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Fostering TEFL-Specific Digital Competences of English Student Teachers and In-Service Teachers in a Cross-Phase Collaborative Seminar

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Abstract: Since the publication of the new standards for teacher education in Germany (KMK, 2019) fostering digital competences has become a joint task of lecturers involved in the courses of studies for future teachers. This article presents a project conducted in the context of the COMeIN initiative (Communities of Practice NRW für eine innovative Lehrerbildung [German for: CoP NRW for an innovative teacher education]) at the University of Wuppertal. A seminar concept for fostering TEFL-specific digital competences was developed and evaluated. Findings from the seminar "Technology Assisted EFL Vocabulary Teaching and Learning: From Theory to Practice", which was conducted during the winter term 2022/2023, are presented. Student teachers and in-service teachers worked collaboratively in CoPs in order to develop digital lexical tasks for EFL classrooms. The student teachers prepared a teacher training session in which they introduced theoretical assumptions and empirical evidence about learning vocabulary with digital media and their implications for teaching. Student teachers and in-service teachers worked together to create teaching materials for students of different grades from primary and secondary schools. The in-service teachers implemented the tasks in their classrooms and provided extensive feedback on the quality of the designed tasks for the student teachers. This study investigates how student teachers and in-service teachers perceive their own digital competences related to teaching vocabulary with digital tools before and after having taken part in this cross-phase collaborative seminar and how they evaluate various aspects of such a seminar concept.

Keywords: Teacher education; higher education; English; digitalization; theory-practice relationship; community of practice (CoP)

1 Introduction

At university level each discipline is required to contribute to fostering digital competences of future teachers (cf. KMK, 2019, p. 13). In the Teaching English as a Foreign Language (TEFL) department, student teachers should learn to critically evaluate the chances and challenges of the English classroom for digitalization, be able to use these insights for subject-specific contexts and for further developing teaching and curricular concepts, be aware of the chances of digital educational resources concerning accessibility and use digital media for differentiation and for providing individual support (cf. KMK, 2019, p. 44). In this article, these general competences refer to the TEFL-specific area of lexis in a technology-enhanced classroom. In a cross-phase collaborative TEFL seminar, which was conducted in the context of the COMeIN[1] project, student teachers and in-service teachers jointly developed digital teaching materials. Student teachers and in-service teachers were asked to rate their own TEFL-specific digital competences with the help of an adapted version of the Digital Competence Framework for Educators (DigCompEdu) self-reflection tool (Redecker & Punie, 2017) before and after the seminar. The study investigated to which extent their perception of their own digital competences had changed and how they evaluated the seminar concept.

In the first part of this paper, general and subject-specific digital competences that English in-service teachers should develop are introduced. The following chapter explains how these competences could be linked to EFL classroom practice by introducing an innovative seminar concept for fostering student teachers' and in-service teachers' competences to plan and critically reflect upon teaching sequences for vocabulary learning with educational digital resources. This part is supported by empirical data which shows that both groups, student as well as in-service teachers, benefited from a CoP-based cross-phase collaboration. The paper concludes with a reflection on bringing student teachers and in-service teachers together, focusing especially on the potential and limits of such collaborative learning scenarios in the university context.

2 Theoretical Background

Apart from being a competent media user, in-service teachers need to have knowledge and skills in order to be able to integrate digital resources into the classroom in a reflected manner. This chapter introduces the Digital Competence Framework for Educators (Redecker & Punie, 2017) used in this research project, which aims at bridging the gap between theory and practice in teacher education. Current theoretical assumptions about the challenges and chances of supporting student teachers and in-service teachers during their professional development are summarized. A specific focus is put on the potential benefits and challenges of establishing collaborative and reflective cross-phase learning environments as Communities of Practice. Finally, research questions are presented.

2.1 Digital Competences in English Teacher Education

It is not a new endeavor to foster digital competences in English teacher education (cf. e.g. Legutke et al., 2007). In the recent discussion, the focus on digital competences has become broader and more facets are taken into consideration (e.g. Benitt et al., 2019). In accordance with fostering digital competences in general, language teachers need to provide support for helping learners to acquire not only the language skills in an increasingly globalized world but also multiple digital skills. The relevance of digital technologies has been reflected in several international teacher education standards and frameworks

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(e.g. American Council on the Teaching of Foreign Languages, 2013; Healey et al., 2008; Kelly & Grenfell, 2004; Newby et al., 2007). The debate and current initiatives in Germany are driven by the publication of the document "Bildung in der digitalen Welt" (German for: "Education in the digital world") (2017). German universities are now required to systematically implement digital learning opportunities in their curriculum development (cf. KMK, 2017, p. 5).

Various models have been developed to describe the components of digital competences (e.g. TPACK by Mishra & Koehler, 2006, or The Digital Teacher by Cambridge Assessment English, 2018). The European Framework for the Digital Competence of Educators (Redecker & Punie, 2017) is often used as a reference point for researchers. One of the benefits of this framework is that it provides a structured orientation for understanding the meaning of digital competences, what they entail, and how they can be modeled to affect teacher education positively (cf. Lütge et al., 2021, p. 32). The model consists of six areas:

1) Professional Engagement (e.g. professional collaboration, reflective practice);
2) Digital Resources (e.g. selecting, creating and modifying);
3) Teaching and Learning (e.g. collaborative learning, self-regulated learning);
4) Assessment (e.g. assessment strategies, feedback & planning);
5) Empowering Learners (e.g. differentiation and personalization);
6) Facilitating learners' digital competence (e.g. information and media literacy, problem solving).

Based on this conceptual framework, the European Commission designed and developed a self-reflection tool that aims to support teachers to develop and reflect upon their digital competences (cf. European Commission, n.d.). To better understand how these competences can best be fostered among pre- and in-service teachers, a large number of studies have been carried out in recent years (see e.g. Krumsvik et al., 2016; Lütge et al., 2021). The question arises how these general competences can be related to the knowledge of foreign language teaching and learning. Professional knowledge of English language teachers can be divided into knowledge and skills (Freeman, 2002) and the ability to deal critically with digital media (cf. KMK, 2019). The six areas of digital competences combine and integrate knowledge and skills that enable teachers to translate subject content into learning opportunities according to the interests and abilities of learners. English teachers need to, e.g., be familiar with the challenges of learning words in a digital setting (= knowledge), create digital resources for lexical learning that are adjusted to learners' needs (e.g. concerning the topic, the structure of the target unit, the school curriculum) (= skills) and be able to critically evaluate to which extent self-created digital resources fit to the specific TEFL learning objective, context, pedagogical approach, and learner group (= reflection). These three areas of knowledge, skills, and reflection are crucial for developing EFL teachers' digital competences. It is assumed that this can be achieved e.g. through systematic collaboration between student teachers and in-service teachers. At the present time, such TEFL-specific digital competence descriptions are not yet available for vocabulary learning. It was therefore one of the aims of the present project to develop competence descriptions on the basis of the seminar's expected outcome (see chapter 3.2).

The continuous search for best practice examples of developing teaching competences is an integral part of the teacher education discourse and "at least as old as teacher education itself" (Benitt et al., 2019, p. 1174). One of the key questions in this discourse is in what way well-reflected actions arise from theoretical knowledge. In Germany the initiative "Qualitätsoffensive Lehrerbildung" (German for: "Quality Initiative Teacher Education" [2019–2023]) by the Federal Ministry of Education and Research funded 91 research projects on digitalization in teacher training. In most of these projects the emphasis was placed on linking theory and practice. Teacher education should foster both

theoretical and practical knowledge of student teachers, the former being seen as a tool for the development of reflective competences. These reflective competences are imperative as reflection is one of the crucial competences for student teachers' engagement with their school practice experience (cf. Albers, 2020) and has been recognized as a building block of successful teacher education (see e.g. KMK, 2019).

2.2 Communities of Practice: Bridging the Gap between Theory and Practice in Collaborative Student Teacher and In-Service Teacher Tandems

In teacher education the relationship of theory and practice has been discussed in a variety of projects and models (see e.g. Caruso et al., 2021; Rothland, 2023). One of the possible concepts for successful teacher education is establishing links between knowledge and practice, for instance through reflection in collaborative learning environments (see e.g. Neuweg, 2021). A focus on collaboration in today's education is crucial. Trilling and Fadel (2009) name collaboration as one of the 21st century skills. For instance, they argue that one should be able to "[d]emonstrate ability to work effectively and respectfully with diverse teams" or "[e]xercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal" (Trilling & Fadel, 2009, p. 55). These collaboration domains are neatly reflected in the document *Education in the digital world* (KMK, 2017), which relates them to digital competences of teachers. Educators should be able to collaborate with other teachers and school and non-school experts regarding the planning and design of lessons as well as to collaboratively develop and implement digital learning opportunities that foster digital competences in a reflective manner. They should also be able to jointly learn how to plan, implement and reflect on the appropriate use of digital media and tools (KMK, 2017, pp. 19–24). This has in turn been reflected in a number of German projects on collaborative theory-practice connection in teacher education. However, projects that focus on explicit cross-institutional cooperation are relatively new (see e.g. Burger & Elsner, 2020; Straub & Dollereder, 2020; Will & Blume, 2022), especially regarding CoPs for the first and the third phase of teacher education.

CoPs allow for bringing agents from different institutions together in order to provide various contexts of interpersonal exchanges (e.g. discussions or reflections) and for fostering multiple kinds of knowledge and skills. Wenger and Wenger-Trayner (2015, p. 1) define CoPs as: "[…] groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (cf. "people" element of successful teacher education, which refers to the collaboration between agents from university and school; Cramer, 2014). CoPs can take various forms: they can be small or large, meet face-to-face or online, include members from the same or various organizations, and be formal or informal (cf. Wenger & Wenger-Trayner, 2015, p. 3). They have various goals, for instance to support professional learning, to promote school improvement or to boost participants' professional growth (cf. Borko, 2004; Hadar & Brody, 2010, as mentioned in Patton & Parker, 2017). Wenger and Wenger-Trayner (2015) propose three crucial elements of a CoP: domain (shared area of interest, which allows the members to acquire specific competence), community (members' engagement in meaningful discussions and purposeful activities, which facilitate learning from and with each other), and practice (shared repertoire of resources, e.g. experience or tools, that members create over time due to regular interaction).

2.3 Research Questions

Taking into account the potential of a cross-phase CoP-based collaboration for strengthening TEFL-specific digital competences of student teachers and in-service teachers, this paper poses the following research question:

RQ1: To what degree is there an increase in student teachers' and in-service teachers' perceived TEFL-specific digital competences before and after a cross-phase collaborative seminar?

Given that such a collaborative seminar concept might pose new challenges for project participants, the second research question aims at obtaining participants' feedback regarding various dimensions of working in tandems:

RQ2: How do project participants (student teachers and in-service teachers) evaluate the concept of the cross-phase collaborative seminar?

3 Method

In order to answer the research questions posed above, a collaborative seminar "Technology Assisted EFL Vocabulary Teaching and Learning: From Theory to Practice" was implemented at the University of Wuppertal during the winter term 2022/2023. Its goal was to foster digital competences related to teaching vocabulary by integrating theory and practice in a learning environment in which agents from university (lecturer, student teachers) and school (in-service teachers) worked and learned together (cf. "people" element of successful teacher education; Cramer, 2014). In order to link digital and TEFL-specific competences as described in subchapters 2.1 and 2.2, five CoP-based tandems were created: TEFL student teachers and in-service teachers worked together (one in-service teacher was paired with three student teachers) to get hold of the challenges of teaching and learning lexical items with the help of digital media. This study investigates to which extent structured and regular collaboration in CoPs allows the development of various areas of digital competence.

3.1 Seminar concept

CoP-based tandems in this project can be characterized as rather small groups of (future) English teachers representing various organizations (university and schools) who meet in mostly informal digital settings. The CoPs' "domain" element in this project was the participants' shared interest in digital lexical learning and willingness to strengthen one's own and pupils' digital competences. The "community" element was achieved by systematic tandem discussions and the teacher training. The "practice" component relates to the task packages (digital tasks, lesson plans, task development cycle documents) that tandems have created during the one-semester-long collaboration. These three components of CoP served as a foundation for regular reflective collaborations that allowed connecting participants from the first and third phase of teacher education. In order to ensure this focus, this collaborative seminar concept was based on the following structure:

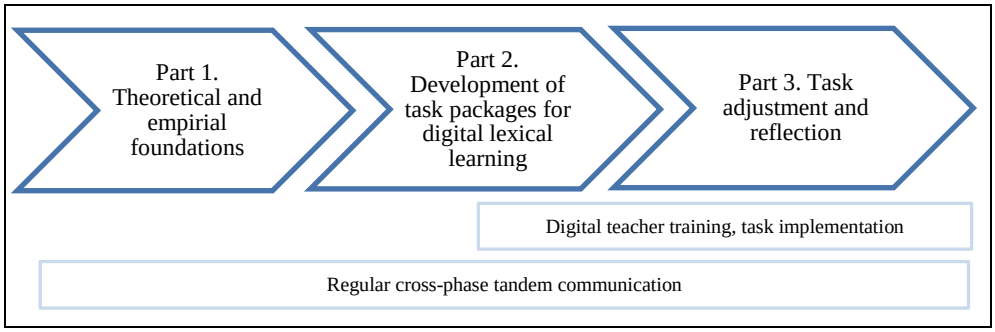

Figure 1: Structure of the collaborative seminar concept on the example of the seminar "Technology Assisted EFL Vocabulary Teaching and Learning: From Theory to Practice" at the University of Wuppertal (own research).

As figure 1 shows, this collaborative seminar was divided into three main parts. Part 1 focused on student teachers' knowledge of theoretical models and concepts, empirical studies and practical implications of key thematic areas (cf. appendix 1). The first contact between student teachers and in-service teachers, who shared similar thematic and professional interests, took place within this phase, fulfilling the CoP criterium of "domain". Part 2 of this class allowed the student teachers to apply the newly acquired knowledge in practice and develop subject-specific skills: by following a framework for planning technology-enhanced vocabulary learning tasks, the CoPs developed EFL lessons by referring to concepts and models from part 1. Regular tandem communication played an important role (CoP element "community"). This not only allowed research participants to foster learning via collaboration in various contexts but also helped to overcome the limitations of tacit knowledge – student teachers put their academic knowledge into practice via material development and regular discussions with in-service teachers. Towards the end of part 2, student teachers offered an online teacher training for the participating in-service teachers: after input on digital lexical learning, the tandems discussed, reflected on, and finalized the task packages (CoP element "practice"). The ability to reflect upon the quality of the teaching material could be fostered at this stage as research participants got involved in decision-making, justifying their teaching activities (student – student, student teachers – in-service teachers, student teachers – lecturer). Before part 3 of the seminar began, in-service teachers implemented the materials prepared by the student teachers in their English lessons. Student teachers received written feedback regarding various aspects of their collaboration (e.g. lesson plan, digital vocabulary task). The goal of part 3 was to critically reflect on the received feedback and adjust teaching materials (cf. reflection in teacher education, Albers, 2020; KMK, 2019).

3.2 Research Instruments

In order to answer the first research question posed in this paper (*To what degree is there an increase in student teachers' and in-service teachers' perceived TEFL-specific digital competence before and after a cross-phase collaborative seminar?*), pre- and post-questionnaires for student teachers and in-service teachers were designed on the basis of the items from the official DigCompEdu self-assessment instrument SELFIE for Teachers (European Commission, n.d.). Subjective self-assessment data elicitation measures such as scale-based questionnaires are commonly utilized in evaluations of (pre-service and in-service) teachers' digital competences (cf. García et al., 2023; Krumsvik et al., 2016; Lütge et al., 2021; McGarr & McDonagh, 2020). This study measured five constructs of digital competence of DigCompEdu (Redecker & Punie, 2017): 1. Digital resources, 2. Teaching and learning, 3. Assessment, 4. Empowering learners, 5. Facilitating learners'

digital competence. These thematic were matched with detailed seminar goals for each session (see appendix 1). In order to ensure focus on various cognitive processes relevant for English teachers, a division of these scales into "Knowledge" (K), "Skills" (S) and "Reflection" (R) was performed (cf. subchapter 2.1 of this paper). Since the main focus of this study are TEFL-specific digital competences, the equal item distribution between areas of (K), (S) and (R) was ensured (cf. appendix 1).

The pre- and post-questionnaires for student teachers consisted of 31 items that used a 6-point Likert scale (coded 0–5) as a response format, allowing the research participants to rate their perceived levels of various domains of subject-specific digital competence on a scale ranging from "strongly disagree" (0) to "strongly agree" (5). In order to eliminate faulty answers from participants being unfamiliar with certain concepts (non-attitude reporting), two response categories ("I am not able to assess it yet" and "I do not understand what it means") were included per item. Those were excluded from the statistical analyses of pre- and post-questionnaires.

The questionnaires were designed using a forced-choice design, resulting in research participants self-assessment on each item. In order to track the teacher progress in the same areas of subject-specific digital competences, in-service teacher pre- and post-questionnaires were designed in a similar fashion. Given the scope of in-service teachers' exposure to input in this project, their questionnaire was reduced by six items (two topics that were not prominent in the cooperation), resulting in the total number of 25 items. Statistical analyses were conducted using paired one-tailed t-tests in SPSS (IBM SPSS Statistics, Version 28). The self-reported growth in project participants' digital competence as expressed by pre- and post-questionnaires was computed by using all questionnaire items. Answers for various constructs from student teacher and in-service teacher pre- and post-questionnaires were coded separately. Afterwards, means, standard deviations, and Cohen's d were calculated. The frequency of response options "I am not able to assess it yet" and "I do not understand what it means" were computed.

In order to answer the second research question *(How do project participants (student teachers and in-service teachers) evaluate the concept of the cross-phase collaborative seminar?)*, a post-seminar reflection questionnaire for student teachers and in-service teachers was designed (see appendix 2). Both questionnaires collected data on participants' personal background using scales from the 2015 PISA study (Mang et al., 2019). For measuring the dimension of technical cooperation, the items adapted from Rolff (1980) were used (e.g. on joint creation of lessons plans or complex, subject-specific lesson planning). These were supplemented with questions from Knüppel's (2012) survey on student teacher and in-service teacher cooperation. The final part in both surveys related to student teachers' and in-service teachers' assessment of this project (seminar input, student teacher-in-service teacher collaboration, teacher training, student products, time effort).

3.3 Sample

Twelve student teachers studying to become grammar school teachers and three primary school student teachers constitute the sample in this research project. Future grammar school teachers were randomly paired with four grammar school English in-service teachers of grades 5, 6, and 7 from Wuppertal and Arnsberg. The three primary school student teachers were paired with one primary school teacher of grade 4 from Wuppertal. One in-service teacher submitted the post-seminar reflection only.

4 Results

4.1 Student teachers' and in-service teachers' perception of their own TEFL-specific digital competences

The frequencies of answer categories "I am not able to assess it yet" and "I do not understand what it means" were 22,85 per cent and 3,23 per cent in student teacher pre-questionnaires respectively and 4 per cent each in teacher pre-questionnaires. None of these items have been selected as an answer in student and teacher post-questionnaires.

Student teachers

Figure 2 on the next page shows the change in student teachers' perception of their own digital competences.

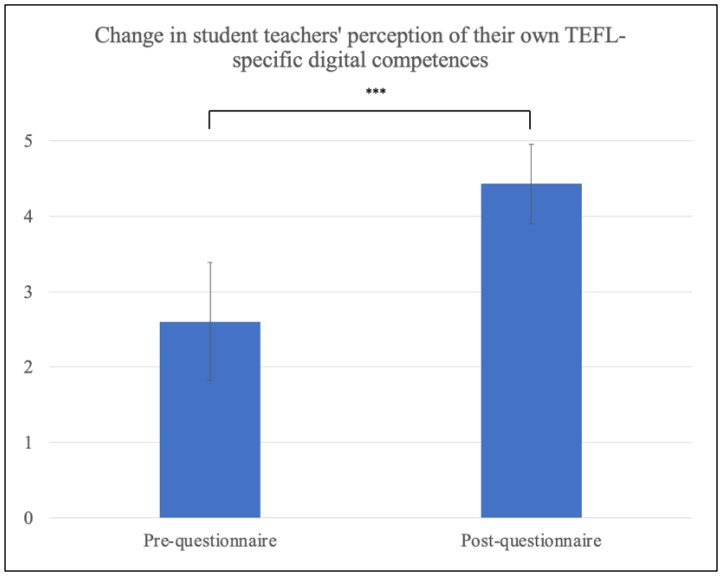

Figure 2: Change in student teachers' perception of their own TEFL-specific digital competences (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

The results from the pre-questionnaire ($M_{pre} = 2.60$, $SD_{pre} = 0.78$) and post-questionnaire ($M_{post} = 4.43$, $SD_{post} = 0.52$) indicate a statistically significant increase in self-reported student teachers' digital competence ($t(11) = 9.882$, $p \leq .001$, $d = 2.85$). This represents a large effect following Cohen (1988). The statistical significance and large effect also hold for the TEFL-specific subdomains of student teachers' digital competence: the figure below shows the self-reported change of student teachers' digital competence in areas of knowledge ($M_{pre} = 2.61$, $SD_{pre} = 0.66$, $M_{post} = 4.48$, $SD_{post} = 0.45$, $t(11) = 9.184$, $p \leq .001$, $d = 2.65$,), skills ($M_{pre} = 2.52$, $SD_{pre} = 0.78$, $M_{post} = 4.42$, $SD_{post} = 0.58$, $t(11) = 7.375$, $p \leq .001$, $d = 2.13$), and reflection ($M_{pre} = 2.71$, $SD_{pre} = 0.70$, $M_{post} = 4.39$, $SD_{post} = 0.62$, $t(11) = 7.510$, $p \leq .001$, $d = 2.17$).

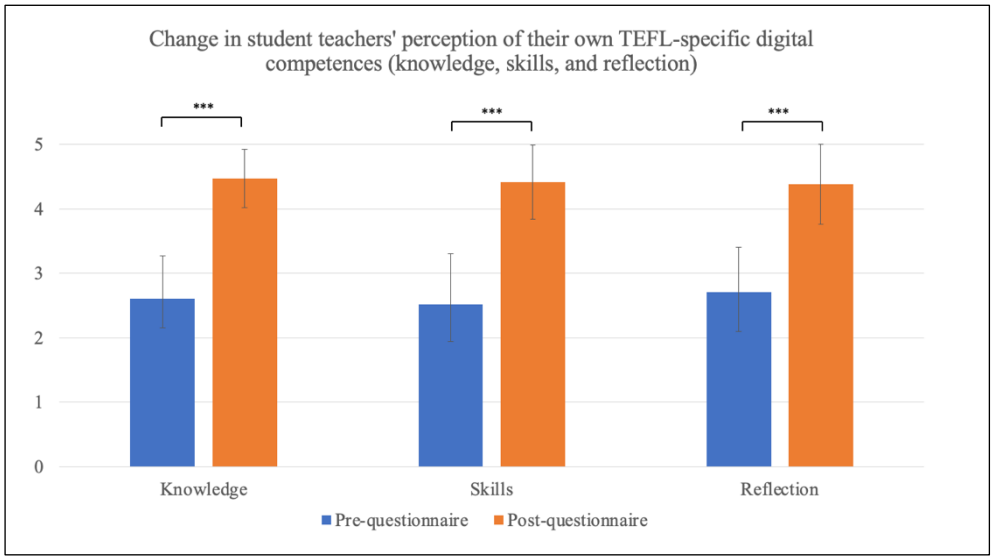

Figure 3: Change in student teachers' perception of their own TEFL-specific digital competences in the areas of knowledge, skills, and reflection (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

Figure 4 shows that the self-reported change in student teachers' digital competences according to DigCompEdu constructs of Digital Resources (M_{pre} = 2.45, SD_{pre} = 0.65, M_{post} = 4.48, SD_{post} = 0.41, $t(11) = 11.673$, $p \leq .001$, $d = 3.37$), Teaching and Learning (M_{pre} = 2.46, SD_{pre} = 0.75, M_{post} = 4.36, SD_{post} = 0.59, $t(11) = 12.705$, $p \leq .001$, $d = 3.67$), Assessment (M_{pre} = 3.01, SD_{pre} = 0.89, M_{post} = 4.54, SD_{post} = 0.78, $t(11) = 3.543$, $p = 0.002$, $d = 1.02$), Empowering Learners (M_{pre} = 2.53, SD_{pre} = 1.43, M_{post} = 4.40, SD_{post} = 0.68, $t(10) = 4.147$, $p \leq .001$, $d = 1.25$) and Facilitating Learners' Digital Competences (M_{pre} = 2.93, SD_{pre} = 1.14, M_{post} = 4.31, SD_{post} = 0.67, $t(11) = 9.882$, $p = 0.002$, $d = 1.04$) is statistically significant, too. All results represent a large effect following Cohen (1988).

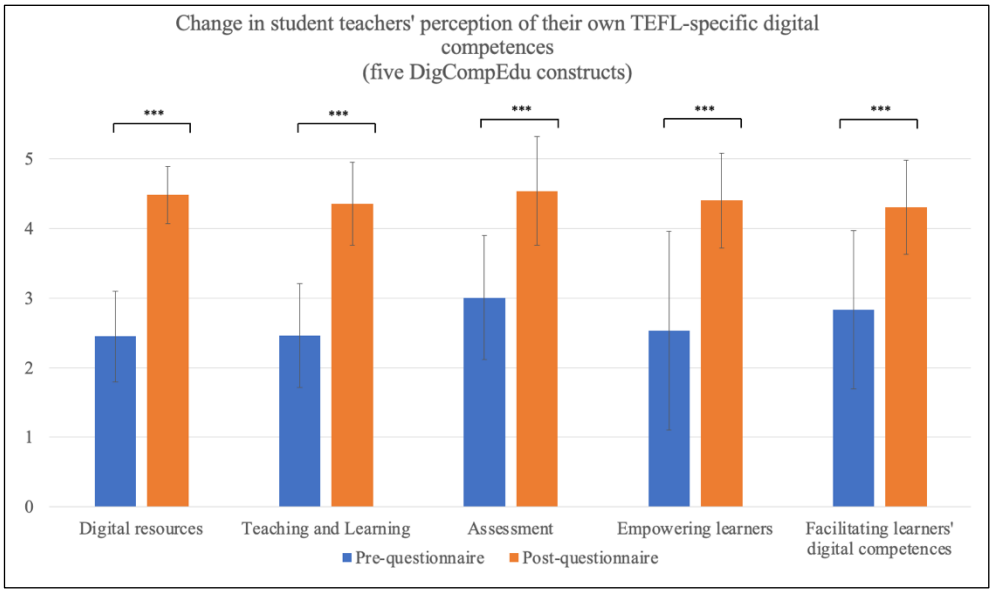

Figure 4: Change in student teachers' perception of their own TEFL-specific digital competences according to the DigCompEdu constructs (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

In-service teachers

Out of five in-service teachers who took part in this study, four filled in pre- and post-questionnaires on the self-assessment of their own digital competence (n = 4). Because of this low number, standard deviations per construct are quite high. The results for in-service teachers' self-assessment of their digital competence pre-CoP and post-CoP can be found in figure 5.

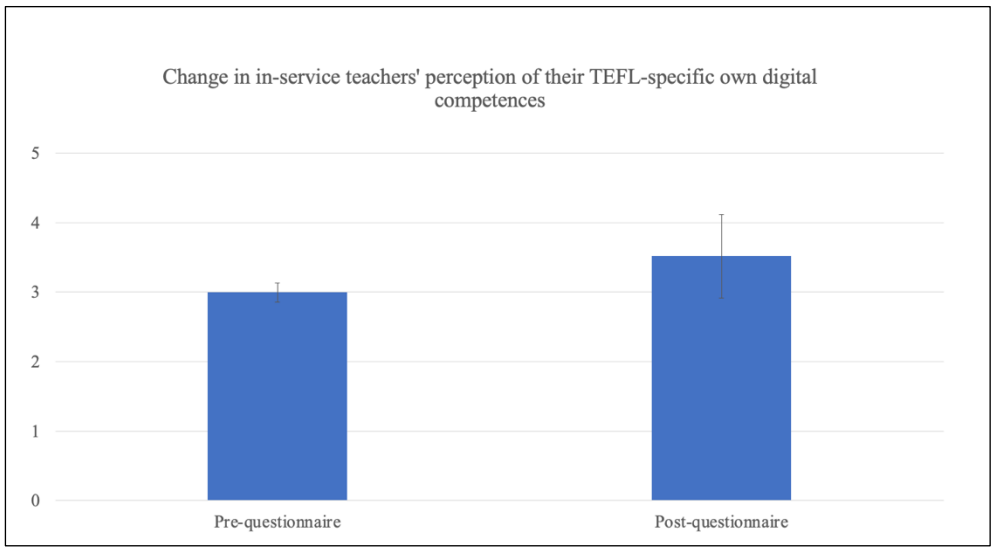

Figure 5: Change in in-service teachers' perception of their own TEFL-specific digital competences (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

The data from the pre-questionnaire (M_{pre} = 2.99, SD_{post} = 0.14) and the post-questionnaire (M_{pre} = 3.54, SD_{post} = 0.55) indicates that there are no statistically significant changes in the level of in-service teachers' perceived digital competence in general ($t(3)$ = 2.343, p = .051). This does not change in regard to TEFL-specific knowledge, skills, and ability to critically reflect the use of digital media (see figure 6).

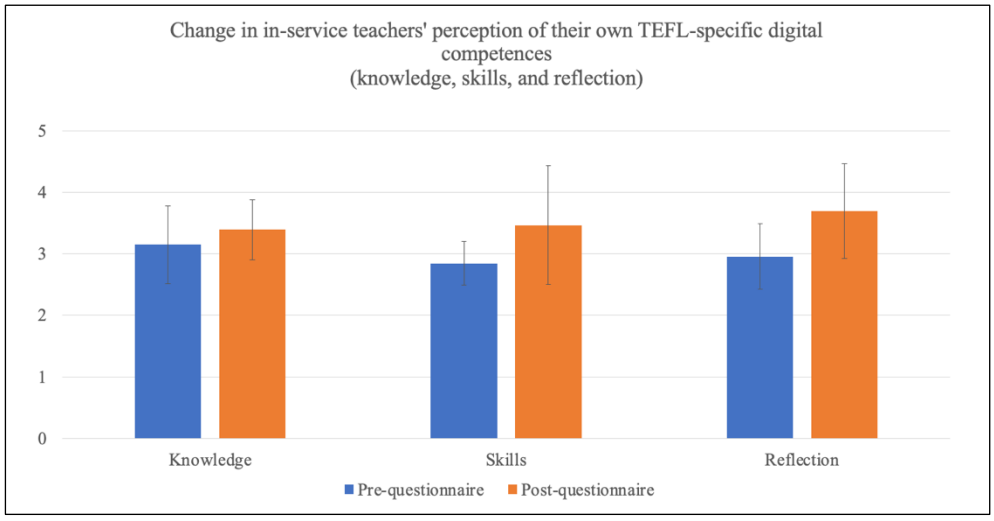

Figure 6: Change in in-service teachers' perception of their own TEFL-specific digital competences in the areas of knowledge, skills, and reflection (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

There are no statistically significant changes to in-service teachers' perceptions of their own digital competences in the areas of knowledge (M_{pre} = 3.15, SD_{pre} = 0.63,

M_{post} = 3.39, SD_{post} = 0.48, $t(3)$ = 1.547; p = .11), skills (M_{pre} = 2.85, SD_{pre} = 0.35, M_{post} = 3.46, SD_{post} = 0.96, $t(3)$ = 1.294; p = .14) or reflection (M_{pre} = 2.95, SD_{pre} = 0.53, M_{post} = 3.69, SD_{post} = 0.77, $t(3)$ = 2.152; p = .60).

Figure 7 on the next page shows that these findings also hold true for DigCompEdu constructs: although a slight increase could be observed, there were no statistically significant changes: Digital Resources (M_{pre} = 2.98, SD_{pre} = 0.38, M_{post} = 3.40, SD_{post} = 0.62, $t(3)$ = 0.932; p = .210), Teaching and Learning (M_{pre} = 3.03, SD_{pre} = 0.27, M_{post} = 3.64, SD_{post} = 0.63, $t(3)$ = 2.221; p = .056), Assessment (M_{pre} = 3.13, SD_{pre} = 0.97, M_{post} = 3.34, SD_{post} = 0.97, $t(3)$ = 1.321; p = .139), Empowering Learners (M_{pre} = 2.88, SD_{pre} = 2.02, M_{post} = 3.63, SD_{post} = 0.75, $t(3)$ = 1.000; p = .196), Facilitating Learners' Digital Competences (M_{pre} = 5.50, SD_{pre} = 1.68, M_{post} = 3.75, SD_{post} = 0.65, $t(3)$ = 1.291; p = .144).

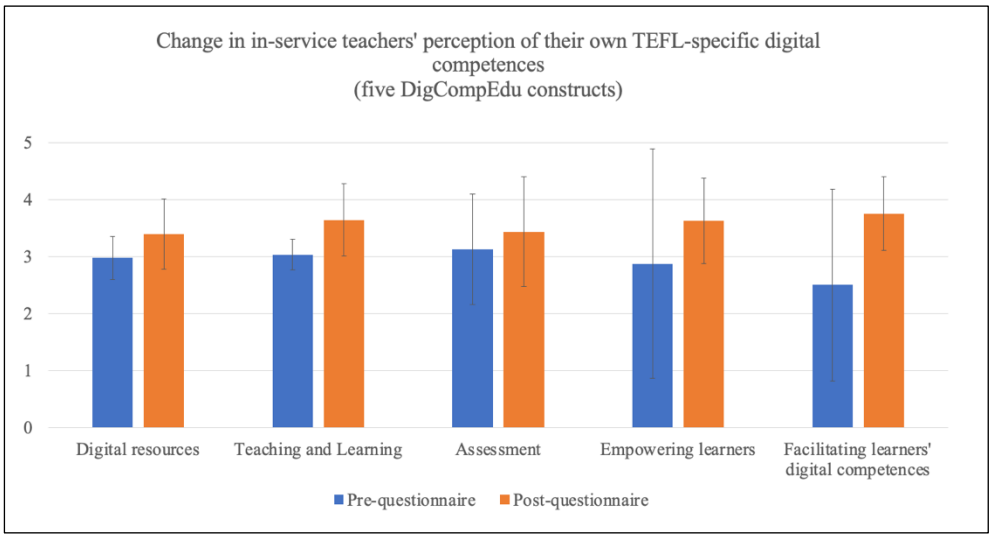

Figure 7: Change in in-service teachers' perception of their own TEFL-specific digital competences according to the DigCompEdu constructs (*$p \leq .05$; **$p \leq .01$; ***$p \leq .001$) (own calculations).

4.2 Evaluation of the cross-phase collaboration seminar

Student teachers and in-service teachers provided very positive feedback on the quality of the cross-phase collaboration experience. Student teachers and in-service teachers rated the quality of the collaboration equally high (student teachers' M = 4.30, in-service teachers' M = 4.73). The amount of time which had to be invested into the collaboration was rated by both groups as appropriate (M = 3.83, M = 4.00). In-service teachers rated the quality of the teacher training and the products that the student teachers produced lower than the student teachers (M = 4.03, M = 3.87) (see table 2 in appendix 2).

There was a homogeneity of variances for student teachers and in-service teachers, as assessed by Levene's test for equality of variances, for CoP Collaboration (p = .246), Teacher Training (p = .996), Products (p = .071) and Time Effort (p = .391). Further, no statistically significant difference between both groups appeared for the feedback categories (see Table 2 in appendix 2).

Standard deviation among the feedback of in-service teachers is quite high in all areas. The data set reveals that one of five in-service teachers rated the quality of the following components of the seminar concept lower than the other teachers: collaboration (1,3 points below average), teacher training (3 points below average), and products which were produced by the student teachers (1,3 points below average).

5 Discussion: The potential of a cross-phase collaboration seminar for fostering TEFL-specific digital competences

The project data indicates that the seminar concept contributed to the development of one's own perceived TEFL-specific digital competence areas for both research groups, student teachers and in-service teachers, in various ways (RQ1). Whereas the general perceived level of digital competence change of student teachers is statistically significant, there are no statistically significant differences regarding the perception of in-service teachers (although there is an increase). This might be explained by student teachers' substantial exposure to specific concepts and activities relevant for fostering multiple domains of digital competence due to numerous seminar sessions and, in comparison, rather limited opportunities for knowledge gains or structured reflective practice for in-service teachers.

Student teachers' perceived improvement from pre- to post-questionnaire is statistically significant in all three facets of TEFL-specific digital competences (knowledge, skills, reflection) as well as all the five DigCompEdu constructs (Digital resources, Teaching and Learning, Assessment, Empowering Learners, Facilitating Learners' digital competences). Large effects can be observed in all these constructs (Cohen, 1988). As expected, this seminar contributed to student teachers' *knowledge* part of their digital competence – through a carefully created syllabus, part 1 of this seminar covered general as well as TEFL-related strategies, models and concepts of digital competence, tools, models, etc. (cf. "knowledge" appendix 1; "domain" element of CoPs, Wenger & Wenger-Trayner, 2015). This has allowed fostering student teachers' knowledge of the following DigCompEdu constructs: Digital resources, Teaching and Learning, Assessment, Empowering Learners. Owing to its collaborative CoP-based nature, a statistically significant change took place regarding student teachers' *skills* – tools analysis, task conceptualization or H5P exercise creation, among others (cf. "skills" appendix 1; "community" and "practice" elements of CoPs, Wenger & Wenger-Trayner, 2015). Owing to this theory-practice connection, student teachers developed practical skills in the five areas of DigCompEdu. Last but not least, a statistically significant progress can be found in student teachers' digital *reflective* competences. This can be explained by regular class and tandem-discussions during which student teachers were involved in ongoing decision-making as well as justifications of and reflection on their choices of activities, tools, etc. (cf. "reflection" appendix 1). Such reflective competences are crucial for teachers' engagement and constitute one of the building blocks of successful teacher education (see e.g. Albers, 2020; KMK, 2019). As reflection-based items in this study were included in all the DigCompEdu areas, it was expected that similar progress could be observed in these as well – this has been confirmed.

The differences in in-service teachers' perceived TEFL-specific digital competences before and after the collaboration are not statistically significant ($p = .06$). A growth was observed in the areas of *knowledge* ($p = .06$) and *reflection* ($p = .09$). Due to new input provided by student teachers in regular tandem discussions and during the teacher training, participating in-service teachers could refresh or perhaps gain new knowledge on specific concepts, models, and empirical findings relevant for the topic of digital lexical learning (cf. "knowledge" appendix 1, Wenger & Wenger-Trayner, 2015). Contrary to the expectations, no statistically significant changes but only a positive increase could be observed in in-service teachers' digital *reflective* competences. It was assumed that due to the collaboration within the CoPs (e.g. numerous feedback rounds and regular tandem discussions), in-service teachers' reflective skills could be further enhanced. As this was not confirmed, it is suggested that future CoP-based seminars focus on this crucial domain more explicitly, for instance through regular tandem discussions guided by reflective questions or joint work with portfolios or journals (see e.g. Albers, 2020). There was a slight uncertainty regarding the possible contribution of this seminar concept

to strengthening in-service teachers' digital *skills* since no major task development was carried out by the in-service teachers directly and they had already possessed high task development skills in general due to their school experience. This has been confirmed (p = .10). The most apparent change in in-service teachers' perception of their digital competence could be observed in the DigCompEdu construct of "Teaching and Learning" (p = .056). This could be explained by the nature of the CoP-collaboration and the focus of this cross-phase seminar concept. Contrary to the expectations, no positive trends could be observed in the area of "Digital Resources" (p = .21). It seems that a focus on one digital technology only and limited access to input (compared to student teachers) were constraining factors for the self-perceived improvement in this area. It is advised that future projects with such cross-phase CoP design address this shortcoming by e.g. inviting in-service teachers to join seminars, exchanging recommendations on various digital tools or discussing evaluation criteria on digital media on a more regular basis.

Given the high frequency of the answer possibilities "I am not able to assess it yet" and "I do not understand what it means" chosen in student pre-questionnaires, the scores for each facet (knowledge, skills, reflection) of TEFL-specific digital competence included less data than in the post-questionnaire. Moreover, in-service teachers were presented with less items (comparability). Since the focus of the questionnaires used in this study was put on knowledge, skills, and reflection domains, equal DigCompEdu item distribution was not possible. Adding these limitations to the small number of research participants,[2] this data shows positive tendencies only and cannot be generalized.

The positive evaluation of the quality of the seminar concept shows that both groups benefited from the collaboration and collected positive experiences. The data suggests that synergies can be unfolded by bringing student teachers and in-service teachers together (e.g. student teachers present ideas on digitally enhanced scaffolding, in-service teachers get new ideas and utilize their school experience to adjust it). Although the student teachers and in-service teachers had to invest a lot of time in activities such as conducting online meetings or preparing and taking part in the teacher training, there was no feedback suggesting that the workload was too high. This is also an indicator for the assumption that student teachers and in-service teachers saw a benefit for their own professional development.

The fact that one of the in-service teachers rated the quality of the collaboration considerably lower than the four others raises the question whether there might be certain requirements which need to be fulfilled for successful cross-phase collaborations. Looking at the self-reflection of this teacher's perceived digital competences it becomes obvious that she had rated her digital competences before the project higher than the other four in-service teachers. It can be assumed that the teacher had expected more from the collaboration seminar and that it did not contain enough new impulses for her as she already had a solid basis of digital competences. In future research it might be interesting to investigate this observation more systematically.

6 Conclusion

Fostering digital competences of student teachers and in-service teachers is an important task of teacher education and cannot be overemphasized. In the present digital age, only digitally competent teachers can facilitate digital competence development of their students, which is obligatory in Germany. Student teachers of English need to also be familiar with the TEFL-specific aims of integrating technologies into the EFL classroom. This project has shown that a CoP-based cross-phase collaborative seminar with a focus

[2] Due to the small number of participants and the high frequency of answer categories "I am not able to assess it yet" and "I do not understand what it means", measures of reliability (e.g. Cronbach's Alpha and McDonald's Omega) were not calculated.

on technology-enhanced vocabulary learning has potential for fostering student teachers' and in-service teachers' TEFL-specific digital competences. From the findings of this research implications can be formulated for university teacher education and school practice.

It can be argued that CoP-based collaborative seminars for EFL teachers should be offered at university level on a regular basis. Voluntary CoP in-service teacher participation has probably contributed to their positive rating of time effort in this project. The presented data shows that student teachers and in-service teachers can benefit from such concepts, which are manageable in terms of time effort. It is assumed that systematic collaboration with universities can positively contribute to in-service teachers' professional development. Young student teachers, who are digital natives, can engage in regular discussion with in-service teachers, who possess valuable school experience. It would be interesting to find out which particular student teachers and in-service teachers benefit most from such collaborations, for instance regarding their willingness to engage in cooperative learning scenarios, their teaching experience or their level of digital competence. It is especially important as the teachers who participated in this study were highly motivated (in terms of the seminar topic and the digital technology of choice) and considered themselves digitally competent before the project took place.

Future projects on cross-phase collaboration in teacher education could expand the understanding of CoP in this paper by including more agents involved in teacher education. It could also be critically discussed whether younger in-service teachers and student teachers can be considered professionals in their respective areas of expertise. Perhaps it would be beneficial to include external experts, who join CoPs in order to provide valuable input.

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Appendix 1: Items Used for Student Teacher and In-Service Teacher Pre- and Post-questionnaires (Perceived TEFL-Specific Digital Competences) (own calculations)

Table 1: Descriptive Statistics on Questionnaire Constructs (own calculations)

Construct	Survey Time	Overall					Student teachers					In-service teachers				
		N	*M*	*SD*	*Min*	*Max*	*N*	*M*	*SD*	*Min*	*Max*	*N*	*M*	*SD*	*Min*	*Max*
K	Pre	16	2.74	0.68	1.29	4.00	12	2.61	0.66	1.29	3.60	4	3.15	0.63	2.62	4.00
K	Post	16	4.21	0.66	3.11	4.91	12	4.48	0.45	3.55	4.91	4	3.39	0.48	3.11	4.11
S	Pre	16	2.60	0.70	0.67	3.44	12	2.52	0.78	0.67	3.44	4	2.85	0.35	2.50	3.33
S	Post	16	4.18	0.78	2.43	5.00	12	4.42	0.58	3.44	5.00	4	3.46	0.96	2.43	4.29
R	Pre	16	2.77	0.65	1.71	4.00	12	2.71	0.70	1.71	4.00	4	2.95	0.53	2.79	3.10
R	Post	16	4.21	0.65	2.95	5.00	12	4.39	0.62	3.48	5.00	4	3.69	0.77	2.56	4.23
T	Pre	16	2.70	0.54	1.59	3.48	12	2.60	0.59	1.59	3.48	4	2.99	0.14	2.79	3.11
T	Post	16	4.21	0.65	2.95	4.97	12	4.43	0.52	3.48	4.97	4	3.55	0.55	2.95	4.23
1	Pre	16	2.61	0.62	1.60	3.90	12	2.49	0.65	1.60	3.90	4	2.98	0.38	2.50	3.40
1	Post	16	4.19	0.83	2.00	5.00	12	4.48	0.41	3.80	5.00	4	3.40	0.62	2.60	4.10
2	Pre	16	2.60	0.70	0.75	3.83	12	2.45	0.75	0.75	3.83	4	3.03	0.27	2.67	3.29
2	Post	16	4.18	0.66	3.14	4.86	12	4.36	0.59	3.14	4.86	4	3.64	0.63	3.14	4.57
3	Pre	16	3.04	0.88	2.00	5.00	12	3.01	0.89	2.00	5.00	4	3.12	0.97	2.25	4.50
3	Post	16	4.31	1.08	2.00	5.00	12	4.54	0.78	2.25	5.00	4	3.44	0.97	2.50	4.50
4	Pre	15	2.66	1.53	0.00	4.50	11	2.58	1.43	0.00	4.14	4	2.88	2.02	0.00	4.50
4	Post	16	4.21	0.76	3.00	5.00	12	4.40	0.68	3.00	5.00	4	3.62	0.75	3.00	4.50
5	Pre	16	2.82	1.24	1.00	5.00	12	2.93	1.14	1.00	5.00	4	2.50	1.68	1.50	5.00
5	Post	16	4.17	0.69	3.00	5.00	12	4.43	0.67	3.00	5.00	4	3.75	0.65	3.00	4.50
T	Pre	16	2.70	0.54	1.59	3.48	12	2.60	0.59	1.59	3.48	4	2.99	0.14	2.79	3.10
T	Post	16	4.20	0.66	2.84	4.97	12	4.43	0.52	3.48	4.97	4	3.52	0.60	2.84	4.20

Constructs: K = Knowledge, S = Skills, R = Reflection, 1 = Digital Resources, 2 = Teaching and Learning, 3 = Assessment, 4 = Empowering Learners, 5 = Facilitating Learners' Digital Competences, T = Total.

Table 2: Items Used for Student Teacher and In-Service Teacher* Pre- and Post-Questionnaires (own research)

DigCompEdu / Professional competence	Digital Resources	Teaching and Learning	Assessment	Empowering Learners	Facilitating learners' digital competences
Knowledge	9) I can name the challenges of learning words in a foreign language in digital settings. 12) I can name digital resources for teaching and learning lexis in EFL. 22) I can name criteria for evaluating the quality of digital tools for lexical learning.	1) I know which digital competences learners should develop in their English lessons according to the NRW syllabus. 4) I can name and explain the subdomains of the MKR. 19) I can explain the term "autonomous learning".	6) I know digital resources which support pupils in achieving and documenting learning outcomes (e.g. apps or websites).	15) l can explain the added value of using digital resources for individualized lexical learning. 18) I know digital resources which support students' autonomous lexical learning. 25) I can define the term "gamification" and its components.	28) I can describe the components of a digital EFL task.
Skills	29) I can create digital resources for lexical learning that are adjusted to learners' needs (e.g. concerning the topic, the structure of the target unit, the grammar school curriculum). 23) I can assess existing digital resources with the help of specific criteria (e.g. challenges of learning words in a foreign language, multimedia learning principles). 13) I can find and select a range of different digital resources for teaching and learning lexis in EFL (e.g. by using various internet sites and search strategies).	20) I can use digital resources in order to enable students' autonomous lexical learning (e.g. concerning planning, documentation, monitoring of the learning process). 2) I can design a lesson that fosters learners' digital competences according to the MKR and the NRW syllabus (for my future school type).	7) I can support pupils in using digital resources for achieving and documenting their learning outcomes (e.g. apps or websites).	16) I can use digital resources in order to provide individualized learning opportunities for lexical learning. 26) I can implement digital resources in a way that actively engages my learners (e.g. gamification).	10) I can help learners to use digital resources to address concrete lexical problems.
Reflection	3) I can evaluate the quality of activities in English coursebooks that foster digital competences. 24) I can critically reflect on the quality of digital tools for lexical learning. 30) I can critically evaluate to which extend self-created digital resources fit the specific TEFL learning objective, context, pedagogical approach, and learner group.	5) I consider carefully how, when and why I integrate digital media in an English lesson to foster pupils' digital competence. 11) I consider carefully how, when and why to use digital technologies in EFL vocabulary teaching to ensure that they are used with added value.	8) I consider carefully which digital resources support pupils in achieving and documenting their learning outcomes (e.g. apps or websites). 31) I can critically reflect on tasks for digital lexical learning using obtained feedback.	17) I consider carefully how, when and why to use digital technologies for fostering individualized lexical learning to ensure that they are used with added value 21) I can critically reflect on the added value of digital tools for supporting students' autonomous lexical learning.	14) I consider carefully how, when and why to use digital technologies in EFL vocabulary teaching to ensure that they are used with added value. 27) I can critically reflect on the responsible use of gamified solutions in tools for EFL lexical learning concerning learners' psychological and social wellbeing.

* Items marked in grey have not been used in teacher questionnaires.

Appendix 2: CoP-Related Items of the Post-Seminar Reflection

Table 3: Descriptive statistics on post-seminar reflection items (own calculations)

Construct	Timepoint	Overall					Student teachers					In-service teachers				
		N	*M*	*SD*	*Min*	*Max*	*N*	*M*	*SD*	*Min*	*Max*	*N*	*M*	*SD*	*Min*	*Max*
1	Post	12	4.67	0.61	3.00	5.00	12	4.67	0.61	3.00	5					
2	Post	17	4.42	0.83	2.00	5.00	12	4.30	0.91	2.00	5	5	4.73	0.52	3.80	5.00
3	Post	17	3.57	1.59	0.00	5.00	12	3.70	1.61	0.00	5	5	3.27	1.67	0.33	4.33
4	Post	17	3.98	0.66	3.00	5.00	12	4.03	0.56	3.00	5	5	3.87	0.93	3.00	5.00
5	Post	17	3.88	1.50	0.00	5.00	12	3.83	1.70	0.00	5	5	4.00	1.00	3.00	5.00

Constructs: 1 = Seminar Input, 2 = CoP Collaboration, 3 = Teacher Training, 4 = Products (written lesson plan, H5P tasks, theoretical and empirical justification of the materials), 5 = Time Effort.

Table 4: CoP-Related Items of the Post-Seminar-Reflection (own research)

Components of the seminar	Items	
	Student teachers	In-service teachers
Seminar input	The texts we had to read for this class were well chosen. The lecturer's presentations were comprehensible. The first part of this class (theoretical background, empirical evidence and practical examples) provided appropriate support for the second part of this class in which I had to apply my knowledge (task development cycle). The lecturer provided enough individual support during the task development cycle.	----
CoP collaboration	How would you rate the quality of the regular communication with the teacher in your tandem?* How would you rate the joint co-creation of your lesson with your tandem partners (co-students and teacher)?* Direct tandem communication with my teacher was helpful.	How would you rate the quality of the regular communication with the students in your tandem?* How would you rate the joint co-creation of your lesson with your tandem partners (students)?* Direct tandem communication with the students was helpful.

	I had sufficient opportunity to discuss the task package with my tandem teacher. The cooperation with the teacher was a good experience. I have benefited from the teacher's feedback. My tandem teacher provided enough support during the task development cycle.	I had sufficient opportunity to discuss the task package with my tandem students. The cooperation with the students was a good experience. I have benefited from the students' feedback.
Teacher training	The teacher training prepared the teachers well for the implementation of the activities planned in my tandem. The teachers have gained new knowledge about the media literacy framework (Medienkompetenzrahmen) through the teacher training. Through the teacher training, I was able to consolidate my knowledge on (digital) lexical learning. The teachers have gained new knowledge about H5P through the teacher training.	The teacher training prepared me well for the implementation of the activities planned in my tandem. Through the teacher training, I gained new knowledge about the media literacy framework (Medienkompetenzrahmen). Through the teacher training, I gained new knowledge about (digital) lexical learning. Through the teacher training, I gained new knowledge about H5P.
Products (written lesson plan, H5P tasks, theoretical and empirical justification of the materials)	How would you rate your written lesson plan?* How would you rate your digital H5P task(s)?* How would you rate your document "Task development: Roadmap"?*	
Time effort	As a student, I could manage my participation in this cooperative seminar well in terms of time.	As a teacher, I could manage my participation in this cooperative seminar well in terms of time.

* Reverse coded items

Information on the Article

Quotation:
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Informationen auf Deutsch

Titel: TEFL-spezifische digitale Kompetenzen von Englischstudierenden und Englischlehrkräften in einem phasenübergreifenden kollaborativen Seminar fördern

Zusammenfassung: Seit der Veröffentlichung der „Ländergemeinsame(n) inhaltliche(n) Anforderungen für die Fachwissenschaften und Fachdidaktiken in der Lehrerbildung“ (KMK, 2019) ist die Förderung digitaler Kompetenzen zu einer gemeinsamen Aufgabe aller in den Lehramtsstudiengängen Beteiligten geworden. In diesem Beitrag wird ein Projekt vorgestellt, das im Rahmen der Initiative COMeIN (Communities of Practice NRW für eine innovative Lehrerbildung) an der Bergischen Universität Wuppertal durchgeführt wird. Es wurde ein Seminarkonzept zur Förderung von TEFL-spezifischen digitalen Kompetenzen entwickelt und evaluiert. Erkenntnisse aus dem Seminar „Technology Assisted EFL Vocabulary Teaching and Learning: From Theory to Practice“ (EFL: English as a Foreign Language), das im Wintersemester 2022/2023 durchgeführt wurde, werden vorgestellt. Lehramtsstudierende und Lehrkräfte arbeiteten in CoPs zusammen, um digitale lexikalische Aufgaben für den Englischunterricht zu entwickeln. Die Lehramtsstudierenden bereiteten eine Fortbildungsveranstaltung vor, in der sie theoretische Annahmen und empirische Belege für den Wortschatzunterricht mit digitalen Medien und deren Auswirkungen auf den Unterricht vorstellten. Die Lehramtsstudierenden und die Lehrkräfte arbeiteten gemeinsam an der Erstellung von Unterrichtsmaterial zum Erlernen von Wortschatz in digitalen Lernszenarios für die Grund- und weiterführende Schule. Die Lehrkräfte setzten die Aufgaben mit ihren Schüler*innen ein und gaben den Studierenden ausführliches Feedback zur Qualität der Aufgaben. In dieser Studie wird untersucht, wie Englischstudierende und Lehrkräfte ihre eigenen digitalen Kompetenzen in Bezug auf das Unterrichten von Wortschatz mit digitalen Werkzeugen vor und nach der Teilnahme an diesem phasenübergreifenden Kooperationsseminar wahrnehmen und wie sie verschiedene Aspekte eine solchen Seminarkonzepts bewerten.

Schlüsselwörter: Lehrerbildung; Hochschulbildung; Englisch; Digitalisierung; Theorie-Praxis-Beziehung; Community of Practice (CoP)