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Digital-inclusive Transformation and Teacher Preparedness for Foreign Language Education – A Bilateral German-Norwegian Perspective

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Digitalisation and inclusion can be understood as transversal topics in pre- and in-service teachers' professional development. Both topics have attracted considerable research activity. However, questions of digital-inclusive transformation have only rarely been discussed within the field of foreign language teaching. Researchers in the field state a pressing need to increase digital-inclusive transformation uptake in foreign language teacher education programmes to develop a transformation 'mindset' in (educational) stakeholders and (future) teachers. Transformation processes in education, however, interact with preparedness for digitalisation and inclusion among pre- and in-service teachers, since the attitude and the willingness of teachers to adapt to digital reality play a decisive role in improving the quality of (digitally enhanced) teaching and learning. Currently, little is known about the interrelationship between the preparedness to use digital technology for foreign language teaching and learning and the preparedness to include foreign language learners with diverse learning needs (DLN) in the digital-inclusive classroom. To this end, this bilateral cross-country study investigates factors that constitute an attitudinal component of foreign language teachers' perceived preparedness for using digital technology with learners with diverse learning needs in Germany and Norway. The Teacher of English Preparedness to Diverse Learning Needs in the digital inclusive classroom questionnaire was administered to 221 participants. The results show a fresh perspective on preparedness for digitally enhanced inclusive teaching linked to educational system requirements for foreign language teaching. Importantly, confidence when using digital technology

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in the inclusive classroom is decisive. For teacher education, it is vital that the attitudinal component of teacher preparedness receives more attention throughout teacher training. It should be related to previous experience of teachers with DT in digital-inclusive environments and be part of a heuristic conceptualisation of teacher preparedness for digital-inclusive contexts.

Keywords: digital-inclusive concept, digital transformation, foreign language teaching, inclusion, teacher preparedness

Digitalnoinkluzivna transformacija in pripravljenost učiteljev za poučevanje tujih jezikov – dvostranska nemško-norveška perspektiva

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Digitalizacijo in inkluzijo lahko razumemo kot prečni temi v strokovnem razvoju bodočih in zaposlenih učiteljev. Obe temi sta pritegnili veliko raziskovalne dejavnosti, vendar so bila vprašanja digitalno-inkluzivne transformacije le redko obravnavana na področju poučevanja tujih jezikov. Raziskovalci na tem področju ugotavljajo, da je nujno treba povečati uporabo digitalnoinkluzivne transformacije v programih izobraževanja učiteljev tujih jezikov, da bi pri (izobraževalnih) deležnikih in (bodočih) učiteljih razvili »miselnost« transformacije. Procesi transformacije v izobraževanju pa se prepletajo s pripravljenostjo na digitalizacijo in inkluzijo med bodočimi in zaposlenimi učitelji, saj imata odnos in pripravljenost učiteljev, da se prilagodijo digitalni resničnosti, odločilno vlogo pri izboljšanju kakovosti (digitalno nadgrajenega) poučevanja in učenja. Trenutno je malo znanega o medsebojni povezanosti med pripravljenostjo na uporabo digitalne tehnologije za poučevanje in učenje tujih jezikov ter pripravljenostjo na vključevanje učencev tujega jezika z različnimi učnimi potrebami v digitalnoinkluzivni razred. V ta namen ta dvostranska meddržavna študija raziskuje dejavnike, ki predstavljajo odnosno komponento zaznane pripravljenosti učiteljev tujih jezikov za uporabo digitalne tehnologije pri učencih z različnimi učnimi potrebami v Nemčiji in na Norveškem. Vprašalnik o pripravljenosti učiteljev angleščine na različne učne potrebe v digitalnem inkluzivnem razredu je bil posredovan 221 udeležencem. Izsledki kažejo nov pogled na pripravljenost na digitalno podprto inkluzivno poučevanje, povezano z zahtevami izobraževalnega sistema za poučevanje tujih jezikov. Pomembno je tudi to, da je pri uporabi digitalne tehnologije v inkluzivnem razredu odločilna samozavest. Za izobraževanje učiteljev je ključno, da se odnosni komponenti pripravljenosti učiteljev posveča več pozornosti med celotnim usposabljanjem učiteljev. Povezati jo je treba s predhodnimi izkušnjami učiteljev z digitalno transformacijo v digitalnoinkluzivnih okoljih in jo vključiti v hevristično konceptualizacijo pripravljenosti učiteljev za digitalnoinkluzivna okolja.

Ključne besede: digitalnoinkluzivni koncept, digitalna transformacija, poučevanje tujih jezikov, inkluzija, pripravljenost učiteljev

Introduction

Digital transformation processes have had a considerable impact on society and its forms of knowledge, science, and education (Stalder, 2016). Media and computer literacy have long become indispensable in modern societies. At the same time, the development of societies towards (more) inclusion has been noted in education systems in general and in language education specifically to provide equity, value diversity and ensure inclusion across educational contexts (Kefallinou et al., 2020). Inclusive education systems, as stated by the OECD (2023), support a diverse student population and reflect on the different goals and uses of financial resources, among others. Norway and Germany are geographically, culturally, and politically close and comparatively prosperous, but the countries' educational systems differ strongly with respect to inclusive and digitally enhanced teaching and learning. What the two contexts have in common, though, is the need to digitally transform teacher education for inclusive education. Teachers, language teachers included, have to be prepared to use digital technology (DT) for inclusive foreign language teaching. The purpose of this study, that was carried out as a part of the DINGLE project, is to explore language teacher students' perceived preparedness to use DT for inclusive purposes in the different international contexts of Norway and Germany, thus combining digital technology and inclusive language education into a digital-inclusive approach to language education. It investigates the attitudinal component of a concept of teacher preparedness for digital-inclusive foreign language teaching and contributes to a model of teacher preparedness for digital-inclusive contexts.

Background to the study

As a critical incident (Tian et al., 2021), Covid-19 has certainly been a catalyst for digital transformation, particularly regarding the forced professionalisation processes of staff and students in educational contexts (cf. Symeonidis, 2018). The Covid-19 restrictions and its subsequent Emergency Remote Teaching (ERT) arrangements (Hodges et al., 2020) represented a challenge for educational systems worldwide but also forced the professionalisation of staff and digital upskilling across the board, university teacher education included (Blume, 2020; Vogt & Tsagari, 2023). Affordances like new digital forms of collaboration for students and staff alike (e.g., Tian et al., 2021) accelerated digital transformation processes (e.g., Chilla & Filk, 2021).

Digital technology (DT) includes communication (e.g., chat), construction (e.g., web authoring software), and entertainment (e.g., DVDs, streaming

apps) technologies. In the inclusive classroom, they appear as 'school technologies' (Ching et al., 2005, p. 232) that include 'all items that might typically be used in an educational context'. DT plays a vital role in education for inclusion on several levels, from assistive technology to implementing new digital genres in teaching. It is seen by Hajok (2018) as an agent of socialisation, particularly in inclusive contexts in education. In the German context, the term 'diclusion' (#diklusion) has been coined to express the close relationship between DT and inclusion (Abels & Stinken-Rösner, 2022; Schulz et al., 2022). However, the degree to which DT is deployed in education in Germany clearly falls behind expectations (Eickelmann et al., 2019), with foreign language education being no exception. At the same time, foreign language teacher education needs to reflect societal digital transformation processes using DT for inclusive purposes.

In this respect, we need to understand how digitally enhanced inclusive education is conceptualised and what theoretical frameworks are appropriate to ensure high-quality schooling. On the one hand, off-campus teaching environments and digitalised learning outside the physical boundaries of schools can raise accessibility for diverse learning groups and would hence be more inclusive. On the other, Covid-19 ERT unearthed various excluding practices that deepened the digital divide (e.g., van de Werfhorst et al., 2022). Limited access to DT for some students, teachers' limited experience with DT, and disadvantageous ad-hoc solutions for learners with special needs in Germany and limited learning outcomes, lower motivation, and a lower degree of social inclusion in Norway (Berente & Seidel, 2022; Damsa et al., 2021; NOKUT, 2022; van Dijk, 2020) constitute only a few examples of this divide.

This study questions the internationally inconsistent terminology concerning terms like inclusion or Special Educational Needs (SEN) to characterise the student body (Chapman & Ainscow, 2022). In Norway and Germany, the term 'inclusion' is mostly used as a policy imperative aiming at promoting education and the provision of resources for learners identified as having SEN and/or at risk of being excluded from learning. The demands and implementation of inclusive teaching greatly diverge since legislation and the implementation of mainstream education for learners with SEN are disparate in different educational contexts across Europe, for example, the 'tilpasset opplæring' (differentiated instruction) principle for all pupils in Norway vs a special needs education system and parallel inclusive schooling in Germany. However, neither Norway nor Germany differ in the percentage of students with SEN, nor do they display variations in the incidence and the types of learning needs (D'Alessio & Watkins, 2009). Hence, instead of limiting specific learning needs to, for example, a medically diagnosed spectrum of disorders and syndromes, we use a term that encompasses the various

manifestations of heterogeneity and diversity, namely 'diverse learning needs' (DLN) (Chilla et al., 2021; Vogt, 2023). DLN is used as a broader term which includes various backgrounds, developmental stages, skills and abilities, identities, and general physiological and psychological features of learners that might affect the current learning process or hinder the accessibility of content. As said above, the digital divide, for example, does not only affect students with (diagnosed) disabilities but also low-income students. Such a practical resource limitation, for example, hinders students from using learning platforms that request phone contracts with large data amounts (Vassilakopoulou & Husted, 2023).

Taken together, digital technology and diverse learning needs offer affordances for digital-inclusive learning and teaching settings that are of particular relevance for the 'digital life worlds' (Giesecke, 2002) of people and of inclusive-digital educational settings (see Vogt & Chilla, 2021). However, in practice, the intersection between digital teaching and inclusive education is rather under-researched. If the potential of digital-inclusive foreign language education is to be exploited to cater for learners' DLN, stakeholders in foreign language teacher education in Germany and Norway and, indeed, throughout Europe must be ready to engage in the innovative transformation processes for digital-inclusive foreign language education (Filk, 2019).

Digitalisation and DT have considerable potential for adaptive and individualised learning processes in (teacher) education (Haleem et al., 2022). They are of specific relevance for teaching and learning (see Petretto et al., 2021) and challenge higher education policies (Rüscher et al., 2022). Having said that, preparing foreign language teachers to navigate transformative digital processes in education and striving for inclusion necessitates a certain degree of preparedness from (pre-service) teachers in teacher education (Hay et al., 2001; Røkenes & Krumsvik, 2016). Digitalisation and inclusion are, therefore, transversal issues in foreign language teacher education and language teachers' professional development (Nadrljanski et al., 2022).

Focusing on foreign language education in a European context, we also need to understand how teaching is in line with the requirements of the Council of Europe recommendations on language education, as, for example, reflected in the Companion Volume to the CEFR (Council of Europe, 2020). In foreign language classrooms, students' different linguistic and cultural backgrounds are important aspects contributing to the diversity of learning needs. For example, teachers need to cater for students who do not have the language of schooling as their first language. With respect to teacher professionalisation and the internationalisation of teacher education, preparedness for the digital-inclusive transformation is a highly relevant aspect of teacher competence. Teacher competence is

related to the subjective theories of (prospective) teachers, specifically their attitude and willingness to respond to the current needs and abilities of learners with diverse learning needs using digital technology in the foreign language classroom (e.g., Rovai & Pfingsthorn, 2022, for the German context).

There seems to be a pressing need to increase DT uptake in foreign/second language teacher education programmes in both Norway (Røkenes & Krumsvik, 2016) and Germany (Marci-Boehncke & Blume, 2022) to develop a transformation 'mindset' in (educational) stakeholders and (future) teachers (McCarthy et al., 2023). For the German context, Drossel et al. (2019) found that only 25% of the teachers in the international ICLS- survey reported that DT had been part of their initial teacher training, with low self-reported confidence levels regarding the use of DT. As a result, German teachers feel underprepared for the systematic integration of DT to cater for their learners' DLN, something which became particularly obvious during the pandemic (Blume, 2020). Norwegian foreign language teachers report a higher sense of preparedness (Vold, 2017). Hence, the concept of teacher preparedness seems to be central for teachers feeling capable of and willing to plan and implement teaching environments for digital-inclusive foreign language classrooms.

Considering inclusive education, Hay et al. (2001) define teacher preparedness as a 'state of readiness' of a teacher for inclusive education (p. 214). The major focus is on questions such as 'Has the teacher been prepared regarding skills and the cognitive and emotional level for the anticipated inclusive education?' (Hay et al., 2001, p. 214). Previous studies report on (pre-service) language teachers' beliefs or mindsets relating to inclusive foreign language teaching (Blume et al., 2021; Dose, 2019), while others focus on the use of DT and (pre-service) teachers' preparedness to use DT (see Røkenes & Krumsvik, 2016). For example, Venkatesh et al. (2003) empirically validated and put forward the Unified Theory of Acceptance and Use of Technology (UTAUT), which captures the following essential elements: (1) performance expectancy, (2) effort expectancy, (3) social influence, (4) intention and facilitating conditions (Venkatesh et al., 2003, pp. 446-453). UTAUT provides a useful tool to assess the likelihood of success for new technology introductions and helps understand the drivers of acceptance to proactively design interventions (including training, etc.). However, it is neither geared to (foreign language) teachers as an important stakeholder group nor concerned with aspects of teachers' preparedness for the use of digital technology for students with DLN in the (foreign language) classroom.

In a study on the preparedness of in-service teachers regarding digital technology, in particular, the use of tablets, Kim and Kim (2017) conceptualised

teacher preparedness as mainly related to confidence, more precisely, self-confidence in deploying DT in the classroom. In the research instrument used, self-confidence was operationalised as the perceived ability to use digital tools such as tablets, electronic boards, or interactive solutions and as the ability to troubleshoot while the relevant DT is in use in the classroom. Viberg et al. (2020) examined teachers' preparedness to use digital technology in education. Their study offers a validated self-reported instrument that can be used to gauge teachers' preparedness. Their instrument is based on the following factors: (1) abilities to use digital learning technology, (2) social influence and support, (3) intention of use, (4) usefulness and efficiency, (5) limitation awareness, (6) pedagogical potential, and (7) assistance awareness (Viberg et al., 2020, pp. 46-47). Again, a knowledge ('abilities') component can be discerned in the model alongside elements that are associated with attitudes (e.g., usefulness and efficiency, social influence, assistance awareness, etc.). However, while these and other components have been included in Viberg et al. 's (2020) model, previous experience is only implicitly represented; for example, limitation awareness could be based on previous trials of DT in instructional language contexts. The researchers caution that further validation is needed of the proposed instrument on larger samples of teachers in various cultural contexts, as the proposed model may work differently when applied to other cultures and that the instrument is aimed to be used both as a starting point and to evaluate the effect of interventions (Viberg et al., 2020, p. 38). The authors conceptualise teacher preparedness in connection with digital technology or digital learning technology as a motivator for change towards integrating digital learning technology into teaching. Thus, teacher preparedness becomes 'a constituent component of digital competence touching upon attitudes or dispositions' (Viberg et al., 2020, p. 38). Moreover, troubleshooting competence seems to be particularly relevant for teachers since they are usually left to their own devices while teaching, and seems to represent an attitudinal part of a model of teacher preparedness. While a confident attitude towards DT seems to be vital, it cannot be the only element that constitutes (foreign language) teacher preparedness.

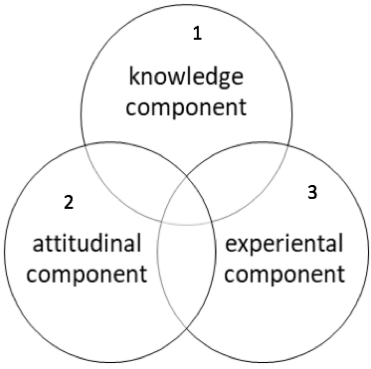
With reference to English as a Second Language, Røkenes and Krumsvik (2016) proposed a theoretical model of teacher preparedness in their study of pre-service ESL teachers in the Norwegian context. They distinguish between practical proficiency aspects and elements of the participants' self-awareness. In their questionnaire study, they included (1) the mastery of digital tools for various purposes, (2) the digital learning strategies pre-service teachers deployed, (3) the ethical aspects involved in the development of digital competence from an educational point of view, and (4) their overall digital competence for

instructional purposes. So, it seems that the aspects of self-perceived knowledge and competence play a vital role in the preparedness of language teachers to use digital technology to provide for their learners' learning needs.

As to aspects of inclusive education in the English as a Foreign Language (EFL) classroom, in their study with Cypriot, Greek, and Polish EFL teachers, Nijakowska et al. (2018) focused on teachers' preparedness for inclusion of dyslexic learners in the mainstream classroom. They surveyed 546 respondents from the three countries, using a questionnaire study to gauge teachers' preparedness to include dyslexic learners in their EFL classrooms and to investigate their training needs in this area. The findings highlight the significance of teachers' experience relating to teaching dyslexic EFL learners. Their personal involvement in inclusion activities, direct contact, and teaching experience with dyslexic learners rather than overall teaching experience seemed to enhance their preparedness (Nijakowska et al., 2018).

Against the background presented above, this study adds to the development of a new concept of teacher preparedness for digital-inclusive education and transformation in the foreign language classroom. The pre-conception of teacher preparedness presented here takes both digital technology and diverse learning needs into account and can be visualised as a componential model that consists of (1) a *knowledge* component, (2) an *attitudinal* component, and (3) an *experiential* component (Figure 1). The components are interrelated. For this model, we synthesised and expanded features from Viberg et al. (2020) and Røkenes and Krumsvik (2016) for knowledge about DT and from Viberg et al. (2020) and Kim and Kim (2017) for attitudes towards digital technology. As experience seemed to be a vital factor, we considered Nijakowska et al. (2018), with their perspective on dyslexia, to align with the diverse learning needs in the classroom. Subsequently, we collated the latter components into the TEP-DLN (Teacher of English Preparedness to Diverse Learning Needs in the digital inclusive classroom) questionnaire examined in the DINGLE study. The various parts of the questionnaire will be further detailed in the methods section.

Figure 1
Model of teacher preparedness in the DINGLE study (own illustration)



The *knowledge component* (1) relates to foreign language teachers' (perceived) ability and skills to use digital technology (DT) with foreign language learners with diverse learning needs (DLN), an aspect which is relevant for foreign language teacher education. It also concerns their overall digital competence for teaching learners with DLN, in tandem with their (perceived) ease of using DT for teaching learners with DLN, their knowledge about the characteristics of the learner group they teach, and the DLN to be addressed in this group.

The *attitudinal component* (2) of the DINGLE teacher preparedness model is characterised by the teachers' self-confidence in using DT with Foreign Language Learners (FLL) with DLN, their attitudes, positive or sceptical, towards integrating and using DT in their foreign language teaching, and their self-perceptions relating to their professional self-concept as (future) foreign language teachers. Additionally, their performance expectation, specifically the expectations that they have about the potential performanceof DT in their teaching to learners with DLN, forms part of this attitudinal component.

The final component is *experience* (3) related to attitudes, such as the strategies teachers choose to use in DT-embedded foreign language learning scenarios and the self-reflected and/or evaluated implementation of DT in foreign language classrooms with learners with DLN. This also includes their troubleshooting experience (Kim & Kim, 2017) and their effort expectancy, specifically the perceived ease of using DT in inclusive FL. Note, however, that pre-service teachers did not have access to a comparable experience in terms of teaching and designing learning environments. Thus, the experiential

component is based on expectations and perceptions rather than actual experience in using DT in inclusive foreign language classrooms. In this study, 'Digital Technology – DT' refers to digital media and their respective applications to reach the goals of foreign language teaching and learning.

Taken together, although some studies addressed the aspect of teachers' preparedness in different contexts, to date, little is known about the interrelationship between preparedness to use digital technology for foreign language teaching and learning and the preparedness to include foreign language learners with DLN in the digital-inclusive classroom. The study has two objectives, namely, to investigate the concept of teacher preparedness for digital-inclusive FLT and to contribute to a model of teacher preparedness for digital-inclusive contexts.

This study aims to explore language teacher students' perceived preparedness to use DT for inclusive purposes in different international contexts to foster inclusive language learning environments in Norway and Germany. One relevant and unresearched aspect of digital transformation is the attitudinal component of teacher preparedness and the self-confidence of (future) teachers to use digital technology and to understand DT as a supportive tool in the (inclusive) classroom and since attitudes are likely to be seen as a key factor to digital competence and self-confidence (Štemberger & Čotar Konrad, 2021). Moreover, the attitude and the willingness of teachers to adapt to digital reality seem to be crucial to improving the quality of education at universities (Yureva et al., 2020).

The study investigates the perceived preparedness of German and Norwegian English as a Foreign Language pre-service and in-service teachers to include digital technology in the inclusive foreign language classroom, focusing on the *attitudinal scale* of the TEPDLN questionnaire. That scale assesses perceptions and expectations of the use of digital technology practices in the inclusive classroom. The research questions of this study can be formulated as follows:

RQ1 What is the factorial structure of the TEPDLN attitudinal scale? What are the factors that constitute the attitudinal component of the foreign language teachers' preparedness for using digital technology with learners with diverse learning needs in Germany and Norway?

RQ2 How do (theoretically driven) demographic variables, such as level of foreign language teaching training, study year, level of education, overall teaching experience and teaching experience with students with DLN, relate to the pre- and in-service EFL teachers' attitudes towards using digital technology in the inclusive classroom?

Method

Participants

Data was collected from 221 pre-service and in-service EFL teachers in Germany and Norway who responded to the TEPDLN online questionnaire survey. As shown in the participant overview in Appendix B, the overall sample featured 116 respondents from Germany and 105 from Norway, suggesting a balanced sample, with 76% identifying as female (n=167), 23% as male (n=52) and 1% identifying as other (n=2). The gender distribution in the sample can be considered typical for EFL teachers in both contexts. The sample predominantly consisted of prospective EFL teachers (94% of the overall sample): around 6% were EFL in-service teachers, 82% were pre-service teachers, and 12% were completing their post-graduate probationary training in Germany (*Referendariat*). As to the level of education, 31% of the respondents held a B.A. degree, 42 % an M.A., and 3% a PhD. Most of the participants (57%) had no teaching experience, whereas 34% had some teaching experience, and only 9% had more than six years of teaching experience. As to experience with students with diverse learning needs (DLN), more than half of the respondents (52%) had teaching experience in regular classes with some students with DLN, whereas 11% of the participants reported no experience with DLN students or opted for the category 'not applicable' (26%). Of the entire sample, 8% have taught in special classes for students with DLN, and only 3% reported conducting one-to-one sessions with DLN learners.

Descriptive statistics revealed a rather homogeneous corpus both for Norway and Germany. Chi-square goodness-of-fit tests were performed to determine whether the distributions for each of the demographic variables were equal between the two countries. No significant differences emerged between the two countries for the variables 'level of training', 'age', 'overall teaching experience', and 'experience in teaching students with DLN'. The distributional patterns, however, differed by the variables 'gender' ($\chi 2$ (2) = 18.568; $p < .000$) with a higher rate of male participants in Norway relative to Germany, and by 'FLT training', specifically study year at university ($\chi 2$ (6) = 73.869; $p < .001$) with a significant proportion of 1st-year students relative to higher study years (62% in the 1st year) in Norway versus a rather equal distribution of participants across study years in Germany. Concerning the completed level of the EFL teachers' education, 81% have completed secondary school/B.A. studies in Norway versus 66% in Germany. Here, 25% hold an M.A. degree compared to 6% in Norway, leading to a significant difference between the countries

($\chi 2$ (4) = 24.638; $p < .001$). A further significant distributional difference between countries concerned the school type and age of future students, which is intricately related to the school type. In this respect, the participants in the Norwegian sample work more often in secondary schools than those of the German group, 73% vs 43%, respectively ($\chi 2$ (5) = 29.848; $p < .001$) and are more likely to work with older students (13-15 years; $\chi 2$ (5) = 24.997; $p < .001$) compared to the German participants who were more likely to work with younger students aged 6 to 12 years (64% vs 41%).

Instrument

In the search for instruments that have investigated teachers' digital-inclusive preparedness, we considered Viberg et al.'s (2020) questionnaire with a focus on digital competences and the study conducted by Nijakowska et al. (2018) in the field of English as a foreign language (EFL) and more specifically teachers' preparedness to include dyslexic learners in mainstream classrooms (see also Nijakowska et al., 2020) to reflect the knowledge, experience, and attitude components of our model of preparedness and to incorporate digital-inclusive teaching experience, 'leveraging technology as an enabler' (McCarthy et al., 2023). Although not specifically focusing on digital competences, Nijakowska et al. (2018) used a questionnaire to examine the effect of demographic variables on the preparedness of teachers to include students with dyslexia.

The Teacher of English Preparedness to Diverse Learning Needs in the digital inclusive classroom questionnaire (TEPDLN, see Appendix A) employed in our study is thus an extended and model-wise revised version of the DysTEFL-Needs Analysis Questionnaire (Nijakowska, 2014; Nijakowska et al., 2018) and gauges the pre- and in-service EFL teacher knowledge, attitudes and experience related to their preparedness to include digital technology in the classroom addressing the relevant target group, namely foreign language learners with DLN. Parts A and B of TEPDLN were adapted from the Nijakowska et al. (2018) questionnaire and expanded to DLN, and Parts C and D synthesise Viberg et al.'s (2020) questionnaire items related to DT. The TEPDLN expands the understanding of dyslexia and aspects of learning needs to the construct of DLN.

The new TEPDLN questionnaire verifies foreign language teachers' respondents' degrees of preparedness regarding the use of DT for foreign language learners with diverse learning needs (DLN), digitalisation and inclusive instructional practices. The entire scale comprises four parts. Part A includes background questions about demographic variables related to the participants'

age, gender, level of training, academic degree, the country where they teach or study to become teachers, overall teaching experience, type of experience in teaching students with diverse learning needs, and their prospective students' age (more than one answer could be selected to the last three questions). Part B addresses EFL teachers' beliefs about their preparedness to include learners with DLN in the EFL classroom and was operationalised on accommodating the learning needs of FLL with DLN consisting of 18 items measured on a 5-point Likert scale (1 = completely disagree and 5 = completely agree). Part C, which is the focus of the current study, comprises 21 questions relating to the attitudinal component of the teachers' preparedness model, namely perceptions and expectations of the use of digital technology practices. Finally, Part D, with 12 items, focuses on resources and collaboration in the digital-inclusive EFL classroom that are intricately related to the knowledge and experience components of the teacher preparedness model.

To ensure the instrument's reliability and validity, five external evaluators, who were experts in the field of DLN, speech and language education, media didactics, foreign language didactics, and inclusive education, were asked to evaluate the appropriateness of the instrument. The online questionnaire went through two cycles of piloting: a first cycle with all researchers who commented on redundancy, order of statements and item clarity. In a second cycle with fellow colleagues teaching the courses, the respondents attended to comment on the comprehensibility, length, and clarity of instructions, among others. After the evaluators' comments, several changes were made that led to a reduced number of items and a more reader-friendly instrument. Following this, the questionnaire was piloted (Cohen et al., 2018) with 30 experienced and pre-service EFL teachers who did not take part in the subsequent study (30% in Norway and 70% in Germany). Finally, the questionnaire was administered online using the Nettskjema platform. The sample was a convenience sample for which the project consortium activated various networks ranging from personal and professional contacts to calls for participation on social media. Participation in the study was voluntary, and written consent was obtained from all participants. All personal data was anonymised. Respondents took between 15 and 20 minutes to answer the questions.

Data Analysis

SPSS 27 was used for statistical analyses. Only complete data sets were considered for statistical analyses. First, the data were cleaned and screened for missing data points and univariate outliers and coded accordingly. Although a

total of 221 participants provided responses to the demographic questions under Section A, there were one to three participants (depending on the question) who did not provide responses to all of the questions of Section C, which is the focus of the current study. Cases with missing values were deleted listwise in the MANOVA analyses. The actual number of participants for each MANOVA test is indicated by the degrees of freedom provided for each statistic (number of participants = *df* +1). Initial teacher training in the German context is slightly different from Norway in that it comprises a university degree and a subsequent practical phase at school called *Referendariat*. These two phases of initial teacher training were subsumed under one category for statistical analyses.

Results

Factor analyses on TEPDLN - Section C (perceptions and expectations of the use of digital technology practices)

The first research question of the current study asked about the factorial structure of Section C (attitudinal component) of the teacher preparedness scale. To address this question, the factorability of the 21 scale items in Section C ('experiences/perceptions and expectations of the use of digital technology') was examined in detail, employing a Principal Component Analysis (PCA), which was initially run for each country separately. The PCA of the responses to the questionnaire items across the German and Norwegian samples showed that the factorial structure of the subsections of the questionnaire was almost identical for both groups, and Cronbach's α coefficients for the three factors were 0.883 for Norway and 0.726 for Germany indicating good internal consistency for each of the countries. Additionally, no significant differences emerged between the two countries in terms of the distributional proportions of the responses to the questions featured in Section C of the TEPDLN. Hence, the German and the Norwegian samples were collapsed for the PCA. The minimum amount of data for factor analysis was satisfied, with a final sample size of at least 221 participants, with over six cases per variable (cf. Table 2). As a rotation measure, Direct Oblimin was chosen due to the inter-correlation between the items. The Kaiser-Meyer-Olkin measure of sampling adequacy was at .879, and the determinant value of Bartlett's test of sphericity was significant (χ^2 (220) = 1613.9, $p < .001$), indicating clusterability.

By performing a principal component analysis on all data across the two samples, a three-factor solution was derived that explains 48.2% of the variance in Section C. We labelled the factors as follows: (a) 'confidence in using

digital technology with DLN students', (b) 'understanding of digital technology', and (c) 'expectations related to usage of digital technology'. The three attitudinal factors relate to (a) teachers' beliefs about possessed knowledge of diverse learning needs and self-efficacy in using digital technology with diverse learners in the EFL classroom, to (b) teachers' presuppositions with respect to digital technology and use in the inclusive classroom (c) teachers' behaviour and expectations with respect to use digital technology in the EFL inclusive classroom. The factor analysis also revealed that question C14 (see Appendix A) had to be excluded from the factor analysis due to serious collinearity issues, while item C1 did not have significant loadings. The remaining 19 items were considered for the factor analysis in our bilateral sample. The initial eigenvalues showed that the first factor explained (confidence in using DT with DLN) was 34.5%, the second factor (understanding of DT) was 7.2%, and the third 6.6% (DT-usage-related expectations) of the variance. As can be seen in Table 1, some factors had cross-loadings. Except for C18, the primary loadings of the questions were considered.

Table 1

Factor loadings for TEPDLN - Section C items (experiences/perceptions and expectations of the use of digital technology practices)

Section C items with significant loadings (>.3)		3-Factor solution		
		(F1) confidence	(F2) understanding	(F3) usage-related expectations
(F1)	C3. I believe I can use digital technology with FLL with DLN without much effort.	.871		
	C20. I feel comfortable about using digital technology when teaching FLL with DLN.	.761		
	C15. I find digital technology easy to use to meet the needs of FLL with DLN.	.676		
	C11. It would be easy for me to become adept at using new digital technology/ tools with FLL with DLN.	.591		
	C7. I find it easy to learn how to use digital technology with FLL with DLN.	.546		
	C4. I understand the potential of digital technology and how this can be used differently when working with FLL with DLN.	.409	.302	
	C18. I believe I can use these digital tools when I teach FLL with DLN.	.447	.481	
	C2. I understand digital technologies as instruction tools.	.327		

Section C items with significant loadings (>.3)		3-Factor solution		
		(F1) confidence	(F2) understanding	(F3) usage-related expectations
(F2)	C17. I understand digital technologies as inclusive language learning environments.		.749	
	C10. I understand digital technologies as language learning environments.		.689	
	C12. I am aware of the possibilities and limitations of digital technology with FLL with DLN and how it may affect my pedagogical approach.		.514	
	C21. Digital technology facilitates learning of FLL with DLN.		.493	.378
	C16. Digital technology helps FLL with DLN achieve their learning goals.		.484	.314
	C6. I understand digital technologies as cultural techniques.		.406	.333
(F3)	C9. Digital technology means that I can do my work faster when I teach FLL with DLN.			.804
	C5. I have found that digital technology is useful when I teach with FLL with DLN.			.622
	C13. Digital technology increases my productivity when I teach FLL with DLN.			.572
	C8. I am actively looking for a digital technology that I can use to cater for FLL with DLN, e.g., in differentiated FL teaching.			.475
	C19. Digital technology facilitates my way to assess the learning of FLL with DLN.			.449

Effects of demographic variables on EFL teachers' attitude towards using DT with students with DLN

The second research question investigated the influence of several theoretically driven demographic variables (Section A of the TEPDLN, cf. Table 1) on the EFL teachers' attitudes towards using DT with students with DLN. To this end, composite scores were computed for each of the three factors (F1: confidence in using digital technology with DLN students; F2: understanding of digital technology; F3: expectations related to usage of digital technology) based on the mean of the items which had their primary loadings on each PCA-derived factor. Subsequently, a series of one-way multivariate analyses (MANOVAs) were conducted, followed by univariate analyses of variance (ANOVAs) and post hoc LSD tests for MANOVA tests with significant results as indicated by the Wilks' λ value.

The investigated demographic variables were country, FLT training, level of training, teaching experience (no more than 10 years), experience with DLN, level of education (secondary-PhD), type of future school to work in (primary-college/university) and age of future students (<5 - >19)). First, we conducted the analyses, splitting the data set by country to examine within-country effects. Since no significant results emerged for each of the countries separately (see Appendix B), we proceeded by collapsing the German and Norwegian data sets in alignment with the PCA analyses, as this would increase statistical power. Here, we report only on demographic variables yielding significant results for Section C when participants from both countries are collapsed together (see Appendix C).

First, a one-way MANOVA was employed to examine whether the Norwegian and German samples differ from each other (country-level effects) in their attitudes towards using digital technology with diverse learners in the EFL classroom, specifically in their confidence, understanding, and DT-related use expectations. Although a significant Box's M value emerged, non-significant Levene's test results indicatedthat the homogeneity of variance-covariance matrix assumption was not violated. A statistically significant MANOVA effect was obtained as a function of country (Wilks' λ =.845, F (3, 217) = 13.28, p < .001, partial η^2 = .155). The multivariate effect size implies that 15.5% of the variance across the three factors was accounted for by country level. Univariate ANOVAs for each factor were conducted as follow-up tests to the MANOVA, indicating that the first and third factors were significantly different for the German and the Norwegian participants: F (1, 219) = 15.45, p < .001, η^2 = .066, F (1, 219) = 24.88, < .001, η^2 = .102, respectively. Thus, the Norwegian participants significantly differ from the German ones in their (a) 'confidence in using digital technology with DLN students' and (c) 'expectations related to usage of digital technology'. In this respect, despite not reaching statistical significance, descriptive statistics showed that Norwegian participants with more teaching experience appear to be more confident and show a better understanding and higher expectations of the use of digital technology compared to theircompatriots with less teaching experience, a trend which is not observed for the German sample (cf. Appendix C). Moreover, regardless of the level of training reached, Norwegian pre- and in-service teachers are more likely to agree more strongly with positive confidence and expectations of the use of DT. In contrast, the German (student) teacher sample is less willing to agree.

MANOVA conducted on the remaining demographic variable revealed no significant effects, except for marginally significant effects for the level of teacher training (FLT vs. Training to be FLT), explaining a rather negligible

proportion of the overall variance in Section C. The participants' level of training explained only 3.3% of the variance (Wilks' $\lambda = .967$, $F(3,217) = 2.48$, $p = .062$, partial $\eta^2 = .033$). Univariate follow-up ANOVAs showed that the second and third factors were significantly different for participants who are in teacher training compared to those working as professionals in schools, namely the factors (2) 'understanding of digital technology' ($F(1, 219) = 4.79$, $p < .05$, $\eta^2 = .021$), and (3) 'expectations related to usage of digital-technology', ($F(1, 219) = 6.69$, $p < .05$, $\eta^2 = .03$). Post Hoc tests were not possible due to having only two levels. When means are compared (cf. Appendix C), one can see that FLTs are more likely to agree than those who are training to be FLTs, so more experience in teacher training appears to be positively associated with understanding and expectation of DT use in the inclusive classroom.

Concerning the informants' study year, a marginally statistically significant MANOVA effect was obtained: Wilks' $\lambda = .881$, $F(18, 632) = 1.53$, $p = .075$, partial $\eta^2 = .041$. The multivariate effect size implies that only 4.1% of the variance in the dependent variables was accounted for by year of teacher training. Univariate ANOVAs for each factor were conducted as a follow-up, indicating that it was the first factor ('confidence in using digital technology with DLN') that was relevant for such effects: $F(6, 221) = 1.99$, $p = .068$, $\eta^2 = .053$. The observed trend was that students in their first year of studies were likely to feel slightly more confident about using digital tools with DLN students compared to fifth- and sixth-year students in both Norway and Germany (see Appendix C).

Discussion

The purpose of the study was to investigate teachers' perceived preparedness for digital-inclusive language teaching in two European contexts based on a theoretically motivated pre-conception of teacher preparedness. To this end, we focused on the interrelationship between the preparedness to use digital technology (DT) for foreign language teaching and learning and the preparedness to include foreign language learners with diverse learning needs (DLN) in the digital-inclusive classroom.

With an emphasis on the attitudinal component of teacher preparedness and the self-confidence of (future) teachers to use digital technology and to understand DT as a supportive tool in the (inclusive) classroom, this study investigated the perceived preparedness of German and Norwegian English as a Foreign Language (EFL) pre-service and in-service teachers to include digital technology in the inclusive foreign language classroom focusing on the *attitudinal* scale of the TEPDLN questionnaire. With the attitudinal scale of the

TEPDLN, we assessed perceptions and expectations of the use of digital technology practices in the inclusive classroom of 221 (student) teacher participants in Norway and Germany.

The first research question addressed the factorial structure of the TEPDLN attitudinal scale. The study identified three factors that underlie the attitude component of the TEPDLN, namely (a) 'confidence in using digital technology with DLN students', (b) 'understanding of digital technology', and (c) 'expectations related to the usage of digital technology'. The PCA of the responses to the questionnaire items across the German and Norwegian samples showed that the factorial structure of the subsections of the questionnaire was almost identical for both groups. By performing a principal components analysis on all data across the two samples, a three-factor solution was derived that explains 48.2% of the variance in Section C. We labelled the factors as follows: (a) 'confidence in using digital technology with DLN students', (b) 'understanding of digital technology', and (c) 'expectations related to usage of digital technology'. Thus, the attitudinal component of the EFL (student) teachers' preparedness to use digital technology with learners with diverse learning needs in Germany and Norway relates to (a) teachers' beliefs about knowledge they possess of diverse learning needs and self-efficacy in using digital technology with diverse learners in the EFL classroom, to (b) teachers' presuppositions with respect to digital technology and use in the inclusive classroom (c) teachers' behaviour and expectations with respect to use digital technology in the EFL inclusive classroom. Note that the first factor ('confidence in using DT with DLN') explained 34.5% of the variance.

The second research question investigated the influence of several theoretically driven demographic variables (Section A of the TEPDLN, cf. Appendix 1) on the EFL teachers' attitudes towards using DT with students with DLN. Note that the analyses splitting the data set by the country to examine within-country effects were conducted first, with no significant results emerging for each of the countries separately. To increase statistical power, we then conducted data analyses by collapsing the German and Norwegian data sets in alignment with the PCA analyses. In a second step, we investigated whether the Norwegian and German samples differ from each other (country-level effects) in their attitudes towards using digital technology with diverse learners in the EFL classroom, specifically in their confidence, understanding, and DT-related use expectations.

Our analyses showed that Norwegian participants significantly differed from the German ones in their (a) 'confidence in using digital technology with DLN students' and (c) 'expectations related to usage of digital technology'.

Referring to descriptive statistics, one could interpret that Norwegian, but not German, participants with more teaching experience appear to be more confident and show a better understanding and higher expectations of the use of digital technology compared to their compatriots with less teaching experience. Norwegian pre- and in-service teachers are more likely to agree more strongly with positive confidence and expectations of the use of DT than (student) teacher participants in the German group. This is of high importance since Viberg et al. (2020) point to the fact that knowledge and attitudes are associated. Note that DT troubleshooting is highly relevant for (experienced) teachers (Kim & Kim, 2017). Germany is a country with a poor digital infrastructure in schools (Schuknecht & Schleicher, 2020), and teachers are usually left to their own knowledge and skills when using DT in the foreign language classroom. Inclusion and DLN are thus often seen as an additional obstacle (Hartung et al., 2021). Based on descriptive statistics, it becomes evident that more experience in teacher training appears to be positively associated with understanding and expectation of DT use in the inclusive classroom. Importantly, students in their first year of studies were more likely to feel slightly more confident about using digital tools with DLN students compared to fifth- and sixth-year students in both Norway and Germany (see Appendix C). The waning interest in DT for digital-inclusive EFL teaching seems to be tied to the level of training and study year as important mediating factors, even though the marginal effects explain a small proportion of the variance. The more experience language teachers have accumulated in their respective teaching contexts, the less favourable their attitudes towards the use of DT for inclusive EFL purposes. This finding does not differ in the respective educational contexts in our bilateral study.

Experiential knowledge seems to be an important mediator in interacting with attitudes. Since attitudes are likely to be seen as a key factor to digital competence and self-confidence (Štemberger & Čotar Konrad, 2021), it is an alarming tendency when more practical experience with DLN classrooms leads to a more pessimistic view about using digital tools with DLN students. Our findings demonstrate the importance of confidence in using DT with DLN as an attitudinal component in a heuristic conceptualisation of teacher preparedness. Respondents confirmed a positive attitude by stating that DT helped learners with DLN achieve their learning goals. They also reported that they could use DT and felt comfortable with its use. The mainly positive attitudes teachers voiced at the beginning of their studies, expressed by high confidence levels, changed during their studies, which comes with teaching experience, for example, in teaching practice or through substitute teaching. The more practical experience teachers have garnered in general, with DT and with students

with DLN, the less prepared the respondents were to engage in digital-inclusive language teaching. This finding applied to teachers in both countries and might refer to the key role of teachers' perceived usefulness and perceived ease of DT use already stated in Teo (2009) for computer use. It must be interpreted with caution because we can only speculate about the reasons for it due to the lack of qualitative supportive data. Students could be frustrated by the lack of infrastructure and the lack of support to use DT for DLN learners, and thus, their confidence (Kim & Kim, 2017) and/or their performance expectancy (Venkatesh et al., 2003) of DT for inclusive purposes might decrease. This is crucial to the question of how language teacher education, including language teacher professional development, must adapt to digital transformation in various international contexts. Since attitude and the willingness of teachers to adapt to digital reality seem to be crucial to improving the quality of education at universities (Yureva et al. 2020), (future) foreign language teachers need supportive structures to build onto their preparedness for using DT in the DLN classroom.

Considering the theoretically motivated model of teacher preparedness proposed here, the importance of confidence for perceived preparedness as measured with the attitudinal scale of the TEPDLN is highly relevant. Therefore, confidence in using DT as an attitudinal factor is a vital prerequisite for digital-inclusive EFL teaching. This finding resonates with Viberg et al. (2020) in that teacher preparedness touches on attitudes (see also Rovai & Pfingsthorn, 2022). The confidence level of teachers regarding the use of DT tends to align more strongly with teaching experience in the Norwegian subsample compared to the German one. Many other results, however, are similar across educational contexts. It is only the bilateral perspective induced by a cross-country approach that highlights these interesting features. The attitudinal component of teacher preparedness seems to have a prominent function. For teacher education, it is vital that the attitudinal component of teacher preparedness receives more attention throughout teacher training. It should be related to teachers' previous experience with DT in digital-inclusive environments. Intraprofessional comparison of experience, practices and policies across educational contexts might be a decisive factor for a change of perspectives. This can be brought about by international exchange and collaboration on a European level, which are the keys to change management for digital-inclusive teaching. Even in apparently similar countries, differences and their collaborative reflection on them can represent a catalyst for awareness-raising and the integrated development of digital-inclusive teacher preparedness. Therefore, European teacher education programmes need to include collaborative initiatives as ways of bringing together teacher-students from different educational contexts, as in our project.

Further study will report on another subset of the data, i.e., focus group interviews with teachers from both contexts.

It becomes clear that the conceptualisation of teacher preparedness as a model of digital teacher preparedness (Viberg et al., 2020) does not suffice to map the complexities of digital-inclusive teacher preparedness. Earlier heuristics like Hay et al. (2001) point to the importance of attitudes and beliefs in digital-inclusive teacher preparedness but exclude the digital component, which represents the knowledge-based part of teacher preparedness, among others. The findings in our study corroborate Kim and Kim (2017) in that confidence in teachers is a vital aspect of the attitudinal component of teacher preparedness. However, for teacher preparedness in societies transforming digitally and inclusively, our findings point to attitudes having to be emphasised in our model of digital-inclusive teacher preparedness. Digital and inclusive transformation are inseparable in the context of FLT and hence cannot be treated as separate entities but as one. Although we only investigated the attitudinal component, the DINGLE model proposed here still allows for the assumption that there must be interdependencies between the three components that should be further explored. It is possible that future studies show no equality between the components, as attitudes are key to digital-inclusive preparedness and a precondition sine qua non (Blume et al., 2021). For transformation concepts, cross-sectional studies engaging students from several European countries are necessary. Finally, the teacher preparedness conceptualisation and modelling need to be adapted accordingly.

Conclusion

The purpose of this study was to explore language teacher students' perceived preparedness to use DT for inclusive purposes in different international contexts and to foster inclusive language learning environments in Norway and Germany. The study had two objectives: to investigate the attitudinal component of a concept of teacher preparedness for digital-inclusive FLT and to contribute to a model of teacher preparedness for digital-inclusive contexts. The attitudinal component of teacher preparedness is predominant and represents a precondition for digital-inclusive teacher preparedness. For teacher education, it is vital that the attitudinal component of teacher preparedness receives more attention throughout teacher training. Attitudes towards DT use for DLN learners, however, change in a negative way across the European contexts involved in our study as respondents have a less favourable attitude and lower confidence and self-efficacy levels towards digital-inclusive EFL teaching the more teaching

experience they have gained. In our view, this development could be countered with European language teacher education containing collaborative elements in which (pre-service) teachers compare and reflect on their digital-inclusive knowledge, attitudes, and experience against the background of theirrespective educational contexts. Further study should be related to previous experiences of teachers with DT in digital-inclusive environments and be part of a heuristic conceptualisation of teacher preparedness for digital-inclusive contexts.

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Appendix A

TEPDLN Online Questionnaire - link:
https://nettskjema.no/a/182447

Teacher preparedness to use technology to cater for foreign language learners with diverse learning needs – DLN

Dear Participant,

This survey is part of an international project, DINGLE (Digital and Inclusive Challenges for Norwegian and German Learning and Education). DINGLE is intended for pre- and in-service teachers who are working with foreign language learners (FLL) with 'diverse learning needs' (DLN).

When we use Diverse Learning Needs (DLN) we refer to the learning needs which reflect various elements of the diversity encountered by learners, e.g., socio-economic background, developmental stage, physical/cognitive abilities, cultural, sexual orientation, gender, ethnic group etc.

This research project aims to:

1. gain an understanding of whether (future) educators feel ready to accommodate the needs of foreign language learners with DLN;
2. find out to what extent (future) educators from various institutions and sectors feel ready to accommodate them and
3. to work out how and to what extent digital technology could support foreign language learners with DLN.

*Please note:

- Participation in the project is voluntary.
- Your responses will be fully confidential, and your participation will remain completely anonymous.
- The survey will take between 15–20 minutes to complete.
- You will be asked questions about your teaching experiences with foreign language learners with DLN.
- The data collected will be analysed by the researchers mentioned below and only for research purposes related to FLL with DLN.

Please feel free to share this questionnaire with other foreign language pre- and in-service teachers.

We appreciate your input and time in responding to the survey questions.

The DINGLE project team.

I have read the above guidelines and agree to take part in this study

a. Yes, I have read the above information and agree to participate in the study

b. No, I do not wish to participate in the study

Part A. General information.

Please tick the statements that describe you best. In some questions more than one answer is possible

A1. I am:

(A1.1) training to be a foreign language (FL) teacher.

(A1.2) a foreign language (FL) teacher

(A1.3) in teacher training 'Referendariat' (for German participants)

(A1.4) If you are training to be a foreign language (FL), please choose from the list below:

(A1.4.1) I am in my first year (first/second semester) of studies.

(A1.4.2) I am in my second year (third/fourth semester) of studies.

(A1.4.3) I am in my third year (fifth/sixth semester) of studies.

(A1.4.4) I am in my fourth year (seventh/eighth semester) of studies.

(A1.4.5) I am in my fifth year (ninth/tenth semester) of studies.

(A1.4.6) I am in my sixth year (eleventh/twelfth semester) of studies.

A2. I teach / I am training to be a teacher in:

(A2.1) Norway

(A2.2) Germany

A3. I am:

(A3.1) – male.

(A3.2) – female.

(A3.3) – diverse / choose not to say

A4. My age is:

(A4.1) – 17–20 years.

(A4.2) – 21–25 years.

(A4.3) – 26–35 years.

(A4.4) – 36–45 years.

(A4.5) – 46–55 years.

(A4.6) – 56 years and above.

A5. I have:
(A5.1) – no teaching experience.
(A5.2) – 1–5 years of teaching experience.
(A5.3) – 6–10 years of teaching experience.
(A5.4) – more than 10 years of teaching experience.

A6. I (will) primarily teach at a … …
(A6.1) – kindergarten.
(A6.2) – primary school.
(A6.3) – lower-secondary school.
(A6.4) – upper-secondary school.
(A6.5) – special school (special needs)
(A6.6) – college, university.
(A6.7) – language school.
(A6.8) – not applicable.

A7. Most of my (future) learners are primarily aged … … :
(A7.1) – under 5 years.
(A7.2) – 6–12 years.
(A7.3) – 13–15 years.
(A7.4) – 16–19 years.
(A7.5) – older than 19.
(A7.6) – not applicable.

A8. My highest level of education completed so far is:
(A8.1) – Secondary School.
(A8.2) – Bachelor's Degree.
(A8.3) – Master's Degree/first state exam.
(A8.4) – PhD.
(A8.5) – Other

A9. I have taught (e.g., during teaching practice placements) …
(A9.1) – classes where there are no learners with DLN.
(A9.2) – classes where there are some learners with DLN.
(A9.3) – special classes for learners with DLN.
(A9.4) – one-to-one sessions for learners with DLN.
(A9.5) – not applicable.

Part B. Accommodating the learning needs of Foreign Language Learners (FLL) with Diverse Learning Needs (DLN).

Please consider the statements below referring to teaching FLL with DLN and indicate to what extent the following statements are true to you.

I believe that ...

1. completely disagree
2. disagree
3. neither agree nor disagree
4. agree
5. completely agree

B1. teachers should modify the way teaching materials are presented to accommodate individual FLL with DLN.

B2. it is important for teachers to collaborate with parents and families of FLL with DLN.

B3. teachers should provide differentiated instruction to cater for the individual needs of FLL with DLN.

B4. FLL with DLN benefit from attending regular classes in mainstream education.

B5. FLL learners with DLN need adjustments in the mainstream language classroom.

B6. teachers should foster autonomy in FLL with DLN.

B7. developing self-determination in FLL with DLN is important.

B8. teachers should personalize assessment techniques to evaluate the progress of FLL with DLN.

B9. teachers should differentiate tasks/assignments to cater for individual learning needs of FLL with DLN.

B10. teachers should be familiar with the difficulties FLL with DLN experience in foreign language learning.

B11. teachers should help FLL with DLN to develop effective learning strategies.

B12. teachers should differentiate their approach to FLL with DLN.

B13. collaborative teamwork with a range of educational professionals is important for teachers of FLL with DLN.

B14. teachers should be familiar with the accommodations that FLL with DLN are entitled to when planning language exams and other types of assessment.

B15. teacher behaviour in a language classroom influences FLL with DLN self-esteem.

B16. teachers should have high expectations for their FLL with DLN.
B17. teachers should manage the classroom environment to cater for the individual learning needs of FLL with DLN.
B18. teachers should give feedback to FLL with DLN in such a way that it boosts their self-esteem.

Parts C and D focus on 'Digital Technology - DT', which, in the context of FL teaching and learning, refers to digital media and their respective applications to reach the goals of FL teaching and learning.

In the following parts, we would like to know more about your experiences and expectations of the use of DT.

Part C. Digital Technology (DT)

Please consider the statements below referring to teaching and digital technology and indicate to what extent the following statements are true to you.

1. completely disagree
2. disagree
3. neither agree nor disagree
4. agree
5. completely agree

C1. I believe that the digital technology that I have been introduced to, supports my pedagogical ideas.
C2. I understand digital technologies as instruction tools.
C3. I believe I can use digital technology with FLL with DLN without much effort.
C4. I understand the potential of digital technology and how this can be used differently when working with FLL with DLN.
C5. I have found that digital technology is useful when I teach with FLL with DLN.
C6. I understand digital technologies as cultural techniques.
C7. I find it easy to learn how to use digital technology with FLL with DLN.
C8. I am actively looking for digital technology that I can use to cater for FLL with DLN, e.g., in differentiated FL teaching.
C9. Digital technology means that I can do my work faster when I teach FLL with DLN.
C10. I understand digital technologies as language learning environments.
C11. It would be easy for me to become adept at using new digital technology/tools with FLL with DLN.

C12. I am aware of the possibilities and limitations of digital technology with FLL with DLN and how it may affect my pedagogical approach.
C13. Digital technology increases my productivity when I teach FLL with DLN.
C14. I understand digital technologies as inclusive learning environments.
C15. I find digital technology easy to use to meet the needs of FLL with DLN.
C16. Digital technology helps FLL with DLN achieve their learning goals.
C17. I understand digital technologies as inclusive language learning environments.
C18. I believe I can use these digital tools when I teach FLL with DLN.
C19. Digital technology facilitates my way to assess the learning of FLL with DLN.
C20. I feel comfortable about using digital technology when teaching FLL with DLN.
C21. Digital technology facilitates the learning of FLL with DLN.

Part D. Resources and Collaboration

Please consider the statements below referring to resources and collaborations in digital technology and indicate to what extent the following statements are true for you.

1. completely disagree
2. disagree
3. neither agree nor disagree
4. agree
5. completely agree

D1. I have access to the necessary resources to be able to use digital technology when I teach FLL with DLN.
D2. Colleagues or fellow students affecting my work think I should use digital technology with FLL with DLN.
D3. I know where I can get help if I encounter a problem with digital technology when I teach FLL with DLN.
D4. I intend to use digital technology with FLL with DLN in the coming year.
D5. The school(s) I am familiar with has supported the use of digital technology with FLL with DLN.
D6. I believe that there are limitations to what the available digital technology can be used when I teach FLL with DLN.
D7. I plan to use digital technology with FLL with DLN in the coming year.

D8. If I run into problems with digital technology when I teach FLL with DLN, I get help within a reasonable time.
D9. I believe that the available supply of digital technology supports my teaching FLL with DLN.
D10. I can find useful digital tools that can be easily integrated into my teaching when I work with FLL with DLN.
D11. I believe that digital technology can limit representations of knowledge content for teaching FLL with DLN.
D12. I can influence which digital tools I use in my teaching when I work with FLL with DLN.

Do you have any further comments you would like to add? If yes, please write them here.

_____

Thank you very much for your participation!!

Appendix B

Participant overview

Variable	Germany		Norway		Both countries	
	N= 116	Total%	N=105	Total%	N= 221	Total%
Level of training						
FLT	6	5	7	7	13	6
Training to be FLT	83	72	98	93	181	82
Referendariat	27	23	0	0	27	12
Gender						
Male	14	12	38	36	52	24
Female	102	88	65	62	167	76
Other	0	0	2	2	2	1
Age (years)						
17–20	11	9	23	22	34	15
21–25	60	52	53	50	113	51
26–35	30	26	14	13	44	20
36–45	9	8	10	10	19	9
46–55	5	4	4	4	9	4
56 and above	1	1	1	1	2	1
Level of education (degree)						
Secondary school	50	43	43	41	93	42
Bachelor's degree	27	23	42	40	69	31
Masters degree/ 1. State Exam	29	25	6	6	35	16
PHD	5	4	1	1	6	3
Other	5	4	13	12	18	8
Overall teaching experience						
No teaching experience	60	52	66	63	126	57
1-5 years	45	39	31	30	76	34
6-10 years	3	3	1	1	4	2
More than 10 years	8	7	7	7	15	7
Experience teaching students with Diverse Learning Needs (DLN)						
Classes without students with DLN	15	13	10	10	25	11
Classes with some students with DLN	62	53	52	50	114	52
Special classes for students with DLN	15	13	3	3	18	8
One-to-one sessions with children DLN	3	3	4	4	7	3
Not applicable	21	18	36	34	57	26

Variable	Germany		Norway		Both countries	
	N= 116	Total%	N=105	Total%	N= 221	Total%
Level of school teachers work at						
Primary school	37	32	28	27	65	29
Lower secondary school	25	22	46	44	71	32
Upper secondary school	24	21	27	26	51	23
Special school (special needs)	25	22	1	1	26	12
College, University	3	3	2	2	5	2
Not applicable	2	2	1	1	3	1
Age of students (in years)						
Under 5 years	0	0	1	1	1	0
6–12 years	48	41	25	24	73	33
13–15 years	43	37	67	64	110	50
16–19 years	11	9	11	10	22	10
older than 19	3	3	1	1	4	2
Not applicable	11	9	0	0	11	5
FLT_Training						
1st year	14	12	65	62	79	36
2nd year	15	13	4	4	19	9
3rd year	17	15	10	10	27	12
4th year	13	11	11	10	24	11
5th year	12	10	10	10	22	10
6th year	14	12	0	0	14	6
NA	31	27	5	5	36	16

Effect of demographic variables on TEPDLN Section C factors – data set split by country.

Variable		Level	F1 Confidence		F2 Understanding		F3 Expectations		F
			Mean	*SD*	Mean	*SD*	Mean	*SD*	
Level of Training	Nor	Training to be FLT	3.72	0.53	3.64	0.56	3.51	0.55	1.41
		FLT	4.06	0.22	4.04	0.24	3.94	0.56	
	Ger	Training to be FLT	3.47	0.50	3.61	0.46	3.15	0.53	0.84
		FLT	3.57	0.61	3.83	0.51	3.52	0.70	
Teaching experience	Nor	No experience	3.68	0.45	3.59	0.49	3.44	0.54	1.52
		1-5 years	3.81	0.63	3.74	0.65	3.67	0.55	
		6-10 years	5.00	-	5.00	-	4.20	-	
		> 10 years	3.98	0.38	3.88	0.28	3.80	0.61	
	Ger	No experience	3.48	0.54	3.58	0.47	3.15	0.47	1.22
		1-5 years	3.46	0.40	3.69	0.44	3.15	0.58	
		6-10 years	2.96	0.51	3.11	0.34	2.80	0.72	
		> 10 years	3.63	0.75	3.79	0.51	3.55	0.63	
Experience with DLN	Nor	Classes without DLN	3.74	0.44	3.65	0.44	3.58	0.50	1.32
		Classes with some DLN	3.68	0.51	3.63	0.51	3.57	0.52	
		Special classes for DLN	3.92	0.94	3.88	0.96	3.73	0.75	
		One-to-one DLN	4.08	0.30	4.37	0.28	3.90	0.47	
		Not applicable	3.79	0.54	3.63	0.59	3.43	0.62	
	Ger	Classes without DLN	3.65	0.54	3.85	0.48	3.14	0.56	0.84
		Classes with some DLN	3.43	0.52	3.58	0.44	3.13	0.54	
		Special classes for DLN	3.37	0.41	3.55	0.52	3.22	0.57	
		One-to-one DLN	3.74	0.71	3.88	0.76	3.46	0.92	
		Not applicable	3.51	0.48	3.61	0.42	3.23	0.45	

Variable		Level	F1 Confidence		F2 Understanding		F3 Expectations		F
			Mean	*SD*	Mean	*SD*	Mean	*SD*	
FLT Training	Nor	1st year	3.77	0.49	3.65	0.51	3.52	0.51	1.13
		2nd year	4.16	0.56	4.12	0.59	3.95	0.37	
		3rd year	3.77	0.41	3.66	0.74	3.58	0.62	
		4th year	3.72	0.71	3.74	0.71	3.54	0.76	
		5th year	3.25	0.42	3.31	0.33	3.30	0.51	
		NA	4.13	0.21	4.00	0.16	3.88	0.67	
	Ger	1st year	3.61	0.48	3.58	0.51	3.08	0.48	0.88
		2nd year	3.44	0.64	3.56	0.38	3.18	0.53	
		3rd year	3.43	0.35	3.61	0.46	3.23	0.44	
		4th year	3.47	0.58	3.71	0.56	2.92	0.50	
		5th year	3.68	0.50	3.63	0.63	3.40	0.46	
		6th year	3.46	0.53	3.65	0.45	3.24	0.63	
		NA	3.29	0.41	3.58	0.45	3.05	0.57	

Appendix C

Effect of demographic variables on TEPDLN Section C factors – collapsed data set.

Variable	Level	F1 Confidence		F2 Understanding		F3 Expectations		F
		Mean	*SD*	Mean	*SD*	Mean	*SD*	
Country	Norway	3.75	0.52	3.66	0.55	3.54	0.56	13.28**
	Germany	3.47	0.51	3.62	0.46	3.17	0.54	
Level of Training	Training to be FLT	3.59	0.53	3.62	0.51	3.32	0.57	2.48
	FTL	3.86	0.47	3.95	0.37	3.76	0.63	
Level of Education	Secondary school	3.56	0.51	3.56	0.46	3.27	0.51	1.25
	BA	3.66	0.54	3.70	0.53	3.47	0.62	
	MA/ 1. State Exam	3.47	0.45	3.66	0.41	3.20	0.56	
	PHD	3.90	0.72	3.83	0.56	3.56	0.75	
	Other	3.76	0.64	3.77	0.72	3.48	0.64	
Teaching experience	No experience	3.58	0.50	3.58	0.48	3.30	0.52	1.04
	15 years	3.60	0.53	3.71	0.53	3.36	0.62	
	6-10 years	3.47	1.10	3.58	0.98	3.15	0.91	
	More than 10 years	3.80	0.61	3.83	0.41	3.66	0.61	
Experience with DLN	Classes without DLN	3.68	0.49	3.77	0.46	3.32	0.57	1.46
	Classes with some DLN	3.54	0.53	3.60	0.47	3.33	0.57	
	Special classes for DLN	3.46	0.54	3.61	0.59	3.31	0.61	
	One-to-one DLN	3.93	0.50	4.16	0.55	3.71	0.67	
	Not applicable	3.69	0.53	3.62	0.53	3.36	0.57	
Future school	Primary	3.48	0.49	3.55	0.49	3.22	0.59	1.30
	Lower secondary	3.67	0.45	3.65	0.46	3.37	0.50	
	Upper secondary	3.76	0.67	3.79	0.55	3.46	0.66	
	Special school (SN)	3.40	0.39	3.53	0.54	3.30	0.53	
	College University	3.84	0.73	3.93	0.48	3.64	0.49	
	Not applicable	3.48	0.27	3.72	0.69	3.53	0.57	

Variable	Level	F1 Confidence		F2 Understanding		F3 Expectations		F
		Mean	*SD*	Mean	*SD*	Mean	*SD*	
Age of students	Under 5 years	4.00	-	4.00	-	4.00	-	1.50
	6-12 years	3.44	0.47	3.53	0.50	3.22	0.58	
	13-15 years	3.71	0.53	3.67	0.49	3.41	0.56	
	16-19 years	3.60	0.64	3.81	0.56	3.40	0.67	
	older than 19	3.97	0.78	3.75	0.48	3.40	0.58	
	Not applicable	3.42	0.32	3.69	0.53	3.34	0.49	
FLT Training	1st year	3.74	0.49	3.64	0.51	3.44	0.53	1.51
	2nd year	3.59	0.68	3.68	0.47	3.34	0.58	
	3rd year	3.55	0.40	3.63	0.54	3.36	0.53	
	4th year	3.58	0.64	3.72	0.62	3.20	0.69	
	5th year	3.48	0.51	3.49	0.53	3.35	0.48	
	6th year	3.29	0.41	3.58	0.45	3.05	0.57	
	NA	3.55	0.55	3.70	0.43	3.33	0.66	

Biographical note

Solveig Chilla, PhD, is a full professor for language and communication education at Europa-Universität Flensburg, Germany. Her main areas of research are digital-inclusive language education, language diversity, multilingual and multimodal language development and didactics and developmental language disorders.

Gerard Doetjes, PhD, is the director of the Norwegian National Centre for English and other Foreign Languages in Education, Halden. His research interests include mutual intelligibility between Scandinavian languages, vocabulary learning and teaching, inclusive language education and foreign language teacher education.

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