered, their research methodology and design were not evaluated for rigor. This may affect the validity of the findings presented in the studies. Despite these limitations, this review was guided by a rigorous and transparent methodology, applied in line with the PRISMA-ScR checklist (Tricco et al., 2018). Future research should consider a broader scope of the discourse on learning between school-based and workplace-based learning contexts and the quality and methodological underpinnings of the included studies.

## 7 Conclusions and Implications for Future Research

This scoping review has mapped the international research over the last two decades on vocational teachers' work at the boundary of school and the workplace in upper secondary VET. Although there has been a steady increase in the number of empirical studies on this topic, the number of studies is still fairly modest. Findings from this review illustrate that vocational teachers can play a crucial role in facilitating learning between school and the workplace in multifaceted ways. Teachers use a range of pedagogical and didactic approaches to help students understand and connect in-school learning with practice, thereby providing both real-life work situations and taking advantage of the safe learning environment at school (e.g. Berner, 2010; Jonasson, 2014; Mårtensson, 2020; Sauli et al., 2021). Findings from the studies included in this scoping review suggest that teachers' work can potentially have a significant impact on student learning, prior to, during and after workplace learning periods. However, the review revealed a gap regarding evidence on the effects of teachers' work. Only one of the reviewed studies provided empirical evidence of the effects of a teacher-lead boundary-crossing approach at school on students' level of integrating school-taught and work-related

knowledge (Bakker & Akkerman, 2014). The fact that quantitative, longitudinal and intervention studies are severely underrepresented results in a paucity of research investigating how teachers' work between school and the workplace impacts students, their learning and outcomes. Considering that the purpose of teachers' efforts is to support learning between school and the workplace, it raises questions that the effects of different practices and approaches have not been fully investigated. Future research should investigate the effects of different pedagogical approaches on student learning in both school and the workplace. To this end, future research should draw on previous research on vocational teachers' didactic strategies and tools, such as studies on the use of learning documentations, e-portfolios or mobile devices in VET. The perspectives of teachers, students and apprentices as well as those of workplace supervisors should be taken into account.

Another prominent result of this scoping review regards the challenges that teachers experience in their communication with workplaces and the absence of research on how to address these. A lack of communication and cooperation between educational actors has been a well-known issue in VET policy for a long time, and recent research suggests that little progress has been made over the past decades (Schwede et al., 2025). This scoping review illustrates that vocational teachers are in many ways dependent on communication and cooperation with workplaces in their work to facilitate learning for their students. Additional research is therefore needed to identify and analyse measures to facilitate communication between teachers and workplace supervisors. Moreover, there is a need to investigate how more expansive coordination, cooperation or collaboration between schools and training companies can support student learning. Researchers should consider a breadth of methodologies for researching the effects of different forms of cooperation on student learning, including systematic interventions testing their impact, longitudinal and case study approaches and approaches involving practitioners in finding solutions.

Although there is little empirical evidence of the impact of teachers' work between school and the workplace, this review has provided many examples of how vocational teachers can play a crucial role in supporting students and apprentices in VET. More research into the work of vocational teachers between school and the workplace will benefit students and apprentices in their learning in VET.

## Acknowledgement

The authors would like to thank specialist librarians Lilja Marlen Johannessen and Elisabeth Karlsen for their support in designing the search strategy, as well as postdoctoral researcher Stine Solberg (OsloMet) and senior researcher Torgeir Nyen (Fafo) for helpful comments on earlier drafts of this article. This work was supported by The Research Council of Norway [FINNUT, Project No: 344382].

## Ethics Statement

This paper fully complies with the principles and guidelines of the ethical statement for publications of the IJR/VET and has been performed based on the guidelines of the Norwegian National Committees for Research Ethics. The conducted research did not include human participants, and informed consent was therefore not necessary. The authors report there are no competing interests to declare.

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