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The role of school placement within research-based teacher education– through the eyes of science mentors

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The role of school placement within research-based teacher education – through the eyes of science mentors

In line with international debate, there is a discussion in Norway on developing teacher education by moving from a more experience-based to a research-based approach. This ongoing change presents a challenge, not only for the development of teacher education but also for teachers working as mentors in school placements. The aim of this study was to investigate science mentors' views on research-based teacher education and the contribution of school placement therein. Data were collected through semi-structured interviews with 11 mentors working as science teachers in Norwegian primary and secondary schools. Data analysis was based on a thematic analytical approach. The results demonstrate that mentors display a mixed and limited understanding of research-based teacher education, and that developing an understanding of what it means in both contexts (on campus and in school placements) needs to be addressed. Mentors view school placement as an arena in which student teachers can freely test different teaching methodologies. Currently, school placement appears to be experienced as somewhat separate from teaching on campus. However, we conclude that school placement founded in a common knowledge base within research-based teacher education can function as a bridge between theory and practice.

Keywords: initial teacher education, science education, research-informed teaching, research-based teacher education

Introduction

Since the mid-1970s, teacher education in Norway has undergone many reforms, the latest being in 2010 and 2017 (Klette & Hammerness, 2016; Norwegian Ministry of Education and Research, 2010, 2017; Trippestad et al., 2017). Teacher education has been transformed from an experience-based to a scientifically anchored educational approach, a change that can be understood as a paradigm shift (Advisory Panel for Teacher Education, 2020). As part of this development, teacher education programmes have changed from four-year courses at the bachelor's level to five-year master's

programmes, preparing student teachers for continuing professional development post education based on their knowledge of scientific theories and methods. This development has been partly inspired by the Finnish approach to teacher education with its long research-based traditions (Colleagues & Author 3, 2019), shifting the focus onto research and development to improve the quality and status of teachers and teaching (cf. Afdal & Spernes, 2018; Munthe & Rogne, 2015). To develop student teachers' research competence, the integration of theory and practice is a high priority within this reformed teacher education. The vision is to educate teachers with an identity marked by an enquiring attitude towards teaching, which they can use to identify, investigate, reflect upon, and change their practices (Norwegian Ministry of Education and Research, 2017).

Within teacher education, student teachers engage in two different learning arenas: teaching on campus with teacher educators and school placement supervised by teachers, who will subsequently be referred to as *mentors*. Previous research has shown that the partnerships between campus and placement schools are often characterised by tensions and misunderstandings (Daza et al., 2021; Zeichner, 2010). However, equal cooperation and a symmetrical relationship between the two learning arenas are central conditions for creating a fruitful partnership and coherence between campus and placement school learning (cf. Sääntti et al., 2014). Teacher education needs both theory and practice, and according to Klette and Hammerness, quality teacher education is designated 'around a clear and shared vision of good teaching; it is coherent in that it links theory with practice and offers opportunities to learn that are aligned with the vision of good teaching; and it offers opportunities to enact teaching' (2016, p. 3). In this study, the partnership between the two learning arenas within teacher education is the focus, and *the aim is to investigate science mentors' views on research-based*

teacher education (RBTE) and the contribution of school placement therein.

Accordingly, the following three research questions have been addressed:

- (1) How do science mentors understand RBTE?
- (2) What opportunities and challenges do science mentors identify in relation to RBTE?
- (3) How do science mentors envisage school placement as an integrated element of RBTE?

Theoretical Background

Research-Based Teacher Education

Research-based teacher education can be interpreted in many ways. Building on the work of Griffiths (2004), Healey (2005) built a two-axis model to describe different distinctions between research approaches in an educational programme. The horizontal axis refers to a focus on research content versus research processes and problems, and the vertical axis represents student teachers as either an audience or participants. From this model, four main types of research approaches were identified: *research-led*, focusing on subject content and an understanding of research; *research-oriented*, aiming at obtaining an understanding of the research process and the research results; *research-based*, emphasising enquiry-based activities; and *research-tutored*, in which research content is written about or discussed in cooperation with peers.

Within the Norwegian context, the focus has been on research-led and research-oriented approaches, with both emphasising teacher-focused activities and student teachers as the audience (Munthe & Rogne, 2015). Nevertheless, previous research shows that student teachers develop their analytical, critical, and reflective abilities

when actively participating in research and development (cf. Griffiths, 2004; Lavonen, 2018). Furthermore, student teachers are likely to gain the most benefit from research (in terms of in-depth learning and understanding) when they are involved in research activities themselves, namely the research-based and research-tutored approaches according to Healey's (2005) description. Similarly, Papatiriu and Hannan (2006) confirm that reading research is by itself not enough for incorporating research findings into daily work, and that an action-oriented approach is needed for students to understand the importance of research in terms of teaching. Consequently, if the objective is to develop RBTE by focusing on students' active approaches in line with Healey's (2005) description, changes in teacher educators' approaches and attitudes are also required, alongside changes to the programme (cf. Mausethagen & Raaen, 2017). The implementation of RBTE critically depends on a common understanding of the role of research in teacher education and the involvement of the field of practice as this constitutes a crucial arena for student teachers' enquiry (Raaen & Thorsen, 2020). Furthermore, the integration of field experience is key in bridging the theory–practice gap (Zeichner, 2010) and developing coherence.

Partnership in Teacher Education

Although Healey's (2005) model has been widely used as a tool for understanding different aspects of research in teacher education, placement schools as learning arenas have not been particularly addressed. Still, partnership in teacher education has been discussed for decades and is often referred to as the division between theory and practice, presupposing that both partners are equal (cf. Baumfield & Butterworth, 2007; Lillejord & Børte, 2016; Petersen & Treagust, 2014). However, the partnership between teacher educators and mentors is often considered challenging since the partners belong to separate communities and may lack an understanding of each other's working

situation and knowledge culture (Allen et al., 2010; Joram, 2007). Furthermore, within RBTE, there is a risk that academic knowledge may be considered the only authoritative source of knowledge. Different models are therefore suggested to enable the integration of other sources of knowledge, particularly from the practice field (Grossman et al., 2009). Zeichner (2010) describes this as a shift in epistemology and in teacher education, which allows different aspects of expertise to coexist on a more equal plane.

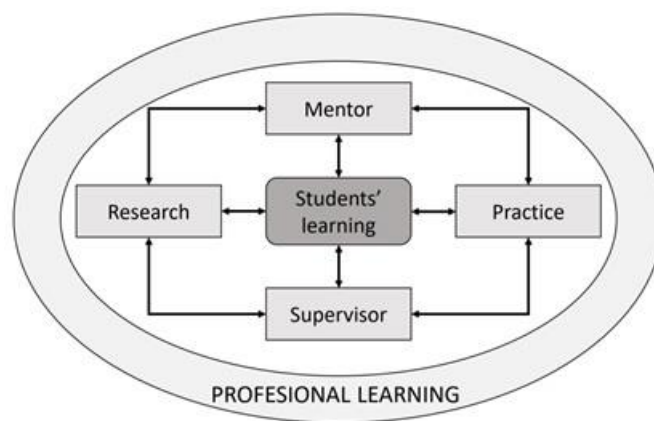
Several researchers have acquired Bhabha's (1994) notion of a 'third space' when describing models for collaboration. In this context, the third space is where the academic culture on campus meets the placement school's culture, that is, an arena for collaboration between the teacher educator, the mentors, and the student teachers (cf. Beck, 2020; Daza et al., 2021; Zeichner, 2010). Ideally, when student teachers are invited to participate in this third space, practical knowledge and skills are related to relevant theory and research (Raaen, 2017), and new knowledge and understandings are generated (Martin et al., 2011). Thus, a well-working partnership requires conceptual coherence (Raaen & Thorsen, 2020), and both groups of educators need a common understanding of educational goals, visions, and knowledge content (Hammerness, 2013). However, previous studies have shown that tensions and a lack of coherence between participants collaborating in the third space often reveal themselves. Furthermore, mentors tend to be critical towards research and mainly judge its value based on its capacity to be directly relevant to their work and classroom activities (BERA, 2014; Everton et al., 2000).

To enhance student teachers' learning, Lillejord and Børte (2016, p. 559) developed a model illustrating fruitful collaboration between teacher educators, mentors, and student teachers, as shown in Figure 1. In this model, student teachers' learning is at the centre, and both the teacher educator and the mentor must relate to

both research and practice. None of the partners possesses a specific knowledge area, and consequently, the model supports knowledge sharing and eases tensions and a lack of coherence between the campus and school placement. The model aims to cross borders between campus and schools and integrate a vision where all participants engage in research (cf. Cochran-Smith & Lytle, 2015). In relation to this study, this means that teacher educators and mentors possess the same understanding of theory and practice within RBTE. To achieve this, both partners need a **shared** understanding of the concept of RBTE and its meaning in both contexts (Klette & Hammerness, 2016).

Figure 1

A new model for learning dialogues in teacher education partnerships.



Note. From Lillejord, S., & Børte, K. (2016). Partnership in teacher education – A research mapping. *European Journal of Teacher Education*, 39(5), 559.

Method and Analysis

Informants and Data Collection

This study utilises a case study approach and was conducted at a teacher education institution in Norway by both Norwegian and Finnish researchers. This means that the

case has been viewed from two different perspectives, providing valuable information and insights (Blömeke & Paine, 2008). The data were collected in spring and autumn 2019 using semi-structured interviews with 11 mentors (Brinkmann & Kvale, 2018). In the study, the informants are science teachers in Norwegian primary or secondary schools, although they also teach other subjects (Norwegian teachers are typically educated in 2–4 subjects). The informants were chosen based on their experiences of school placement within science teacher education; thus, their qualifications in relation to the aim of the study were the basis for their strategic selection. The informants were contacted personally and invited to participate in individual interviews. Two researchers conducted the interviews using Skype (without video).

The interview guide was developed by the research team, and to test the guide, a pilot study was carried out in early 2019. Since no significant changes were made to the guide, this interview was also included in the study. The interview guide comprised three areas of focus concerning a) mentors' background characteristics, b) mentors' views on RBTE, and c) mentors' views on how school placement can facilitate RBTE. In relation to each focus area, between two and five interview questions were asked and (when appropriate) succeeded by follow-up questions. For the purpose of this paper, all the interview data have been used. The interviews lasted about 40 minutes and were recorded and transcribed. The study follows the general ethical standards approved by the Norwegian National Research Ethics Committees (2016) (approval number 382281).

Data Analysis

Although the main responsibility lay with one researcher, all researchers participated in the analysis process. Dialogues and meetings were held both face-to-face and online, with the aim of achieving a common understanding of the data. The data analysis

process was based on a thematic analytical approach in accordance with Braun and Clarke (2006), which follows six phases: 1) *Familiarising yourself with the data*. The researchers transcribed the 11 interviews verbatim and read the transcripts thoroughly and repeatedly. 2) *Generating initial codes*. Three of the researchers analysed the data separately in an inductive manner. The researchers performed individual preliminary analyses, each focusing on both separate and common parts of the data. This open-coding procedure resulted in many different codes, some of which were similar in character but others that differed due to the researchers' different analyses. 3) *Searching for themes*. The researchers discussed and compared the initial codes and agreed on preliminary themes in relation to each research question. 4) *Reviewing the themes*. The themes were checked in relation to the coded extracts and the entire body of data, generating a thematic map of the analysis. Based on the preliminary themes and the thematic map, more systematic coding was carried out. NVivo 12 software was employed, and the initial codes were used as the basis for the reviewed analysis. This part of the analysis thus had the character of a directed content analysis (cf. Hsieh & Shannon, 2005). The codes were compared for similarities and differences and grouped into higher-order themes, which were then checked in relation to the coded extracts and the entire data set. One researcher had the main responsibility for conducting the systematic coding, while the others contributed to the process by performing critical reading. This peer debriefing between the authors was very important for the trustworthiness of the analysis. 5) *Defining and naming the themes*. The ongoing analysis refined the specific focus of each theme, generating clear definitions and names for them all. The data were condensed and finally resulted in main themes, each related to one of the research questions. 6) *Producing the report*. Authentic and convincing extracts were selected from the data to ensure the trustworthiness of the analysis.

Finally, a detailed description of the data was presented, focusing on the aim of the study.

Results

The research questions guided the analysis and provided the starting point for developing themes. The analysis revealed several overarching themes, which will be presented here in relation to the three research questions.

Science Mentors' Understanding of RBTE

Within the theme 'perceptions and experiences', three subthemes were identified: *no clear view*, *student teachers engaging in research*, and *teacher education based on research*.

No clear view

The mentors displayed mixed views on the concept of RBTE. Most needed an explanation of the notion and of the recent changes to the teacher education programme, and two of them displayed *no clear view* of the concept. They expressed confusion with respect to how research is supposed to be included, and one asked: 'But do you mean that the student teachers are supposed to engage in it, or is it you teacher educators that conduct research?' (M-6).

Student teachers engaging in research

Three of the mentors associated the concept with student teachers collecting data and engaging in research, while all evaluated such engagement as positive. One mentor associated it with student teachers 'entering classrooms with notebooks' (M-1), while two other mentors referred to recent experiences with student teachers collecting data

for a Research and Development (R&D) assignment during their placement. Both considered such assignments as new approaches compared to their own teacher education. They noticed that the student teachers now work in a more focused way, since they need to read educational theory, are more curious about teaching, and focus on how their teaching is planned. According to these mentors, the process of writing an assignment helps student teachers to delve deeper into educational topics and focus, in a more structured way, on their planning, pupils, and learning outcomes.

Teacher education based on research

Six of the mentors pointed to pre-service teacher education and expressed expectations that student teachers would acquire updated and deeper knowledge with respect to new methodologies, relevant scientific topics, and curriculum development. They welcomed more extensive teacher education and assumed that the student teachers would acquire better subject knowledge, which they considered fundamental for good professional practice. Furthermore, educational research was emphasised as an important component as the various subjects have their characteristic demands, and student teachers should test various educational approaches and relate them to theory and reflect on them. One of the mentors (M-4) summed this up: ‘Basically, I assume it to be teacher education that is updated, which is closely related to the curriculum and research on how pupils learn (...) updated with respect to what is going on within the various subjects.’

Opportunities and Challenges Related to RBTE

Within the theme ‘opportunities and challenges’, two subthemes were identified:

concrete activities and educational tools and mentors’ attitudes towards educational research.

Concrete activities and educational tools

Several mentors emphasised the importance of having resources available related to new educational approaches and topics, such as computational thinking. They also mentioned several national and international science programmes. Some mentors value methodologies that are concrete and straightforward to implement, and they look for short activities that can add variation in class, in particular, practical activities and lab work that are feasible in terms of the available equipment. The methodology that mentors most frequently associated with science education research was enquiry-based science education. Mentors acknowledged that this approach is both supported by a wide area of educational research and, at the same time, stands for a research-like methodology through which pupils work in a way that reflects the processes of scientific research. These two perspectives indicate a need to be precise when referring to this potentially ambiguous notion. One mentor argued: ‘If I am to work with research-based teaching, then I have to choose between two ... is it the pupils that should work in a research-based way, or should I base my teaching on research?’ (M-1).

Mentors’ attitudes towards educational research

Several mentors recognised research as a basis for educational strategies and recommendations. Educational research can contribute with methodologies and ‘tools that work’ and RBTE generates greater confidence in teaching approaches. Two mentors mentioned that many may be reluctant to introduce new methods, but they also recognised how appreciative pupils are if they try. Two other mentors argued that interest in research should be an integral part of their practices. One of them, who holds a master’s degree in education, stated: ‘... when you have tried to do a little bit of research yourself ... you open up to new things, and the more you know, the easier it is

to identify badly conducted research ... One can be more critical towards “research shows that”, which is one of the most dangerous things.’ (M-7).

Science mentors’ visions of school placement as an integrated part of RBTE

The analysis of how school placement can facilitate RBTE was clustered around three subthemes: *testing out educational approaches*, *bridging theory and practice*, and *stimulating reflection*.

Testing out educational approaches

All mentors envisaged school placement as an arena for real-life experience; they highlighted various aspects of such placement and what student teachers may gain from it. Several mentors emphasised the role of school placement in observing a link between theory and practice. Placement also provides an arena for the critical investigation of the research presented during campus studies. Mentors further stressed that student teachers should not persist with familiar approaches but rather be curious and dare to test the various educational methodologies they have learnt. Mentors also explained that student teachers are offered a lot of freedom and should learn to take independent decisions, since school placement should be a place for trial and error: ‘Clearly, it is an arena where they are simply allowed to blossom, and when it comes to research-based education, they can dive into it and test things out’ (M-8). Other mentors drew attention to the importance of reflecting on what happened during a lesson or what went wrong. Student teachers should understand that school placement is not about performing a perfect lecture, but rather it is a place to benefit from the support of teachers while gaining experience.

Bridging theory and practice

Mentors stated that their role differs from that of teacher educators, and some identified the gap between theory and practice; one mentor stated: 'I have to emphasise more clearly that I am a link between theory and practice. I have to know quite a lot about both' (M-9). The mentors consider it important that student teachers have a realistic encounter with professional practice, and their role within this encounter is to challenge but also support, supervise, and motivate. All mentors recognised that they play an important role in RBTE; however, several requested clearer guidelines concerning what is expected from them. Well-defined guidelines may give mentors legitimacy, and collaboration with student teachers may therefore be less dependent on personalities and relationships. To fulfil the role, most mentors emphasised a need for closer collaboration and communication between campus and school placement—or what one mentor referred to as 'your and our projects', which were considered to be on 'two different planets' (M-1). According to mentors, the two arenas are experienced as being separate by student teachers. Furthermore, several mentors stated that they need to update their educational knowledge and revealed that they need to be informed about what student teachers are currently working with on campus to be able to supervise them. They expressed the view that staying updated is an obligation for mentors but also that it is challenging to achieve during a busy workday.

Stimulating reflection

Mentors considered stimulating reflection to be an important task. They expect student teachers to be able to reflect and justify their choices and strategies and avoid 'just doing' things. Several mentors stressed that they encourage student teachers to refer to theory and what they have learnt on campus when planning and justifying their

teaching, as well as using it actively in their reflections. Hosting and supervising student teachers are also viewed as an opportunity to update and develop their own teaching practice by several mentors. Mentors find reflecting together with student teachers to be enriching, especially since they experience limited time in their daily work to stay updated. One mentor summarised by saying ‘... my wish, when I sit down with the student teachers, is that they can update me as well with respect to teaching approaches and the theory behind them. For I must be honest, we don’t always have time to stay updated’ (M-9).

Discussion

The aim of this study was to investigate science mentors’ views on RBTE and the contribution of school placement therein. In order to achieve coherent RBTE, partners on campus and in schools need a common understanding of the concept (Raaen & Thorsen, 2020). Some of the mentors in this study display a limited understanding of the concept of RBTE and what this shift in teacher education entails. Others seem to have mixed views as to whether it should be the pupils or the student teachers that work with research-based processes. Most informants in this study associate RBTE with education that is informed by up-to-date research, both within subject areas and in the broader field of education. However, there are also several mentors who value and are interested in how research can inform the student teachers’ teaching and reflections during school placement. Hence, these mentors share the vision of RBTE and display an investigative stance towards school placement (Cochran-Smith & Lytle, 2015), viewing research as a common responsibility, as illustrated on the left-hand side of Figure 1 (Lillejord & Børte, 2016). Some mentors also have experience working with student teachers conducting research projects during their school placement and express attitudes that emphasise research processes and problems (Griffiths, 2004; Healey,

2005). Given these diverse opinions, there is a need to address the notion of RBTE to achieve a coherent understanding of its meaning in both contexts, namely on campus and in school placement (Lillejord & Børte, 2016).

With regard to the contribution of school placement to RBTE, mentors view it as an arena where student teachers are free to test different teaching methodologies. Several informants discuss how they make room for student teachers to bring in and test models and ‘methods that work’. They regard their role in this context to be discussion partners in order to stimulate student teachers’ reflections, allowing them a space in which trial and error may be followed up by discussions and reflections involving theory. This constitutes the RBTE in Healey’s model (2005) as the student teachers are involved in inquiry-based experimentation with various teaching strategies and reflect on the outcomes.

Another contribution envisaged by the mentors of school placement in RBTE is the schools as places where the student teachers experience coherence between their teacher education on campus and their future working lives. The mentors’ insights into classroom teaching from their daily work may provide a bridge between the educational theory learnt on campus and real-life classroom experience (Lillejord & Børte, 2016; Raaen, 2017). For this to work, the mentors emphasise a need to be up to date on the content learned by student teachers on campus, and they request a clear common knowledge basis and a shared awareness of the role of educational research. Such integration of theory constitutes an example of how research-based school placement may bridge the gap between theory and practice and contribute to a common language and goal.

School placement, as a learning arena, is often considered to result in tension between schools and campus. According to Lillejord and Børte (2016), neither of the

partners possesses a specific knowledge area, but both partners need to cross boundaries between research and practice (Daza et al., 2021; Raaen & Thorsen, 2020). This contrasts with the mentors in our study who think that the campus has greater ownership of teacher education than themselves. In this sense, it is also the responsibility of the campus to invite mentors into the third space (Beck, 2020; Daza et al., 2021) to avoid the two arenas being seen as separate communities that lack an understanding of each other's knowledge culture (Allen et al., 2010; Joram, 2007). Mentors suggest that, currently, school placement exists in parallel with campus education, rather than in unity with it, and propose that campus should provide them with information about the overall education and learning goals of the students, as well as updating them on educational theory. Thus, mentors' ability to relate practical knowledge and skills to relevant theory and up-to-date research is required for them to support student teachers in accordance with the teaching on campus (Raaen & Thorsen, 2020). Klette and Hammerness (2016) argue that mentors and teacher educators need to have a common understanding of educational goals, visions, and knowledge content, and it seems that our mentors expect campus to provide them with this understanding, or at least with a means of developing it.

Lillejord and Børte's (2016) model of partnership between schools and campus emphasises both research and practice as the basis for professional development. Some teachers question the relevance of research and, like some of the mentors in this study, how it can be adopted in terms of school placement (Borg, 2009). However, engaging with research in school placement may be understood to be broader than just applying or testing theory. Literature describes mentors' discussions and reflections as transboundary translation (Raaen & Thorsen, 2020). Such a process of sense-making of research-based knowledge may also be viewed as an inquiry-based activity (Raaen,

2017). In line with many other teachers (Borg, 2009), most of the mentors in this study do not have formal research competence and view themselves as practitioners, but, implicitly, they reflect on the sources of knowledge relevant for the teaching profession. Such a reflection is fundamental for establishing an inquiry-based approach to teaching (Daza et al., 2021; Raaen, 2017). This broader understanding of research engagement may support the shared responsibility for implementing RBTE. The reflections of mentors presented indicate a need to address the basic assumptions of RBTE. These include a shared acknowledgment of campus and the practice field as arenas for exploration, as well as the systematic and mutual processes of making sense of research and practice, aiming at coherence (Cochran-Smith & Lytle, 2015; Daza et al., 2021; Raaen & Thorsen, 2020).

Strengths and Weaknesses

Because the study was conducted on a small scale and the sample was selected from only one teacher education department, the conclusions drawn are limited. However, the aim of the study was not to offer generalisable answers but to give deeper insight into mentors' views on school placement within RBTE. The results can thus function as a tool for the development of teacher education and especially regarding the role of school placement. Based on the mentors' interest in the study, 11 informants were interviewed. Although the mentors represented different schools, it is difficult to know whether they are representative of the whole group. Despite this, their views and understanding are highly relevant to the aims of the study as they are experienced teachers. The interviews were carried out by two researchers who both worked in the teacher education department. This means their role and position may have affected the informants during the interviews, although no real power relations were evident in the process of the research. The mentors were further encouraged to be honest in terms of

their views and understanding to support the development of RBTE in the future.

Furthermore, only mentors were interviewed in the study, meaning that their perspective alone was the focus. To enhance the development of school placement, further research is needed from the teacher educators' perspective. By investigating both perspectives, a deeper understanding of partnership in RBTE – leading to fewer tensions between the partners and common conceptual coherence – can be achieved.

Conclusions

The aim of this study was to investigate science mentors' views of RBTE and the role of school placement therein. The study is relevant to the ongoing discussion on the development of RBTE in Norway. The current shift away from a more experience-based approach is a challenge, not only for the development of teacher education but also for mentors involved in school placements. As a result of this shift in teacher education programme, the mentors themselves represent another type of teacher education; hence, their competences are not always congruent with the research-based approach that student teachers experience during their teacher education. This was demonstrated by the mixed and limited understanding of RBTE demonstrated by mentors in this study. However, the mentors regard school placement as an opportunity to enhance student teachers' learning, since it provides an arena for trial and error and successive supervised reflection. In this study, school placement seems to be experienced as being somewhat separated from teaching on campus. In conclusion, a more developed common knowledge base covering content and methodological approaches within RBTE can bridge the gap between theory and practice and contribute to more coherent and meaningful teacher education.

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