

Teachers' Professional Competence for Bilingual (Economic) Education

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Summary

Bilingual education holds great potential to simultaneously nurture bilingualism, biliteracy as well as subject-specific and intercultural competences – all crucial skills for the 21st century. However, the widespread implementation of bilingual education faces challenges such as the lack of learning materials and considerable training needs of active bilingual education teachers. Although teachers' challenges and pedagogical practices within different content-based bilingual education types like immersion, dual-language education or content and language integrated learning are similar, an overarching and comprehensive overview of bilingual education teachers' required competences is still missing. To address this research gap and ultimately increase the quality of teacher training, the present dissertation closely examines the required competences of bilingual education teachers for secondary education both in general and in the context of the promising bilingual subject of economics. This investigation incorporates a systematic literature review, a mixed-methods study to accumulate practitioners' insights into professionalism and a linguistic analysis of learning materials.

The systematic review encompassed 79 international reports on bilingual education teachers' competences, which were categorically grouped and narratively synthesised. A competence model specific to bilingual education teachers was developed based on the converging competences found in the competence frameworks and the reports on individual competences. Important competences included several aspects of language proficiency such as subject-specific or academic language proficiency and additional requirements like critical consciousness, cooperation skills, pedagogical/psychological knowledge of methodology or material design and pedagogical content knowledge.

The second study used a mixed-methods design with 32 participants (trainee teachers and teacher educators involved in a bilingual education qualification program) filling in a questionnaire and 11 follow-up interviews with participants teaching political studies or geography bilingually. It compared beliefs about generalist and bilingual education teachers'

professional competences and revealed that bilingual education teachers' competence requirements were more pronounced. These included expanded language proficiency, international content knowledge and pedagogical content knowledge of merging language, content, learning and culture. Higher motivation and enhanced pedagogical/psychological knowledge of material design, methodology and assessment were also deemed important by practitioners. Notable differences between trainee teachers and teacher educators emerged particularly regarding the importance of reflection and the required level of language proficiency.

In the third study, the linguistic complexity of 1529 English main body texts in 30 bilingual economics learning materials was analysed. The results showed a lack of systematic complexity progression across grade levels that can potentially hinder students' continuous language development. Together with substantial fluctuations in lexical richness and the overall scarcity of ready-made materials, these results highlighted the need for bilingual education teachers to create or adapt their own learning materials. To this effect, language proficiency, pedagogical/psychological knowledge of material design and learning processes, (pedagogical) content knowledge and intrinsic motivation were identified as essential for high-quality material production.

The present dissertation furthermore discusses and triangulates the results of the three studies to come up with a competence model specifically targeted at bilingual economic education teachers. Overall, it sheds light on teachers' competences, challenges and opportunities in the field of bilingual (economic) education. Therefore, this comprehensive dissertation contributes to the enhancement of teacher training for bilingual (economic) education. Additionally, the two competence models developed in this dissertation can be used as reflective tools by interested generalist (economic) education teachers. Finally, this dissertation creates a solid foundation for future research, which overall benefits policy, schools, teachers, students and researchers alike.

Zusammenfassung

Bilingualer Unterricht birgt das Potential sowohl die Zweisprachigkeit, die fremd- und muttersprachliche Lese- und Schreibfähigkeit als auch fachspezifische und interkulturelle Kompetenzen zu fördern – allesamt entscheidende Fähigkeiten des 21. Jahrhunderts. Allerdings ist die weit verbreitete Umsetzung von bilingualem Unterricht mit verschiedenen Herausforderungen verbunden. Dazu gehören der Mangel an Lernmaterialien und die Notwendigkeit von Aus- und Weiterbildung für bilinguale Lehrkräfte. Obwohl inhaltsbasierte bilinguale Formate wie Immersionsprogramme, sogenannte „Dual-Language“ Programme oder bilingualer Sachfachunterricht große Ähnlichkeiten bezüglich ihrer lehrbezogenen Herausforderungen und den pädagogischen Praktiken aufweisen, fehlt bis dato ein umfassender Überblick über die benötigten Kompetenzen. Um diese Forschungslücke zu schließen und letztlich die Qualität der Lehrkräfteausbildung zu verbessern, untersucht die vorliegende Dissertation die erforderlichen Kompetenzen von bilingualen Lehrkräften der Sekundarstufe sowohl fachübergreifend als auch im Kontext des für den bilingualen Unterricht vielversprechenden Fachs Wirtschaft. Hierfür wurden eine systematische Literaturanalyse erstellt, die Überzeugungen von Praktiker:innen zur Professionalität in einer Mixed-Methods-Studie erfragt und eine linguistische Komplexitätsanalyse von Lernmaterialien durchgeführt. Die systematische Literaturanalyse schloss 79 internationale Aufsätze zu den Kompetenzen von Lehrkräften des bilingualen Unterrichts ein, welche kategorisch gruppiert und narrativ zusammengefasst wurden. Basierend auf den inkludierten Kompetenzrastern und den individuell in Aufsätzen aufgelisteten Kompetenzen wurde ein Kompetenzmodell spezifisch für bilingual unterrichtende Lehrkräfte entwickelt. Zu den besonders hervorgehobenen Kompetenzen gehörten dabei verschiedene Aspekte der Sprachkompetenz wie beispielsweise fach- oder bildungssprachliche Kenntnisse. Außerdem wurden ein kritisches Bewusstsein, Kooperationsfähigkeit, pädagogisches/psychologisches Wissen über Methodik oder Materialgestaltung und fachdidaktisches Wissen thematisiert.

Die zweite Studie verfolgte einen Mixed-Methods-Ansatz und untersuchte mithilfe eines Fragebogens und darauf folgenden Interviews die Einstellungen von Referendar:innen und Dozierenden, die an der bilingualen Zusatzausbildung beteiligt waren. Den Fragebogen füllten 32 Personen aus und es wurden 11 Interviews mit Teilnehmenden geführt, die Gemeinschaftskunde oder Geografie bilingual unterrichten. Die Studie verglich die Überzeugungen zu professionellen Kompetenzen von Lehrkräften des regulären und des bilingualen Unterrichts und hat gezeigt, dass die Kompetenzanforderungen an die Lehrkräfte des bilingualen Unterrichts deutlich höher sind. Unter anderem wurden erweiterte Sprachkenntnisse, internationales Fachwissen und fachdidaktisches Wissen über die Verbindung von Sprache, Inhalt, Lernen und Kultur hervorgehoben. Zudem wurden eine höhere Motivation und erweitertes pädagogisches/psychologisches Wissen zur Materialgestaltung, Methodik und Bewertung von den Praktiker:innen als wichtig erachtet. Bemerkenswerte Unterschiede zwischen Referendar:innen und Dozierenden zeigten sich insbesondere hinsichtlich der Bedeutung der Reflexion und des erforderlichen Niveaus der Sprachkenntnisse.

Die dritte Studie umfasste die Komplexitätsanalyse von 1529 englischen Texten aus 30 Lehrwerken für den bilingualen Wirtschaftsunterricht. Dabei zeigte sich ein Mangel an systematischer Komplexitätsprogression über die Klassenstufen hinweg, was die kontinuierliche Sprachentwicklung der Schüler:innen erschweren könnte. Zusammen mit erheblichen Schwankungen des lexikalischen Reichtums und dem allgemeinen Mangel an Lernmaterialien machen diese Ergebnisse deutlich, dass Lehrkräfte des bilingualen Unterrichts ihre eigenen Lernmaterialien erstellen oder anpassen müssen. Als wesentliche Kompetenzen für die Erstellung qualitativ hochwertiger Materialien wurden dabei Sprachkenntnisse, pädagogisches/psychologisches Wissen über Lernprozesse und die Gestaltung von Materialien, fachdidaktisches Wissen, Fachwissen und intrinsische Motivation identifiziert.

Nach der detaillierten Vorstellung der drei einzelnen Studien werden die Ergebnisse diskutiert und aufeinander bezogen, um folgend ein spezifisches Kompetenzmodell für bilingual unterrichtende Wirtschaftslehrkräfte zu entwickeln. Insgesamt beleuchtet die vorliegende Arbeit damit die Kompetenzen, Herausforderungen und Möglichkeiten von Lehrkräften im Bereich des bilingualen (Wirtschafts-)Unterrichts. Sie kann außerdem zur Verbesserung der Ausbildung von bilingualen Wirtschaftslehrkräften beitragen und die zwei entstandenen Kompetenzmodelle können als Reflexionsinstrumente von interessierte Sachfach- oder Wirtschaftslehrkräften verwendet werden. Somit schafft die Dissertation eine solide Grundlage für künftige Forschungsprojekte, so dass schließlich die Politik, die Schulen, die Lehrkräfte, Schüler:innen wie auch interessierte Forscher:innen gleichermaßen von den Ergebnissen profitieren können.

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List of Abbreviations

BETs	Bilingual education teachers
CBI	Content-based instruction
CIC	Classroom interaction competence
CLIL	Content and language integrated learning
CLKT	Content and language knowledge for teaching
CK	Content knowledge
CM	Classroom management
CTAP	Common text analysis platform
ICT	Information and communication technology
LKCT	Language knowledge for content teaching
MTLD	Measure of textual lexical diversity
NGSL	New general service list
PRISMA	Preferred reporting items for systematic reviews and meta-analyses
PSC	Pedagogical Spanish competences
TTR	Type-token ratios

1. Introduction and Theoretical Background

1.1 Introduction

Phenomena such as the increase in international cooperation and understanding after the Second World War, the rise in worldwide trade and worker mobility through globalisation, and the recent refugee migration due to ongoing conflicts have significantly accelerated the change towards a more diverse population. This development places particular demands on teachers and schools since they encounter students' linguistic, social and cultural heterogeneity on a daily basis (Organisation for Economic Co-operation and Development [OECD], 2018a). Under these circumstances, providing equal learning opportunities, meeting the needs of all students (OECD, 2018a), and increasing the level of education under social and political pressure are great challenges (Coyle, 2018).

Since '[l]anguage is the primary medium for communication, thinking and understanding' (Jhingran, 2019, p. 5), language learning with the goal of achieving biliteracy and bilingualism is a first step to addressing the challenges of diversity. Biliteracy 'refers to any and all instances in which communication occurs in two (or more) languages in or around writing' (Hornberger, 1990, p. 213), while bilingualism is often equated with native-like proficiency in two languages (Bloomfield, 1933). However, both biliteracy and bilingualism are complex concepts since they can involve varying degrees of proficiency and communication skills in the two languages. For example, functional bilingualism describes the use of the second language only for specific purposes (Niemeier, 1999). Assumptions about language acquisition also influence the understanding of bilingualism: subtractive bilingualism involves acquiring a second language at the expense of the first, while additive bilingualism describes taking up a second language while maintaining the first (Baker & Jones, 1998; García, 2009). In comparison, dynamic bilingualism focuses on the challenges of an

interconnected and multilingual world and understands bilingualism as an ever-changing adjustment process of language practices (García, 2009).

When support measures, such as using native speakers as teaching assistants or language-sensitive instruction, are in place, language learning might meet the linguistic challenges of diversity. However, these measures are not enough to address students' social and cultural heterogeneity, which is where bilingual education enters the picture. In general, bilingual education refers to a broad variety of educational programs teaching parts or all of the curriculum in two languages (Baker & Wright, 2021). Since the 1960s, bilingual education has gained momentum and found its way into most educational guidelines globally (Sánchez-Pérez & Manzano-Agugliaro, 2021). It has even been described as 'the only way to educate children in the twenty-first century' (García, 2009, p. 5). In contrast to regular second or foreign language education, bilingual education takes diversity into account by actively fostering students' tolerance and appreciation of different cultural, social, and linguistic backgrounds (García, 2009). Translanguaging, as the active inclusion of students' various language skills and practices in the classroom, is just one of its more innovative approaches (García, 2009). Moreover, bilingual education teaches content through the additional language whereas traditional language learning studies language as a subject (Baker & Wright, 2021). Apart from the goals of fostering bilingualism, biliteracy, and social, linguistic, and cultural awareness, the aims of bilingual education programs range from the assimilation of students with immigrant backgrounds and improvement of students' academic achievement and chances of global employment to the preservation of heritage languages (Wright & Baker, 2017). Additionally, bilingual programs give students the chance to connect with distant family members and extend their social environment (Bialystok, 2018).

Although many factors influence the success of bilingual education programs (Kirss et al., 2021), teachers' education and competences, as well as appropriate learning materials, are

essential. However, shortcomings in these areas are emphasised by research (Pérez Cañado, 2016a, 2016b; Pérez Gracia et al., 2020; Porcedda & González-Martínez, 2020), and a comprehensive overview of relevant competences, covering more than one specific type of bilingual education program and also tackling subject-specific competence requirements, is still missing. To bridge this research gap, the present dissertation closely investigates bilingual education teachers' competences both in general and regarding the promising bilingual subject of economics through a literature review, practitioners' insights, and an analysis of learning materials. The dissertation is guided by one overarching research question with three sub-questions:

Which competences of bilingual (economic) education teachers

- a) are deemed necessary within the literature?*
- b) are considered essential by practitioners?*
- c) can be deduced from a linguistic analysis of existing learning materials?*

The first paper of the dissertation consists of a systematic literature review of bilingual education teachers' competences and results in a newly developed competence model. The second paper includes a questionnaire and interviews with bilingual education practitioners and examines and compares the beliefs of bilingual education and generalist teachers' professionalism. Finally, the third paper considers the high but under-exploited potential of the subject of economics for bilingual education and presents a linguistic complexity analysis of bilingual economics learning materials. This analysis enables inferences on teachers' requirements for language (adaptation) skills and the appropriateness of existing materials for bilingual economic education.

The systematic review includes bilingual education as practised all over the world; however, this dissertation focuses particularly on bilingual education in Germany, as this is the setting of the second study and the origin of the materials considered in the third study.

Moreover, it focuses on bilingual education within the general secondary school system since bilingual education in Germany is mainly provided at this level (Eurydice, 2006).

Overall, the present dissertation yields a chance to better understand teachers' requirements for bilingual (economic) education, improve bilingual teachers' professionalisation, increase the incentive to offer bilingual education, and guide the future development of bilingual (economics) learning materials.

The remainder of the dissertation is structured as follows: The next chapter elaborates on the theoretical background of bilingual education, starting with its history and motivation. Then, different program types as well as their effectiveness and criticism are presented. Thereafter, influencing factors, pedagogical guidelines, and the importance of teacher training are illustrated. The significance of the three included studies is explained before the studies themselves are presented in three separate chapters. The dissertation closes by integrating the findings of the three studies, discussing limitations as well as theoretical and practical implications and offering a conclusion.

1.2 Theoretical Background of Bilingual Education

1.2.1 The History of and Motivation for Bilingual Education

The broad variety of languages spoken within countries has increased historically through migration, colonialism, and, more recently, globalisation. In detail, colonial practices altered local language hierarchies in favour of the coloniser's language, which was often set as the language of instruction in schools and impaired the preservation of indigenous languages (García, 2009; Migge & Léglise, 2007). Educational problems arising from such practices or their postcolonial remnants form the basis for the introduction of bilingual education in such contexts. For example, the use of English only as a school language in the United States resulted in many language-minority students struggling academically and needing early educational support measures in their first language to achieve the goal of English language literacy

(Bialystok, 2018). As a result, laws such as the Bilingual Education Act of 1968 were passed, which addressed equal educational opportunities for English language learners and provided funding for the development and maintenance of new programs and teacher training (Wiese & Garcia, 2001). In other countries, the motivation for bilingual education was to educate language-majority students in the minority language to achieve proficiency in both languages, for example, in Canada, or to preserve heritage languages, such as Maori in New Zealand (Bialystok, 2018).

In contrast, bilingual education in regions such as Europe, where monolingual schooling is traditionally predominant, is rooted in initiatives launched to increase international and cultural understanding and support reconciliation after the Second World War. For instance, bilingual programs in Germany started to surface in the 1960s as part of the reconciliation with France (Breidbach & Viebrock, 2012). The later expansion of such initiatives in Europe was based on success stories from Canadian and U.S. bilingual programs (Hanesová, 2015; Marsh, 2012). Accordingly, the European Commission (1995) encouraged the teaching and learning of two or more foreign languages and simultaneously proposed the implementation of subject teaching in a foreign language during secondary education. This European approach to bilingual education (Nikula, 2017; Pérez Cañado, 2012) was named content and language integrated learning (CLIL) and had both educational and political goals. The first goal was to broaden the everyday communication skills students acquired through foreign language learning programs, while the second, which follows from the first, was to enhance workers' mobility and employability across Europe (Council of the European Union, 2011; Marsh, 2012).

As the examples given above show, the introduction of bilingual education is often motivated by the association of second or foreign language learning with equal learning opportunities and mobility. In highly multilingual countries in Africa or Asia, the additional

factor of social advancement is associated with bilingual education. African countries still face difficulties in implementing bilingual education programs that include African languages due to the prevailing association of colonial language schooling with opportunities for upward social mobility (Bunyi & Schroeder, 2017). Similarly, in Asian countries such as China, Pakistan (Haidar & Fang, 2019), Japan, and South Korea (Hu & McKay, 2012), the perception of colonial languages and, in particular, the lingua franca of English as a ‘gatekeeper for better employment and education’ (Haidar & Fang, 2019, p. 170) has fostered the introduction of extended English language lessons and bilingual education in the 21st century. For example, English medium instruction (EMI), which describes the teaching of a non-language subject in English, has gained momentum in Chinese primary, secondary (Hu & McKay, 2012), and higher (Galloway et al., 2020) education.

Lastly, bilingual education for deaf children emerged in the 1980s (García, 2009) as a means to give deaf students social and economic access to the hearing community and, in particular, to enable communication with their parents (Reagan, 2015). The aims include teaching both sign language and spoken language while strengthening the students’ deaf identity (García, 2009; Reagan, 2015; Wright & Baker, 2017). Fostering sign language and written language skills is thus more prominent than fostering oral language skills in this type of bilingual education (Reagan, 2015).

In summary, the implementation of bilingual education follows educational, political, socio-cultural, and economic rationales (Baker & Wright, 2021). More specifically, motives for implementation vary across countries and range from supporting struggling bilingual students, fostering students’ bilingualism and mobility, enabling social upward movement to providing access to the community for deaf children.

1.2.2 Research-Guided Motivations for Bilingual Education

Apart from the circumstantial reasons mentioned above, second language acquisition approaches and research have influenced the (pedagogical) implementation of bilingual education immensely. First and foremost, the communicative approach that emerged in the 1970s, also called communicative language teaching, rejected a strong focus on grammar and translation and called for a greater focus on communication within the classroom. This approach understands the goal of language learning to be gaining communicative competence in the second language that can be applied in real situations and interactions (East, 2017). Using the language is therefore key to language learning, and teaching non-language subjects in a second language can provide sufficient opportunity for natural language usage. In detail, task-based language teaching and content-based instruction (CBI) are particularly influential as variations of the communicative approach (Kramsch, 2017) and foster different aspects of language proficiency. According to Cummins (1979, 2008), language proficiency requires not only conversational fluency in the form of basic interpersonal communication skills but also written and oral academic language fluency, originally called cognitive academic language proficiency.

First, task-based language teaching involves the student-centred performance of tasks as an underlying principle of language acquisition (Ellis, 2021). These tasks, in turn, offer natural (conversational) language usage (Brandl, 2017) by providing language input and guiding students' language use without restricting their linguistic repertoire (Ellis, 2021). Reviews of empirical and theoretical research highlight the effectiveness of this approach (Ellis, 2009; Robinson, 2011). Second, CBI 'refers to instructional approaches that make a dual, though not necessarily equal, commitment to additional language- and content-learning objectives' (Stoller & Fitzsimmons-Doolan, 2017, p. 71) and encourage students' academic language learning (Stoller, 2008). Carefully implemented context-based bilingual programs

appear beneficial for students' learning outcomes (Lyster, 2017). Both variations of the communicative approach had great appeal as rationales for the implementation of bilingual education programs but also as guidelines for practical bilingual teaching.

1.3 Types of Bilingual Education and Their Aims

Bilingual education simply describes the use of two (or more) languages for formal instruction (Baker & Wright, 2021). Since many different motives have influenced the worldwide implementation of bilingual programs, bilingual education has become the umbrella term for a wide variety of program types. With the exceptions of transitional bilingual education, which has relative monolingualism in the majority language as its goal, and EMI, which lacks an overall linguistic goal, all bilingual education types follow the objectives of bilingualism and biliteracy although their practical approaches differ (Baker & Wright, 2021; García, 2009). A selection of prominent types of bilingual education and their aims is presented next, and an overview is given in Table 1.

Transitional bilingual education usually targets very young minority-language learners and aims at their successful transition to majority-language schooling through the temporary use of the students' home language in the classroom (Baker & Wright, 2021; García, 2009). Over a few years, the share of the home language decreases until the students are deemed fluent in the majority language and ready for monolingual mainstream education (Baker & Wright, 2021).

Developmental (maintenance) bilingual education, also called *indigenous* or *heritage language education*, is mostly found at the primary level (Wright & Baker, 2017). It describes programs that attempt to foster and/or preserve not only the language but also the identity and culture, of minorities while at the same time aiming at students' proficiency in the majority language (Baker & Wright, 2021). Bilingual education of deaf children is often categorised as developmental (García, 2009).

Table 1*Overview of Bilingual Education Types*

Bilingual education program types	Target students	Linguistic goals	Teachers' second/foreign language proficiency	Education level
<i>Transitional</i>	Language minority	Relative monolingualism	Native speakers	Kindergarten to primary education
<i>Developmental (maintenance)</i>	Language minority	Balanced bilingualism & biliteracy	Native speakers	Kindergarten to primary education
<i>Immersion</i>	Language majority	Balanced bilingualism & biliteracy	Native speakers	Kindergarten to secondary education
<i>Dual-language</i>	Language majority & minority	Balanced bilingualism & biliteracy	Native speakers	Kindergarten to secondary education
<i>CLIL</i>	Language majority	Functional bilingualism & biliteracy	Non-native speakers	Secondary education
<i>EMI</i>	Language majority	Absent	Non-native speakers	Higher education

Note. Adapted from Baker and Wright (2021), García (2009), and Pecorari (2020).

Immersion bilingual education differs from the two programs described above as it is intended for students from majority-language backgrounds and involves the exclusive use of a second language as the medium of instruction (García, 2009). The proportion and starting point of immersion teaching can vary under the immersion model and range from total to partial immersion and from kindergarten to secondary school (Baker & Wright, 2021). Since the majority language is still present in students' everyday life and is not forbidden in school

(indeed, it may even be respected), bilingualism, biliteracy, and the successful integration of the two cultures are the desired outcomes (Baker & Wright, 2021).

Dual-language bilingual education, also known as *two-way immersion* or *two-way bilingual education*, brings together students from predominantly two different language backgrounds in as balanced a ratio as possible (Baker & Wright, 2021). It is most prevalent in the U.S. and involves teaching students in each of the two languages for about 50 per cent of the time while avoiding the simultaneous use of both languages in the same lesson (Wright & Baker, 2017). The aims of these programs, which are often long-term, are bilingualism, biliteracy, and intercultural awareness (Baker & Wright, 2021).

CLIL, the European proposal for bilingual education, describes ‘a dual-focused educational approach in which an additional language is used for the learning and teaching of both content *and* language’ (Coyle et al., 2010, p. 1). *CLIL* usually starts after students have achieved literacy in their first language, and the additional language is thus predominantly a foreign language or even a lingua franca (Dalton-Puffer & Smit, 2013). Along with other aims, such as content knowledge, intercultural awareness, or internationalisation, proficiency in the additional language is central to *CLIL* (Dalton-Puffer & Smit, 2013). However, the aim of this approach is not to achieve native-like proficiency, which distinguishes it from immersion programs (Lasagabaster & Sierra, 2010).

EMI defines teaching a non-language subject through English in a setting where the majority language differs from English (Galloway et al., 2020), and this type of bilingual education tends to be implemented in higher education settings (Pecorari, 2020). In comparison to *CLIL*, *EMI* aims at the development of content knowledge but does not entail explicit language learning goals in either the home language or in English (Dearden, 2016; Galloway et al., 2020; Pecorari, 2020). However, functional bilingualism – in the sense of being able to use English for the purpose of studying – could be deemed an implicit aim.

CBI is sometimes also regarded as a type of bilingual education, which opens up a terminological puzzle regarding how CBI can be differentiated from the types of bilingual education mentioned above, in particular, CLIL (Cenoz, 2015; Macaro, 2018). For example, some experts argue that CBI is the overarching instructional principle for all bilingual education types (García, 2009) whereas others argue the same for CLIL (Mehisto et al., 2008). In the course of this dissertation, CBI is treated as a broad second language learning approach that is often applied within bilingual education programs and in this sense is the counterpart to the European CLIL. As such, CBI can be used as a superordinate term for some, particularly content-based, types of bilingual education, such as immersion or dual-language education.

Overall, this wide range of bilingual education program types allows countries, regions, and even schools to choose and implement the type of program that suits them best. However, research indicates that some program types are more effective than others, as discussed in more detail in the next section.

1.4 Effectiveness and Criticism of Bilingual Programs

In the last 50 years, bilingual education has gained recognition within the research community, as illustrated by the sharp increase of research papers mostly stemming from the US, Spain, and the United Kingdom (Sánchez-Pérez & Manzano-Agugliaro, 2021). Germany, the setting of the second and third studies in this dissertation, produced the tenth largest number of studies considered in a review study of bilingual education research (Sánchez-Pérez & Manzano-Agugliaro, 2021). Research on bilingual education programs' effectiveness and the criticisms made of them is particularly important and is summarised below.

Initially, researchers were particularly interested in the effects of bilingual education on the development of students' linguistic abilities (Bialystok, 2018) since bilingualism is a central aim of bilingual education. Furthermore, balanced bilingualism has been shown to be beneficial for children's cognitive performance, for instance, regarding language awareness, working

memory, or attentional control (Adesope et al., 2010). However, it is not only well-balanced bilingualism but the uneven and early stages of bilingualism achieved through bilingual education programs that might enhance students' executive functions (Marian et al., 2013) and allow students to make use of the beneficial cognitive properties of bilingualism (Bialystok, 2018). Furthermore, bilinguals are deemed 'more receptive to cultural differences than monolinguals' (Liu & Chong, 2023, p. 3).

Leaving the sole focus on linguistic development behind, researchers started to conduct meta-analyses of the effects of bilingual versus English-only/submersion programs on students' academic achievements. The results show that bilingual programs have had a small but positive effect (Cohen's $d = 0.23$) on the academic achievement of language-minority students in the U.S. (Rolstad et al., 2005, 2008) and in Europe (Hedges $g = 0.23$) (Reljić et al., 2015). The programs considered in these analyses range from preschool and kindergarten to secondary school (e.g., Medina & Escamilla, 1992; Ó Muircheartaigh & Hickey, 2008).

Regarding the different types of bilingual education, the meta-analysis carried out by Rolstad et al. (2005, 2008) and other studies (Collier & Thomas, 2017; Kim et al., 2015; Marian et al., 2013) indicate that long-term dual-language education programs outperform both transitional and monolingual education programs in terms of their effectiveness on students' academic achievements. In contrast, empirical research on the program effectiveness of EMI is still lacking (Galloway et al., 2020; Jablonkai & Hou, 2022).

Nevertheless, some criticism has been voiced of bilingual programs and their effectiveness. For example, the pre-selection of high achievers for CLIL programs in Germany could distort comparisons between CLIL and non-CLIL students and lead to an overestimation of the effect(s) of CLIL (Rumlich, 2016). Although research is still scarce (Reljić et al., 2015), studies ensuring group comparability and therefore countering pre-selection as a second bias show that bilingual programs still tend to have positive effects on students' outcomes. For

instance, studies of homogenous groups of CLIL and non-CLIL students found that CLIL had beneficial effects on first- (Pérez Cañado, 2018), second-, and foreign- (San Isidro & Lasagabaster, 2019) language proficiency while CLIL students' content knowledge progressed similarly to that of non-CLIL students (Dallinger et al., 2016; San Isidro & Lasagabaster, 2019). However, in the long run, CLIL students outperformed non-CLIL students even as concerns content knowledge (Pérez Cañado, 2018).

Possible other biases mentioned by researchers are CLIL students' motivation, more qualified teachers, and students' socioeconomic background (Bruton, 2011; Dallinger et al., 2018; Paran, 2013). However, empirical studies on the last of these factors are contradictory: First, Pérez Cañado (2020) found that both CLIL and non-CLIL students' socioeconomic backgrounds significantly influence students' foreign language attainments although CLIL seems to weaken this effect. In contrast, Rascón Moreno and Bretones Callejas (2018) showed that CLIL students' socioeconomic backgrounds, as opposed to those of non-CLIL students, did not affect the outcomes of students' foreign language, native language, or content learning significantly, which indicates that CLIL is suitable irrespective of students' socioeconomic backgrounds.

Lastly, concerning the culture-focused aims of bilingual education, studies have shown that attending bilingual programs can promote students' intercultural awareness (Gómez Parra et al., 2021) and help to preserve the cultural inheritance of minority groups (Ozfidan & Toprak, 2019). All in all, bilingual education appears to have many positive effects on students, which is another reason to implement it further.

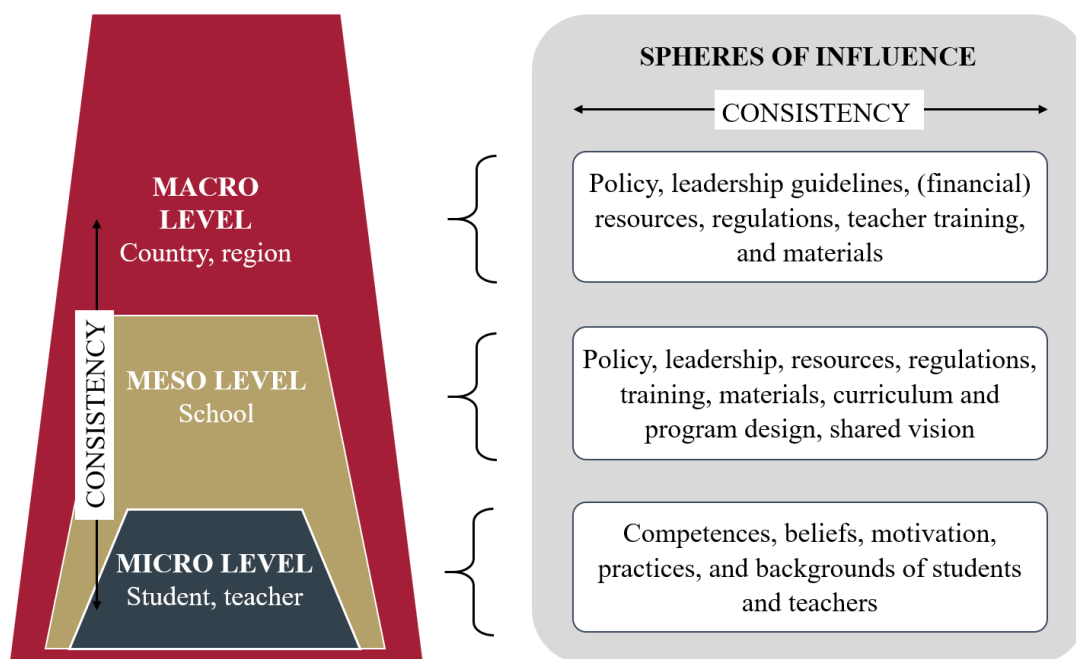
1.5 Factors Influencing Bilingual Education's Success

The effectiveness and success of bilingual education programs depend on several factors spanning multiple but consistently interrelated levels (see Figure 1), from the micro level, of teachers and students, to the meso level, of schools, and, finally, the macro level, of

country or region (Kirss et al., 2021). Below, the spheres of influence of these three levels are described in greater detail.

Figure 1

Extended Conceptual Framework of Factors Shaping Bilingual Education



Note. Adapted from Kirss et al. (2021, p. 3).

The *macro level* influences bilingual education programs not only through policymaking, leadership guidelines, (financial) resources (Kirss et al., 2021), and regulations regarding implementation and duration (Ball et al., 2015) but also through the provision of teacher training and learning materials (Baker & Wright, 2021). However, bilingual education research still emphasises a lack of learning materials (Ball et al., 2015) and overarching curricula (Li et al., 2020).

Schools, on the *meso level*, can also affect curriculum design (Kirss et al., 2021) and program planning, for example, regarding classes' homogeneity (Baker & Wright, 2021). Schools can further implement a shared vision and foster cooperation (Baker & Wright, 2021).

On the *micro level*, factors such as students' language, literacy, and cognitive skills, identity and socio-economic background, cultural knowledge, and motivation influence a

program's success (Baker & Wright, 2021; Ball et al., 2015). Given that teachers are the principal in-school factor influencing students' success (Hattie, 2008; Maulana et al., 2021), and their professionalism depends on many aspects, such as beliefs, motivational orientations, self-regulation, and knowledge (Baumert & Kunter, 2013), they are also central to a bilingual program's success. In particular, their linguistic, cultural, and pedagogical competences, attitudes toward and beliefs about bilingual teaching and learning, teaching practices, (teaching) motivation, and cooperation with parents and the community influence the success of a program (Baker & Wright, 2021; Ball et al., 2015). Extensive lists of teachers' competences within CLIL competence frameworks (Marsh et al., 2011) or bilingual education teacher preparation guidelines (Blum Martinez & Baker, 2010; Guerrero & Lachance, 2018) emphasise the challenging character of bilingual education, resulting in high prerequisites for teachers and supporting the importance of the role played by teachers in ensuring a program's success.

1.6 Pedagogical and Methodological Guidelines for Bilingual Education

The significance of teachers and their competences for bilingual education has already been briefly outlined in the previous section. Some teacher requirements for bilingual education types may differ; for instance, immersion teachers are often native speakers while this is not the case for CLIL (Dalton-Puffer & Smit, 2013) or EMI teachers (Pecorari, 2020). However, pedagogical practices across the different bilingual education types show sufficient similarities (Dalton-Puffer & Nikula, 2014; Genesee & Lindholm-Leary, 2013) to illustrate the overarching pedagogical and methodological guidelines for successful bilingual teaching. The following section introduces the most important guidelines for practice, starting with guiding principles from second language acquisition.

To begin, providing comprehensible input slightly above the learner's current skills is highlighted as a necessity for second language acquisition (Krashen, 1981). In general,

interactions with more experienced peers or teachers can help learners to further develop their skills and reach a zone of proximal development that they would not have been able to reach on their own (Vygotsky, 1978). For example, embracing and fostering the highly interactive and participatory nature of bilingual education (Moate, 2010) and focusing on active collaboration, exchange, and meaning negotiation within authentic contexts in a learner-centred classroom can facilitate language learning (Kramersch, 2017). Making use of material from the internet and social media (Kramersch, 2017) and including digital media in the classroom (Cinganotto & Cuccurullo, 2015) could provide such authentic contexts. Making these inputs accessible for students through instructional scaffolding is a further influential concept from second language acquisition theory. Instructional scaffolding describes temporary support measures for skill development by teachers, parents, peers, or tools that aim at students' future independent problem-solving (Belland, 2014; Wood et al., 1976). This type of scaffolding enables students to complete tasks that they were previously unable to solve (Belland, 2014).

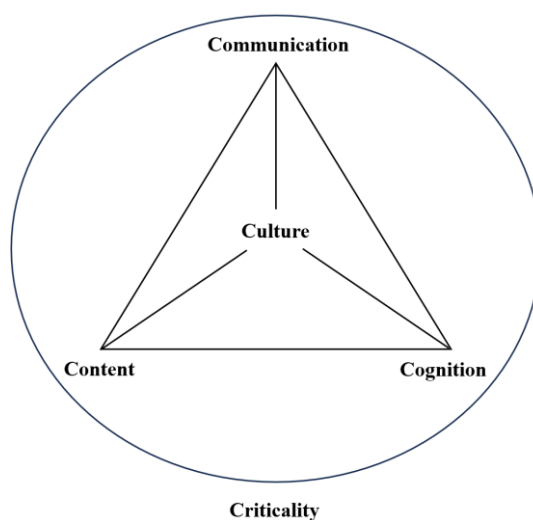
Bilingual education theory also provides some language learning guidelines, for instance, enhancing language learning by acknowledging the dynamic interrelation of learners' home and target languages for learning within bilingual classrooms (Cummins, 2017; García & Lin, 2017). Allowing bilingual practices such as code-switching or translanguaging can operationalise such interrelation. Code-switching describes the mixture of two languages within the same speech, while translanguaging embraces and involves all the inherent language practices and registers of bilingual students (García, 2009).

All the guiding principles outlined above were focused on language learning; however, as Coyle's (1999) 4Cs Framework demonstrates, bilingual education involves other important aspects as well. The holistic 4Cs Framework (Coyle, 1999) brings together 'content (subject matter), communication (language), cognition (learning and thinking) and culture (social

awareness of self and ‘otherness’) (Coyle, 2007, p. 550) as interrelated and guiding aspects of CLIL. Moreover, the framework can be extended to include criticality, as a fifth C, as shown in Figure 2 (Sakamoto, 2022). Criticality encompasses reflection on and examination of possible culture- or language-related ideology conveyances in CLIL (Sakamoto, 2022).

Figure 2

The 5Cs Framework



Note. Adapted from Sakamoto (2022, p. 2429) and based on Coyle (2007, p. 551)

However, since the 4Cs Framework is not focused on practical advice, more practice-oriented tools have emerged to inform CLIL teachers, for example, the language triptych (Coyle et al., 2010), which elaborates on the different roles of language in CLIL, and the CLIL-Pyramid (Meyer, 2010), which serves as a guide for developing high-quality learning materials. Moreover, since the 4Cs do not focus on academic language development, the 4Cs Framework has been expanded to a pluriliteracies approach that emphasises the importance of subject-specific literacies for the internalisation of conceptual knowledge (Meyer et al., 2015). In detail, fostering subject-specific literacies through scaffolded materials and concept-verbalisation tasks enables meaning-making and enhances knowledge construction, which, in turn, allows students to master a concept instead of simply memorising it (Meyer et al., 2015). The beneficial character of intertwining content and language for deep learning processes is also

supported by cognitive psychology research (Stoller & Fitzsimmons-Doolan, 2017). Nevertheless, integrating content and language goals within the classroom is not necessarily a priority of CLIL practitioners (van Kampen et al., 2018), a fact that emphasises the requirement of the pluriliteracies approach as a guideline for bilingual education.

The pluriliteracies approach developed by Meyer et al. (2015) visibly intertwines communication, content, and cognition. In contrast, culture is assumed to be a rather passive factor in the background that only influences the learning process through discipline-specific cultures, such as typical genres and strategies, and criticality is not considered at all. However, teachers also need to consider the globally interconnected characteristics of education (Cummins, 1998). For example, teachers should also aim at cross-cultural proficiency, in the sense of a reflective understanding of others and themselves, and include social equity practices in the classroom (Hernández, 2017). The reflective component of cross-cultural proficiency thus reflects a possible inclusion of criticality.

All in all, it is challenging for teachers to take all these guidelines into account, a situation that underlines the importance of adequate preparation during bilingual education teacher training. Therefore, current findings on bilingual education teacher training are addressed in the next section.

1.7 Training of Bilingual Education Teachers

Following the guidelines outlined in the previous section and putting innovative approaches, such as CLIL, or other types of bilingual education into practice require fundamental changes to regular classroom teaching. This endeavour can even be described as a methodological revolution (Pavón & Rubio, 2010). Consequently, high-quality teacher education is an indispensable factor in a program's success (Barrios & Milla Lara, 2020) and is elaborated in more detail below.

Teacher professionalism, mediated through instruction quality (Kennedy, 2016; Kunter et al., 2013) as well as teacher certification and teaching behaviour (Hattie, 2008; Maulana et al., 2021) influence students' learning outcomes. Effective teaching in a bilingual classroom particularly influences English language learners' outcomes (Padron & Waxman, 1999). Therefore, and in response to the growing number of diverse learners, general teacher certification programs in the United States have been extended to include a focus and courses on teaching in culturally and linguistically diverse classrooms (Skelly, 2019). For instance, López et al. (2015) pointed out that the national assessment results of students in U.S. states with higher investment in bilingual teachers' professional development are better than those in states where this investment is lower.

Beyond that, positively evaluated and innovative bilingual teacher training programs emphasise the importance of regional and personal exchanges (Alfaro & Quezada, 2010; Murillo, 2017), the inclusion of online community and discussions (Santo & Meo, 2016), fostering participants' pedagogical language competences (Aquino-Sterling, 2016; Aquino-Sterling & Rodríguez-Valls, 2016), and leaving sufficient opportunities for reflection and cooperation (Escobar Urmeneta, 2013), for example, through drama-based pedagogy (Caldas, 2017, 2018, 2019).

Nevertheless, the research literature indicates a lack of adequate teacher preparation in the field of bilingual education (Pavón & Ellison, 2013; Pérez Cañado, 2016a, 2016b; Porcedda & González-Martínez, 2020), a situation which is exacerbated by an accompanying lack of materials (Ball et al., 2015; Li et al., 2020). For example, the certification process does not adequately prepare bilingual education teachers because it often relies on linguistic competence exclusively (Custodio-Espinar, 2020), involves inadequate methodology training (Fernández Costales & Lahuerta Martínez, 2014), or has a performance-based assessment system that is

not designed for bilingual settings (Kleyn et al., 2015). These conditions call for more research on bilingual education teachers' professional competence and development.

Moreover, research suggests that teachers' belief systems influence teaching practices (e.g., Brandl, 2017; Pajares, 1992; Wilkins, 2008) and, through complex processes, vice versa (Basturkmen, 2012; Buehl & Beck, 2014). In detail, beliefs not only influence practice through classroom procedures, interactions, objectives, and learning materials but also shape the roles of teachers and students (Kuzborska, 2011). Consequently, bilingual education teachers' beliefs about professional competence are also crucial for teacher training, practice, and research.

1.8 The Significance of the Research Project

The highlighted need for more research on bilingual education teachers' competences, the importance of teachers' beliefs in their practice, and the lack of available learning materials lay the groundwork for this dissertation. Below, the rationale for the structure of the dissertation is addressed in greater detail.

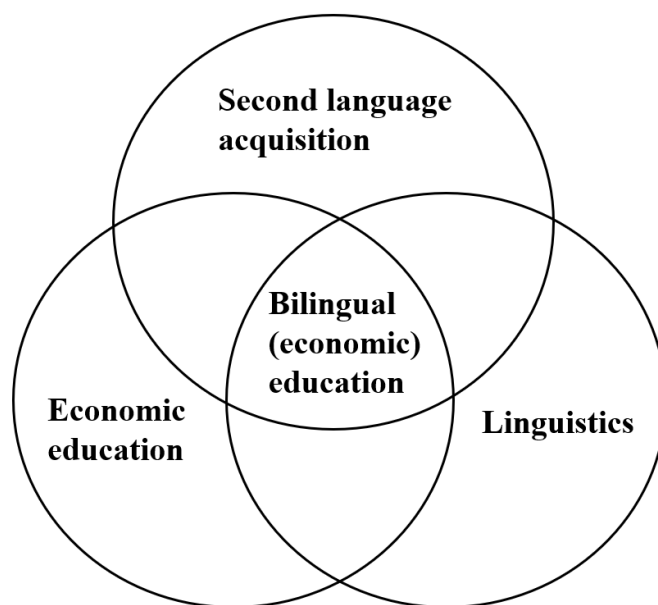
First, the dissertation combines discipline-specific knowledge and methodology, collaboration, and interdisciplinary research to authentically reflect increasingly interconnected and interdependent real-world circumstances, an approach that perfectly aligns with the OECD's vision of education in the year 2030 (OECD, 2018b). In detail, this dissertation on bilingual (economic) education connects the fields of second language acquisition, linguistics, and economic education (see Figure 3) and employs three very different methodological approaches within the studies: first, a qualitative systematic literature review (study 1); then, a mixed-methods approach including a questionnaire and interviews (study 2); and, lastly, a quantitative linguistic complexity analysis of bilingual economics learning materials (study 3). Furthermore, the degree of collaboration also increased throughout the period in which this dissertation was prepared. Initially, two researchers with a background in

economic education and English language learning examined the literature (study 1); then, teacher educators and trainee teachers were included as sources of practical insight (study 2); and, finally, a research collaboration with computational linguists was initiated.

In terms of content, the dissertation moves from theoretical considerations on bilingual education teachers' competences (study 1) to practitioners' beliefs about bilingual education professionalism (study 2) and, finally, to actual learning materials and the inferences that can be drawn from them about teachers' competences (study 3).

Figure 3

Overview of Research Fields Involved in this Dissertation



The first study (*A Systematic Review of Bilingual Education Teachers' Competences*) addresses the question of how the competences of bilingual education teachers in secondary schools have been conceptualised within research (Scherzinger & Brahm, 2023). It analyses international research from 1995 to 2020 and generates an overarching model for bilingual education teachers' professional competences based on the generalist teachers' competence model developed by Baumert and Kunter (2013).

The second study (*What does it Mean to Be(come) a Professional Bilingual Education Teacher?*) investigates bilingual teacher educators' and bilingual trainee teachers' beliefs about

the ideal competence profile of the bilingual education teacher. Furthermore, differences between the two groups of participants are highlighted. The research data were gathered using an online questionnaire and interviews with bilingual education practitioners. The data were then analysed qualitatively and quantitatively.

Based on the results of the first and second studies and an identified shortage of bilingual education materials, the third study (*Linguistic Complexity Analysis of English Bilingual Economics Materials from Germany*) dives into the bilingual subject of economics by quantitatively analysing the linguistic complexity of English-bilingual economics materials from Germany. First, it examines possible distinctions between learning materials for different secondary grade levels and between redactional and external texts. Then, it analyses differences between the included modified and original texts more closely.

The research emphasis of the third study, namely, on bilingual economics learning materials or bilingual economic education in general, was made possible by the mandatory implementation of economic education in grammar schools in one German state in 2016. However, economic education has also received international appreciation because it fosters important capacities, such as financial decision-making (Erner et al., 2016) and debt management (Goedde-Menke et al., 2017), and is needed to make informed career choices. Research on the bilingual version of economic education seems promising because foci on globalisation, international trade, and multi-perspectivity are formative for both economics and bilingual education. Additionally, as economic education has only recently been introduced, very few schools in Germany offer it in a bilingual format. The results of the third study might therefore help bilingual economics teachers to identify a suitable language level for teaching and learning materials and guide the future creation of materials for bilingual economic education. Since bilingual economic education lacks materials, this research is much needed.

The following chapters present the three studies. Thereafter, the findings are summarised and discussed. Then, the strengths and limitations of the dissertation as well as implications for research and practice regarding bilingual (economic) education are pointed out. Lastly, a conclusion is offered to complete the dissertation.

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2. Study 1: A Systematic Review of Bilingual Education Teachers' Competences

Scherzinger, L., & Brahm, T. (2023a). A systematic review of bilingual education teachers' competences. *Educational Research Review*, 39, 100531. <https://doi.org/10.1016/j.edurev.2023.100531>

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Abstract

Ongoing globalisation processes call forth a need to foster students' intercultural competences and language skills. Simultaneously, teachers face an increasing diversity of students' first languages and cultures within classrooms, demanding responsive and integrative practices from them which address all students. Bilingual education is one possible format in which these challenges can be met; however, it requires a high level of teacher professionalism. This systematic literature review harvests international research on bilingual education teachers published between 1995 and 2020. It compares frameworks and research on bilingual education teachers' required competences for secondary education and generates a professional competence model for bilingual education teachers. This systematic review of 79 individual reports identifies a total of 16 converging competences, many focusing on language proficiency and pedagogical/psychological knowledge. Furthermore, it yields important implications for bilingual teacher training such as the fostering of (academic) language proficiency, cooperation skills and knowledge of bilingual education research.

Keywords: bilingual education; secondary education; teacher education; teacher competence; systematic review

The Importance of Bilingual Education Teachers' Competences:

Introduction and Theoretical Background

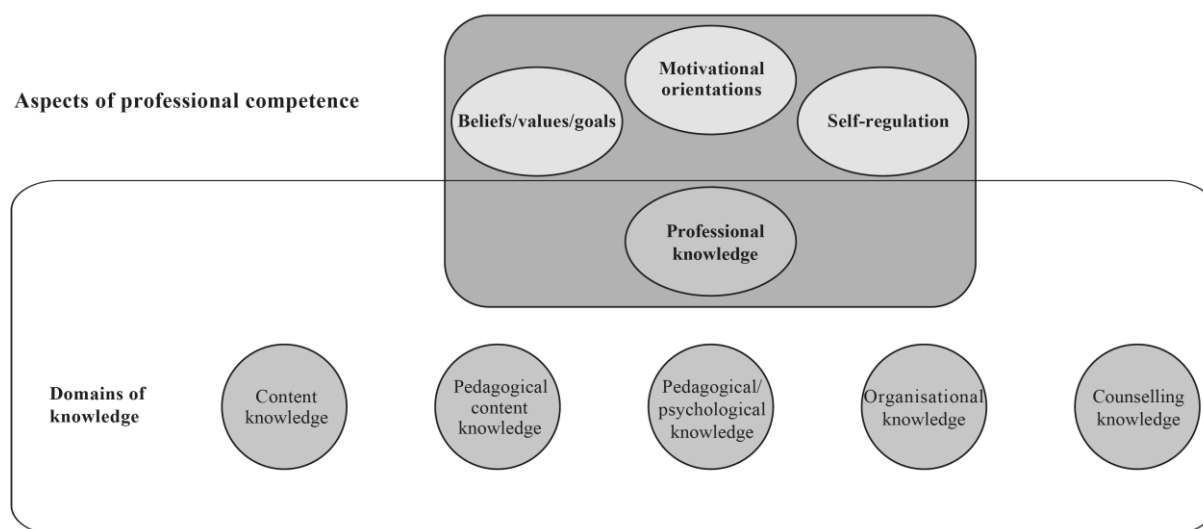
In the light of the growing number of diverse learners in school (OECD, 2018), bilingual education is becoming a more frequent teaching format. In principle, bilingual education describes the use of two or more languages for teaching and learning (Wright & Baker, 2017). The overall aims of bilingual education are “the assimilation of immigrants, helping children to gain employment through multilingual [and multicultural] competences, increasing school achievement [or] helping to preserve a minority language” (Wright & Baker, 2017, p. 66). In North America, immersion programs, predominantly for second language learning, and dual-language programs, mostly for minority students (Genesee & Lindholm-Leary, 2013) are widely implemented. Both are categorised as content-based instruction (CBI), which combines content and language to enable language learning through actively using the language when learning content (Genesee & Lindholm-Leary, 2013). Content and language integrated learning (CLIL) is the European implementation of bilingual education. CLIL took root around 1994 (Marsh et al., 2001) and is defined as “a dual-focused educational approach in which an additional language is used for the learning and teaching of both content *and* language” (Coyle et al., 2010, p. 1). The differences between these forms of bilingual education are (controversially) discussed, however, we follow Cenoz (2015) and Dalton-Puffer and Nikula (2014) in their conclusion that there is important commonness between CLIL, immersion or CBI in general, namely that teachers' pedagogical practices and challenges are similar (Dalton-Puffer & Nikula, 2014; Genesee & Lindholm-Leary, 2013). This also shows that there is a disconnection in research between CLIL and CBI. Accordingly, this review aims at integrating the research streams with special focus on bilingual education teachers' (BETs') competences. It can be assumed that (bilingual education) researchers, teachers and administrators can gain new insights and, therefore, profit from a joint assessment of these

forms of programs. We provide such an assessment in this review since this assumption allows us to include a larger number of studies (see below).

Effective bilingual education programs and implementation guidelines around the world emphasise teacher qualification/ training as important prerequisite for a program's success (e.g., Barrios & Milla Lara, 2020; Henderson & Palmer, 2020). This is not surprising since research on the relationship between teachers' competences and students' learning outcomes has shown that teaching quality and teacher certification are the main in-school factors responsible for student success (Darling-Hammond, 2000; Hattie, 2008; Maulana et al., 2021). Competences comprise a collection of prerequisites for successful domain-specific actions which are available on an individual or inter-individual level (Weinert, 2001). They include knowledge, skills and values "leading to effective action in situation in a particular domain" (Caena, 2014, p. 315; Deakin Crick, 2008). As a theoretical background for this paper, the generic and multidimensional model of teachers' professional competence (Baumert & Kunter, 2013) will be used. The model combines the competence definition of Weinert (2001) with Shulman's (1986; 1987) and Bromme's (2001) categories of teachers' knowledge. Additionally, it assumes that competences are not innate but can be learned over time (Kunter et al., 2013). The model includes motivation, self-regulation, beliefs/values/goals regarding learning and professional knowledge (Figure 4). The latter comprises content knowledge, pedagogical content knowledge, pedagogical/psychological knowledge, organisational knowledge and counselling knowledge (Baumert & Kunter, 2013). This model of teachers' generic professional competence provides an appropriate theoretical background for our systematic review as it enables to reveal and emphasise specific competence requirements of BETs.

Figure 4

Model of Teachers Professional Competence (Adapted from Baumert & Kunter, 2013, p. 29)



Although some CLIL-specific frameworks for teachers' competences have been derived theoretically (Bertaux et al., 2010; Marsh et al., 2011), their revision through comparison with other bilingual and generic professional competence frameworks, as well as with complementary empirical or theoretical research on the competences of BETs is lacking. Above all, existing studies on BETs' competences often only focus on one aspect of overall competence. Consequently, an overall assessment of BETs' competences is still a research gap. Against this background, we systematically reviewed the literature with the aim to summarise and discuss findings regarding BETs' professional competences. Accordingly, the research question (RQ) "How are the competences of BETs in secondary schools conceptualised within research?" will guide this systematic literature review. Based on the theoretical background model, we analyse content-based types of bilingual education from all around the world to create a comprehensive conceptualisation. Although research on immersion teaching, in particular, highlighted the crucial significance of long-term engagement starting at the elementary level for successful bilingualism/biliteracy among students (Gándara & Escamilla, 2017; McIvor & McCarty, 2017; Wright & Baker, 2017), our focus was on BETs from secondary schools, i.e., from middle to high school, for the following reasons. First, primary

programs often incorporate transitional bilingual education, which transitions students early on to English-only instruction, after a short period of bilingual teaching. Transitional bilingual education has been shown to be the least successful form of bilingual education (Collier & Thomas, 2004; Herrera, 2020). Also, secondary education teachers face serious challenges dealing with English language learners, due to a lack of support and preparation (Santibañez & Gándara, 2018).

Overall, this paper extends previous research on bilingual teacher education since it is the first attempt to systematically synthesise previous research to provide a comprehensive model of BETs' competences, encouraging a reflection on required professional competences in the field. It also provides practical implications for bilingual teacher education programs. Thus, this systematic review contributes to the literature on bilingual education (e.g., Rubio-Alcalá et al., 2019) as well as to that on teacher professionalism more generally (Opfer & Pedder, 2011; Kennedy, 2016).

Method

This systematic review is guided by the Preferred reporting items for systematic reviews and meta-analyses' (PRISMA) 2020 statement (Page, McKenzie et al., 2021). Preliminary non-systematic searches were carried out in September 2020 for the researchers to identify different terminologies of this field of research and determine the search terms. The review aims, as well as the inclusion and exclusion criteria in Table 2, were, then, developed. The year 1995 was chosen as a starting point because CLIL was then coming into widespread use and tendencies arose to counter the scarceness of research in the field of bilingual students' teacher efficacy (Garcia, 1991) and minority teachers in general (Villegas et al., 1993). Furthermore, the implementation of CLIL in Europe in 1994 gave rise to a greater research interest in bilingual education. Therefore, the review's time interval ranges from 1995 to 2020.

Table 2*Inclusion and Exclusion Criteria Applied to the Review*

Type	Inclusion	Exclusion
Time	January 1, 1995 to December 02, 2020	Any other points in time
Target	Secondary BETs (pre-service, trainee or in-service)	Students, parents, principals, paraeducators or teaching assistants
Publication	Peer reviewed journal articles and conference proceedings, book chapters & dissertations	Presentations or policy reports
Study	Empirical studies & theoretical contributions	Autoethnographic recommendations
Content	RQ: Bilingual teachers' competences & training needs	Reports on shortages, bilingual education in general, teaching materials or guides
Setting	Secondary schools & teacher training programs	Preschool/kindergarten, primary education, higher and adult education in general (except for teacher education)
Setting	Bilingual education forms: CLIL, CBI (immersion & dual-language programs)	Transitional bilingual education, foreign or second language education, special education
Language	English or German	Any other languages
Acquisition	Full text is available	No full text is available

In December 2020, advanced searches of the databases Education Source, ERIC, MLA International Bibliography (via EBSCOhost) and ProQuest Dissertations were undertaken using the search string (“bilingual education” OR CLIL OR “bilingual teaching” OR “bilingual teacher”) AND (“teacher training” OR “teacher education” OR knowledge OR competenc*). Furthermore, the first 100 results from Google Scholar were included in our initial search. We chose these databases, since e.g. Google Scholar or ERIC are broader as well as more encompassing than other databases like Web of Science (Alexander, 2020), which fits well with our goal of representing and including literature as diverse as possible. Additionally, the German database Education Research Portal was searched using the search string (“bilingualer

Unterricht” oder CLIL) und (Lehrerbildung oder Kompetenz oder Wissen). We did not include additional forms of education, for instance, CBI or dual-language education since we consider bilingual education to be an umbrella term for all such forms. However, we included CLIL in our search terms because some researchers diverge from our assumption and consider CLIL to be an umbrella term for all forms of bilingual education (Mehisto et al., 2008). The searches returned 4298 records after the removal of duplicates through the reference management programs Citavi, Endnote, Mendeley and a final manual sorting for records in languages other than English or German.

The extracted titles and abstracts were collaboratively screened by three independent raters, based on the predefined inclusion and exclusion criteria in Table 2 and through the systematic review web application Rayyan (Ouzzani et al., 2016). All records were screened by the first author of this paper and one of the other two raters. The reports¹ were then checked for full-text availability, and 70 non-available reports were excluded (see Figure 5). Afterwards, the reports were read in full by two raters to further compress the selection. Detailed information on all fully read and included papers was entered into an Excel spreadsheet (e.g., publication year, authors, form of bilingual education, type of study; see also Table 3). For good measure, a backward search was conducted in which the bibliographies of included and recently published reports were reviewed and assessed so any important papers which had not yet been identified in the systematic review could be included. These reviews or theoretical contributions on competence frameworks and competence research were handled as follows: First, the references were backwards-searched and checked for inclusion. If the references were available and suitable, they were included. If, however, the referenced literature was not – or only partly – available, or in languages other than English and German,

¹ A report is defined as “[a] document (paper or electronic) supplying information about a particular study. It could be a journal article, preprint, conference abstract, study register entry, clinical study report, dissertation, unpublished manuscript, government report, or any other document providing relevant information” (Page, Moher et al., 2021, p. 2).

only the originally found review or theoretical contribution itself was included. The quality of the included studies, which were not peer reviewed during the publication process, was evaluated using the Critical Appraisal Skills Program for qualitative studies (Critical Appraisal Skills Program, 2018). The outcome of this appraisal is summarised in Table A1 (see Appendix A). Included and non-peer reviewed theoretical works were not appraised due to the lack of an appropriate appraisal framework.

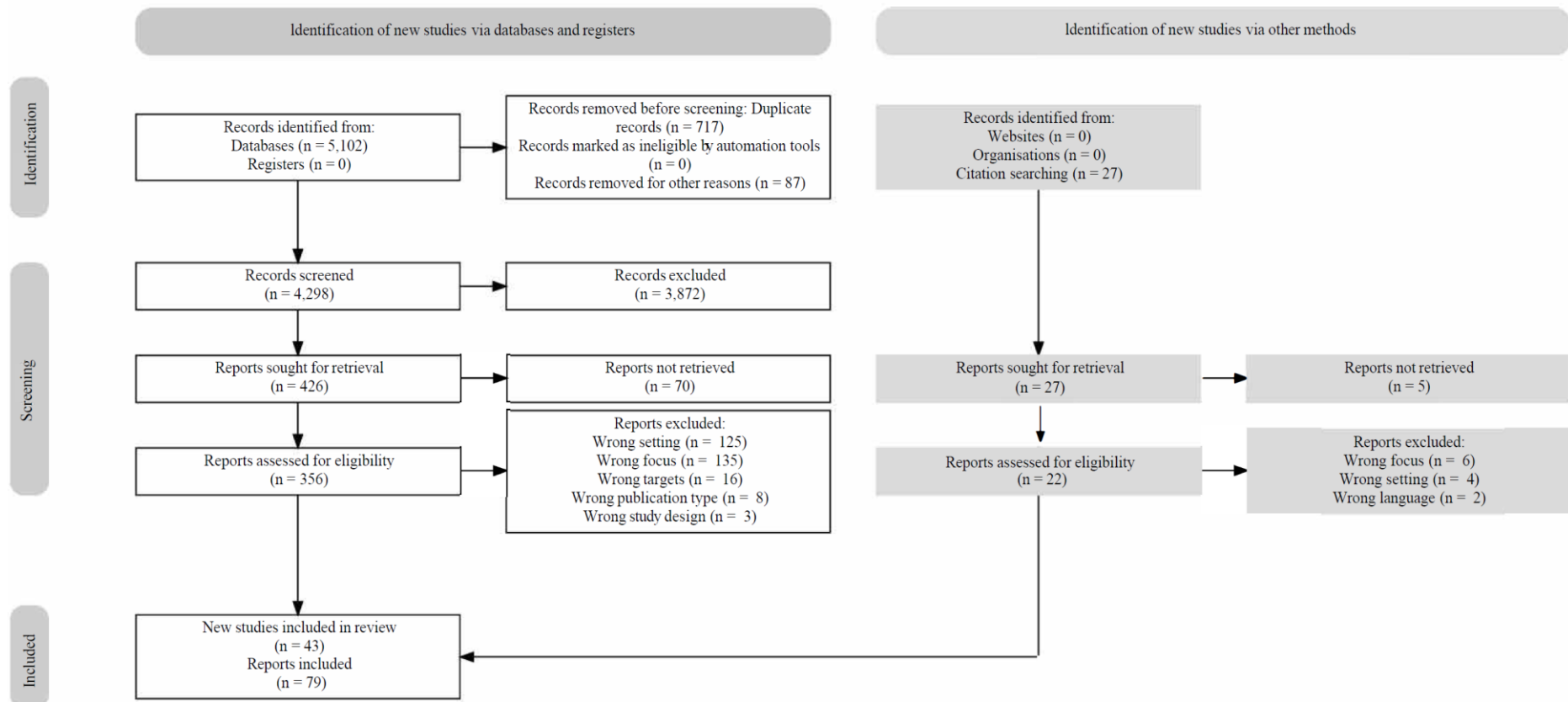
In general, the raters cooperated during all steps of the selection and discussed disagreements regarding the inclusion or exclusion of papers based on their title and abstract and, later, their full text, until 100% agreement was reached on the included papers. The initial interrater agreement was 82.6 per cent for the screening of titles and abstracts and 87.9 per cent for full texts. After the final selection of the revised sample of papers, the report information in the Excel spreadsheet on competences and training programs was analysed and grouped into categories.

Results

In this section, the included reports and their results are synthesised. First, the selection process is depicted in a PRISMA flow diagram (see Figure 5). Then, an overview of the descriptive features of the included papers is given, and finally, the main findings of the systematic review are summarised narratively. An overview of the included records can be found in Table 3.

Figure 5

Adjusted PRISMA Flow Diagram (Page, Moher et al., 2021) Created Using the Flow Diagram Tool (Haddaway et al., 2020)



Note. The included reports encompass English (n = 76) and German reports (n = 3).

Table 3*List of Included Reports*

Author(s), Year	Bilingual Education Format	Country	Type of Article/ Study Design	Languages (Study or Program)	(Aspired) School Setting	Teachers' Subjects	Study Sample Background
Aiello et al. (2017)	CLIL	Italy	empirical study (mixed methods: language assessment, questionnaire, interviews, observations)	English & Italian	secondary schools	variety of subjects (mostly math, physics or humanities subjects)	subject teachers who will teach CLIL courses
Alfaro (2019)	dual-language education	USA	theoretical work	English & additional language	dual-language education, not specified more closely	not specified	X
Alfaro and Bartolomé (2017)	bilingual education	USA	theoretical work	English & Spanish	not specified	not specified	X
Aquino- Sterling (2016)	bilingual education	USA	empirical study (qualitative: transcripts of lesson descriptions)	English & Spanish	K-12 bilingual schools	not specified	students aiming to become BETs
Aquino- Sterling and Rodríguez- Valls (2016)	bilingual/ dual-language education	USA	theoretical work	English & Spanish	K-12 bilingual schools	not specified	X
Banegas et al. (2020)	CLIL	Latin America	literature review (2008 - 2018)	English & Latin America community's L1	primary, secondary and higher education	not specified	X

Table 3 (continued)*List of Included Reports*

Barrios and Milla Lara (2020)	CLIL	Spain	empirical study (mixed methods: questionnaires, focus group interviews)	English & Spanish	primary and secondary schools	variety of subjects (mostly science or social science)	students, teachers and parents participating in CLIL programs
Bertaux et al. (2009)	CLIL	Europe	theoretical work	not specified	not specified	not specified	X
Blum Martínez and Baker (2010)	bilingual education	USA	theoretical work	English & additional language	primary and secondary education	not specified	X
Briceño et al. (2018)	bilingual education	USA	empirical study (qualitative: interviews)	English & Spanish	not specified	not specified	bilingual teacher candidates (heritage Spanish speakers)
Calderón (1997)	bilingual education and English as a second language	USA	theoretical work	English & Spanish	primary and secondary education	not specified	X
Cammarata and Tedick (2012)	immersion education	USA	empirical study (qualitative: interviews, lived experience descriptions)	English & Spanish or French	primary, secondary and high school	math, history and social studies	immersion teachers
Cinganotto (2016)	CLIL	Italy	theoretical work	Italian & additional language	secondary schools	not specified	X

Table 3 (continued)*List of Included Reports*

Cinganotto and Cuccurullo (2015)	CLIL	Italy	theoretical work	Italian & additional language	secondary schools	not specified	X
Coonan (2011)	CLIL	Europe	empirical study (qualitative: questionnaire, interviews)	not specified	not specified	not specified	non-language CLIL teachers
Cruz (2000)	immersion education	USA	empirical study (qualitative: interviews, journals, observations, program documents)	English & Spanish	middle school	social studies, math and/or reading, language arts or English second language	mainstream and bilingual teachers
Custodio-Espinar (2020)	CLIL	Spain	empirical study (quantitative: questionnaire)	English & Spanish	primary and secondary schools	variety of subjects	in-service CLIL teachers
Czura et al. (2009)	CLIL	Poland	empirical study (qualitative: classroom observations, interviews)	English & Polish	secondary schools	not specified	bilingual education coordinators, teachers and students

Table 3 (continued)*List of Included Reports*

Dafouz-Milne et al. (2010)	CLIL	Europe	empirical study (qualitative: classroom observations)	Catalan, Czech, Dutch, English, French, German, Italian, Luxembourgish & Spanish	secondary and vocational education	not specified	CLIL content and language teachers, teacher trainers and academics
Dale et al. (2011)	CLIL	Netherlands	theoretical work	English & Dutch	secondary education	not specified, but examples given for various subjects	X
Durán-Martínez et al. (2016)	CLIL	Spain	empirical study (quantitative: questionnaire)	English & Spanish	primary and secondary schools	not specified	in-service non-language CLIL teachers (novices, experienced and experts)
Ekiaka-Oblazamengo (2018)	bilingual education	USA	empirical study (qualitative: interviews, syllabi)	English & Spanish or Hebrew	primary and secondary schools	not specified	BET educators and teacher candidates
Escobar Urmeneta (2010)	CLIL	Spain	theoretical work	English & Spanish & Catalan	secondary education	not specified	X
Escobar Urmeneta and Walsh (2017)	CLIL	Spain	empirical study (qualitative: in-class interactions from corpus)	English & Spanish & Catalan	secondary schools	science, biology and math	transcribed CLIL classroom interactions

Table 3 (continued)*List of Included Reports*

European Platform (2012)	CLIL	Netherlands	theoretical work	English & Dutch	secondary bilingual schools	not specified	X
Fernández Costales and Lahuerta Martínez (2014)	CLIL	Spain	theoretical work	primarily English & additional language	primary, secondary and tertiary education	not specified	X
García Laborda and Alcalde Peñalver (2020)	CLIL	Spain	empirical study (mixed methods: questionnaire)	English & Spanish	not specified	not specified	prospective teachers of CLIL and non-CLIL courses
Giraldo and Murcia (2018)	bilingual education	Colombia	empirical study (mixed methods: survey, questionnaire, interviews, researcher journals)	English & Spanish	not specified	language education in general	professors, language teacher education expert and pre-service teachers
Gnutzmann (2015)	CLIL	Germany	theoretical work	foreign language & German	not specified	not specified	X
Grant (1997)	bilingual education	USA	empirical study (mixed methods: test scores, questionnaires)	English & Spanish	primary and secondary education	not specified	examinees of a Spanish proficiency exam, bilingual teacher experts

Table 3 (continued)*List of Included Reports*

Guerrero (1997)	bilingual education	USA	theoretical work	English & Spanish	primary and secondary education	not specified	X
Guerrero (1998)	bilingual education	USA	theoretical work	English & Spanish	primary and secondary education	not specified	X
Guerrero (1999)	bilingual education	USA	theoretical work	English & Spanish	primary and secondary education	not specified	X
Guerrero and Lachance (2018)	dual-language education	USA	theoretical work	English & additional language	primary and secondary education	not specified	X
Hartono (2016)	bilingual education (immersion)	Indonesia	theoretical work	primarily English & Indonesian	kindergarten, primary and secondary education	not specified	X
Hernández and Alfaro (2019)	dual-language education	USA	theoretical work	English & Spanish	PreK-12 dual-language education	not specified	X
Hillyard (2011)	CLIL	Europe	theoretical work	English & additional language	primary, secondary, tertiary education	not specified	X
Hood (2020)	two-way immersion education	USA	empirical study (qualitative: interview, focus group discussions, journal prompts, pre-/postsurvey)	English & Spanish	primary and middle schools	not specified	pre-service teachers, practicing immersion teachers, and immersion administrators

Table 3 (continued)*List of Included Reports*

Johannessen and Bustamente-López (2002)	bilingual education	USA	theoretical work ^a	English & Spanish	primary and secondary education	not specified	X
Knudson (1998)	bilingual education	USA	empirical study (mixed methods: survey, observations, interviews)	English	primary, middle and high schools	multiple subjects, single subjects, special education and bilingual education	student teachers and interns
Koopman et al. (2014)	CLIL	Netherlands	empirical study (qualitative: lesson observations, interviews, language teaching wall activity)	English & Dutch	secondary schools	biology, geography, history, maths and multicultural studies	experienced CLIL subject teachers
Leisen (2015)	CLIL	Germany	theoretical work	German as foreign language	not specified	not specified	X

^a Report includes three studies, the studies' results were not relevant for this literature review

Table 3 (continued)*List of Included Reports*

Lemberger and Reyes-Carrasquillo (2011)	bilingual education and English as a second language	USA	empirical study (qualitative: questionnaire, interviews, classroom observations)	English & Spanish	kindergarten, primary and secondary schools, and adult education	variety of subjects (social studies, science, math or language arts, English-as-a-second-language)	bilingual education and English as a second language teachers
Limerick (2020)	intercultural bilingual education	Ecuador	empirical study (qualitative: participant observation, interviews, document and curriculum analysis)	Kichwa & Spanish	Indigenous schools, not specified more closely	not specified	examiners und examinees of the Kichwa exam
Liu and Rutledge (2020)	bilingual education	USA	empirical study (mixed methods: survey, diary entries)	English, but some participants also speak Spanish or an Indigenous language	K-5 bilingual classrooms but K-12 teachers	not specified	monolingual and bilingual pre-service teachers
Lopriore (2020)	CLIL	Italy	empirical study (qualitative: questionnaire, interviews, documentary analyses)	English & Italian	upper secondary schools	different subjects, not specified more closely	future CLIL subject teachers

Table 3 (continued)*List of Included Reports*

Lorenzo (2008)	CLIL	Spain	empirical study (mixed methods: adapted texts)	English & Spanish	secondary school	bilingual history	second language teachers familiar with CLIL
Maljers et al. (2007)	CLIL	Europe	theoretical work	not specified	not specified	not specified	X
Maroney and Smith (2000)	bilingual education	USA	empirical study (qualitative: interviews)	English & Spanish	primary and secondary education	not specified	Mexican-trained BETs
Marsh et al. (2011)	CLIL	Europe	theoretical work	not specified	not specified	not specified	X
Mattheoudakis and Alexiou (2017)	CLIL	Greece	empirical study (qualitative: interviews)	English & Greek	primary and secondary schools	only specified for two teachers (math and physics)	English language teachers, a generalist teacher and subject teachers teaching CLIL
McFarland (1995)	bilingual education and English as a second language	USA	theoretical work	English	not specified	not specified	X

Table 3 (continued)*List of Included Reports*

Méndez García and Pavón (2012)	CLIL	Spain	empirical study (qualitative: interviews)	Spanish & French	primary and secondary schools	geography, history, economy, music, physical education, science, physics and chemistry	language assistants, content teachers and language teachers
Menken and Antunez (2001)	bilingual education	USA	empirical study (mixed methods: survey, state-level licensure requirements, requirements of bilingual education training programs)	English & Additional language	primary and secondary education	not specified	bilingual teacher education programs
Morton (2016)	content-based instruction	Spain	empirical study (qualitative: observations, interviews, video- recordings)	English & Spanish	secondary school	science (biology)	bilingual education subject teacher and students
Morton (2018)	CLIL	Spain	empirical study (qualitative: classroom interactions)	English & Spanish	secondary school	science (biology, chemistry)	bilingual education subject teachers and students

Table 3 (continued)*List of Included Reports*

Murillo (2018)	dual-language education	USA	empirical study (qualitative: testimonios)	English & Spanish	primary schools (and middle school) with dual-language programs	not specified	Latinx dual-language teachers
Novotná et al. (2001)	CLIL	Czech Republic	theoretical work ^b	English & Czech	primary and secondary education	math	X
Pavón and Ellison (2013)	CLIL	Europe	theoretical work	not specified	not specified	not specified	X
Pavón et al. (2020)	CLIL	Spain	empirical study (quantitative: questionnaire)	English & Spanish	primary and secondary schools	not specified	content teachers, language teachers and language assistants involved in CLIL
Pavón and Rubio (2010)	CLIL	Spain	theoretical work	Spanish & additional language	primary and secondary education	not specified	X
Pérez Agustín (2019)	CLIL	Europe/ Spain	literature review	English & Spanish	not specified	not specified	X
Pérez Cañado (2016a)	CLIL	Europe	empirical study (mixed methods: questionnaires)	English, Spanish or additional language	primary and secondary schools, universities, provincial educational administration	not specified	pre- and in-service CLIL subject or language teachers, teacher trainers and coordinators

^b Report also refers to an empirical study, however, the study's results were not relevant for this literature review

Table 3 (continued)*List of Included Reports*

Pérez Cañado (2016b)	CLIL	Europe	empirical study (mixed methods: questionnaires)	English, Spanish or additional language	primary and secondary schools	not specified	in-service CLIL teachers
Pérez Cañado (2018)	CLIL	Europe, Latin America, Asia	theoretical work	not specified	not specified	not specified	X
Pistorio (2009)	CLIL	Argentina	theoretical work	English & first language	not specified	not specified	X
Porcedda and González-Martínez (2020)	CLIL	international	systematic literature review	English or Spanish articles	primary, secondary and higher education	not specified	X
Quero Hermosilla and González-Gijón (2017)	bilingual education	Spain	empirical study (quantitative: questionnaire)	English & Spanish/Castilian	secondary school	not specified	non-language subject teachers
Quezada and Alexandrowicz (2019)	dual-language education	USA	theoretical work	English & additional language	not specified	not specified	X
Relaño Pastor and Poveda (2020)	CLIL	Spain	empirical study (qualitative: classroom interactions, ethnographic data, interviews)	English & Spanish	secondary school	biology, religion and ethics	Language assistants, content teachers and coordinator

Table 3 (continued)*List of Included Reports*

Robinson (2020)	CLIL	Italy	empirical study (mixed methods: questionnaires)	English & Italian	secondary education	variety of subjects, from science to philosophy	future CLIL subject teachers
Rodríguez-Valls et al. (2017)	dual-immersion education	USA	theoretical work	English & Spanish	primary and secondary education	social studies (history), Spanish language arts	X
Román et al. (2019)	bilingual education	USA	empirical study (mixed methods: survey)	English & Spanish	pre-kindergarten, kindergarten, primary and secondary schools	variety of subjects, not specified in detail	Spanish speaking bilingual teachers
Schauwienold-Rieger (2012)	bilingual education	Germany	empirical study (mixed methods: document analysis, expert surveys, interviews)	German & additional language	primary and secondary schools	not specified	kindergarten teachers, teachers, students, parents, principals, teacher educators, vocational teachers, business representatives
Szwed and González-Carriedo (2019)	bilingual education	USA	empirical study (qualitative: interviews)	English & Spanish	early childhood, primary and secondary education	not specified	preservice BETs

Table 3 (continued)*List of Included Reports*

van Kampen et al. (2020)	CLIL	Netherlands	empirical study (qualitative: interviews)	English & Dutch	secondary schools and CLIL teacher education programs	variety of subjects (drama, biology, math, physical education, fine arts and social studies)	CLIL practitioners and specialists
Varghese (2004)	bilingual education	USA	empirical study (qualitative: field notes, interviews, documents)	English & Spanish	primary and secondary education	not specified	instructors, assistant and administrator of the professional development, apprentice bilingual teachers
Vomvoridi-Ivanović (2012)	bilingual education	USA	empirical study (qualitative: field notes, oral comments, observations)	English & Spanish	primary education (with primary and secondary education teachers)	math	bilingual Latin@ pre-service teachers
Zhorabekova (2015)	CLIL	Kazakhstan	empirical study (mixed methods: survey, observation, interviews, testing analysis, documents)	English, Kazakh & Russian	not specified	not specified	(pre-service) language and subject teachers

Descriptive Features of the Included Studies

The articles included in this review principally cover bilingual education in Europe (40) and the United States of America (USA) (31). Four address South America, two were conducted in Asia, and two include countries on different continents. Regarding the form of bilingual education, 42 articles specifically address CLIL, 25 deal with bilingual education in general and twelve consider CBI, dual-language education or immersion. As concerns study design, 32 were theoretical works, three were literature reviews and 44 were empirical contributions, 25 of which had a qualitative design, with interviews being the most used data source. Furthermore, four studies had a quantitative design through questionnaires/surveys. Last, 15 studies had a mixed-methods design, with most including both interviews and questionnaires/ surveys, sometimes in combination with additional data collection methods (Table 3).

Main Findings

Teachers' Competences in Bilingual Education

Our RQ addresses how BETs' competences are conceptualised within research. The systematic literature review covered 79 reports, which will be described in more detail. First, the competences defined in BETs' competence frameworks, profiles or overarching teacher training designs are examined in terms of overall convergence in the light of the theoretical background (Figure 4). Second, further theoretical and empirical work on individual competences is presented. In the subsequent summary of the results for our RQ, we relate the review results to the theoretical background model and depict the resulting extended professional competence model for bilingual education teachers (Figure 6).

The systematic literature review revealed a total of 24 competence frameworks or profiles. Of these 24 reports on competences, 17 describe teachers' competences for CLIL (e.g., Dafouz-Milne et al., 2010; Novotná et al., 2001; Zhorabekova, 2015) and two for dual-

language settings (Guerrero & Lachance, 2018; McFarland, 1995). The remaining five cover overall BETs' competences in the USA (Blum Martinez & Baker, 2010; Calderón, 1997; Menken & Antunez, 2001), the Netherlands (European Platform, 2012) and Germany (Schauwienold-Rieger, 2012). Except for Novotná et al. (2001), who focus on teachers' competences for CLIL in the subject of mathematics, all papers have a cross-curricular focus, which supports the universal applicability of the resulting competence list. Table 4 illustrates the outcome of the comparison of the frameworks. In total, content analysis reveals 16 converging competences; only competences found in at least five reports were included. Not all frameworks mention the listed competences directly, but they can be deduced from the context or are emphasised as training needs. Within the table, these cases are marked with brackets around the check mark.

General Competences for Bilingual Education Teachers

To begin with, the eight top competences in Table 4 represent general sets of skills relevant to all teachers but with a particular importance in bilingual education. There is perfect or almost perfect agreement in all reports regarding competences referring to pedagogical/psychological knowledge (Baumert & Kunter, 2013), such as knowledge of learning processes, methodology, material design, assessment and classroom management (CM), highlighting their importance for bilingual education. Moreover, the review singled out content knowledge as a competence of crucial importance (20 reports). In comparison with these frequently listed competences, information and communication technology (ICT) and knowledge of research only appear in 14 and 13 reports, respectively, which indicates that these competences are deemed less relevant.

Table 4*Comparison of Competence Frameworks*

Competences Knowledge of...	Bertaux et al. (2010)	Blum Martinez and Baker (2010)	Calderón (1997)	Cinganotto (2016)	Coonan (2011)	Dafouz- Milne et al. (2010)	Dale et al. (2011)	Escoba Urmeneta (2010)
...methodology	✓	✓	✓	✓	✓	✓	✓	✓
...learning processes	✓	(✓)	✓	(✓)	✓	(✓)	✓	✓
...material design	✓	(✓)	(✓)	✓	✓	(✓)	✓	✓
...assessment	✓	✓	✓	✓	✓	✓	✓	✓
CM	✓	(✓)	✓	✗	✓	✓	(✓)	✓
CK	(✓)	✓	✓	✓	(✓)	✓	(✓)	✓
...ICT	✓	✗	✓	✓	✗	✗	(✓)	✗
...research	✓	✓	✓	✗	✗	✗	(✓)	✗
Language proficiency	✓	✓	✓	✓	✓	(✓)	✓	✓
...how to merge content, language & learning	✓	✓	✓	✓	✓	✓	✓	✓
Cooperation skills	✓	✓	✓	✓	✓	✓	(✓)	✓
Interculturality	✓	✓	✓	✗	✓	✓	✗	✗
...L2 acquisition	✓	✓	✓	✗	(✓)	✗	✓	✗
... bilingual programs (implementation)	✓	✓	✓	✗	✓	✗	✗	✗
Willingness to learn, motivation	✓	✗	✗	✗	✗	✗	✗	(✓)
Critical consciousness	✗	✓	✓	✗	✗	✗	✗	✗

Note. CM = classroom management; CK = content knowledge; ICT = information & communication technology. ✓ = mentioned;

(✓) = indirectly mentioned; ✗ = not mentioned

Table 4 (continued)*Comparison of Competence Frameworks*

Competences Knowledge of...	European Platform (2012)	Gnutzmann (2015)	Guerrero and Lachance (2018)	Hillyard (2011)	Leisen (2015)	Lopriore (2020)	Maljers et al. (2007)	Marsh et al. (2011)
...methodology	✓	✓	✓	✓	✓	✓	✓	✓
...learning processes	✓	(✓)	(✓)	✓	✓	✓	(✓)	✓
...material design	✓	✓	✓	✓	✓	✓	✓	✓
...assessment	✓	✓	✓	✓	✓	✓	✗	✓
CM	✓	✗	(✓)	✓	✓	(✓)	✓	✓
CK	(✓)	✓	✗	✗	✓	(✓)	✗	✓
...ICT	✓	✗	✗	✓	✗	✓	✗	(✓)
...research	✗	✗	(✓)	(✓)	✓	✓	✗	✓
Language proficiency	✓	✓	✓	✓	✓	✓	✓	✓
...how to merge content, language & learning	✓	✓	✓	✓	✓	✓	✓	✓
Cooperation skills	✓	✗	✓	✓	✓	✓	✓	✓
Interculturality	✓	✓	✓	✓	✗	(✓)	✓	✓
...L2 acquisition	(✓)	✗	✓	✓	✓	✓	✗	✓
...bilingual programs (implementation)	✓	✗	✓	✓	✗	✗	✗	✓
Willingness to learn, motivation	✗	✗	✗	✓	✓	(✓)	✗	✓
Critical consciousness	✗	✗	✓	✗	✗	✗	✗	✗

Note. CM = classroom management; CK = content knowledge; ICT = information & communication technology. ✓ = mentioned;

(✓) = indirectly mentioned; ✗ = not mentioned

Table 4 (continued)*Comparison of Competence Frameworks*

Competences Knowledge of...	McFarland (1995)	Menken and Antunez (2001)	Novotná et al. (2001)	Pavón and Ellison (2013)	Pérez Cañado (2018)	Pistorio (2009)	Schauwienold- Rieger (2012)	Zhorabekova (2015)	✓ & (✓) in sum
...methodology	✓	✓	✓	✓	✓	✓	✓	✓	24/24
...learning processes	✓	✓	✓	✓	(✓)	✓	✓	(✓)	24/24
...material design	(✓)	✓	(✓)	✓	✓	✓	(✓)	✗	24/24
...assessment	✓	✓	✓	✓	✓	✓	✓	✓	23/24
CM	✓	✗	(✓)	✓	✓	(✓)	(✓)	✓	21/24
CK	✗	✓	✓	✓	✓	✓	✓	✓	20/24
...ICT	✗	✗	✓	(✓)	✓	✓	✓	✓	14/24
...research	✓	✓	✗	✓	✓	✗	✗	✗	13/24
Language proficiency	(✓)	✓	✓	✓	✓	✓	✓	✓	24/24
...how to merge content, language & learning	✓	✓	✓	✓	✓	✓	✓	✓	24/24
Cooperation skills	✓	✓	✗	✓	✓	✓	✓	✗	21/24
Interculturality	✓	✓	✓	✓	✓	✗	✓	✗	18/24
...L2 acquisition	✓	✓	(✓)	✓	✗	✓	✓	✗	17/24
...bilingual programs (implementation)	✓	✓	✗	✓	✓	(✓)	(✓)	✓	15/24
Willingness to learn, motivation	✗	✗	✗	✗	✓	✗	✓	✓	10/24
Critical consciousness	✓	✓	✗	✗	✗	✗	✗	✗	5/24

Note. CM = classroom management; CK = content knowledge; ICT = information & communication technology. ✓ = mentioned;

(✓) = indirectly mentioned; ✗ = not mentioned

Specific Competences for Bilingual Education Teachers

The bottom eight competences displayed in Table 4 represent specific sets of teacher skills required for bilingual education. All reports identify language proficiency, as well as knowledge of how to merge content, language and learning, as essential for BETs. The latter falls into the domain of pedagogical content knowledge while language proficiency makes up a new knowledge domain within our theoretical background (resulting in a new category in Figure 6). Most reports indicate that language proficiency requires more than Basic Interpersonal Communication Skills (Cummins, 1979) or standard language (Cummins, 2017) and should include Cummins' (1979; 2017) Cognitive Academic Language Proficiency or academic language (Bertaux et al., 2010; Dale et al., 2011; Hillyard, 2011; Marsh et al., 2011; Pavón & Ellison, 2013; Pérez Cañado, 2018) and subject-specific language proficiency (Cinganotto, 2016; Gnutzmann, 2015). At the same time, only five reports (Blum Martinez & Baker, 2010; Calderón, 1997; Menken & Antunez, 2001; Novotná et al., 2001; Pistorio, 2009) underline the importance of language proficiency in the teacher's mother tongue, with the other authors only referring to second or foreign language proficiency. However, in this regard, Guerrero and Lachance (2018) point out that there is a research gap on the effect of teachers' bilingualism and biliteracy on the bilingual and biliteracy abilities of their students. Therefore, it is hardly surprising that most reports do not state a fixed level of required language proficiency but, instead, highlight the effective use of language within the bilingual classroom as a central precondition for successful bilingual teaching (e.g., Escobar Urmeneta, 2010; Guerrero & Lachance, 2018; Leisen, 2015; Maljers et al., 2007; Novotná et al., 2001). Nevertheless, knowledge related to (second) language (L2) acquisition, as part of pedagogical/psychological knowledge, is only mentioned in 17 reports, although this competence is intuitively necessary for effective language learning as it helps teachers to understand the processes to learn a language.

Concerning cooperation skills, 21 of 24 reports (see Table 4) include these as an expected competence for BETs. The majority focussing on working together with other teachers (Calderón, 1997; Cinganotto, 2016; Dafouz-Milne et al., 2010; Dale et al., 2011; Escobar Urmeneta, 2010; European Platform, 2012; Leisen, 2015; Lopriore, 2020; Pavón & Ellison, 2013; Pérez Cañado, 2018; Pistorio, 2009; Schauwienold-Rieger, 2012). This competence is not included in the theoretical background model and therefore added as a new aspect within our bilingual education competence model (Figure 6). Other reports focus on cooperation with parents or the community (Blum Martinez & Baker, 2010; McFarland, 1995; Menken & Antunez, 2001) or with all stakeholders of bilingual education (Bertaux et al., 2010; Coonan, 2011; Guerrero & Lachance, 2018; Hillyard, 2011; Maljers et al., 2007; Marsh et al., 2011). These cooperation skills are classified as part of counselling knowledge in our competence model (Figure 6).

Interculturality and critical consciousness as competences related to cultural aspects came up in 18 (e.g., Bertaux et al., 2010; Hillyard, 2011) and five reports (e.g., Calderón, 1997; Guerrero & Lachance, 2018; Menken & Antunez, 2001), respectively. Interculturality describes the promotion of cultural awareness and cultural exchange (Bertaux et al., 2010) and falls into the domain of pedagogical content knowledge. In comparison, critical consciousness encompasses awareness and reflection on (oppressive) language or cultural ideologies and potential advocacy for bilingual students' rights (Palmer et al., 2019) and only occurs in reports from the USA. Although critical consciousness is not integrated in the theoretical background model, it can be categorised as an intersection between beliefs/values/goals and motivational orientation (Figure 6).

Knowledge of bilingual programs and their implementation (as part of teachers' organisational knowledge), is mentioned in just over half the reports, whereas the presence of a fundamental willingness to learn or motivation (motivational orientation in the theoretical background model) is only listed in ten reports (Table 4), all of which address CLIL settings

(e.g., Hillyard, 2011; Leisen, 2015; Lopriore, 2020; Zhorabekova, 2015) or German bilingual education (Schauwienold-Rieger, 2012).

Competence Overview as Basis for Reflection

It is noteworthy that this list of 16 competences is only treated as an indication of BETs' competences and as a point of reference for self-reflection for development needs because the examined reports do not declare that teachers must have all of them. More precisely, Hillyard (2011) points out that acquiring professional competence in bilingual education requires practice and assimilation time. Development over time was also highlighted in a study by Durán-Martínez et al. (2016), who assessed the perceptions of ideal CLIL teacher competences of Spanish expert and novice in-service content CLIL teachers (n = 151). While experience increased the scepticism toward the quality of existing bilingual course material, it also increased appreciation of cooperation, innovation and bilingual education in general (Durán-Martínez et al., 2016). With this example of empirically inquired competences, the following section further examines the 16 competences for BETs by extending them through theoretical and empirical contributions on individual competences. Including this first example, a total of 59 reports (four of them were already included as framework or profile) are discussed in the following section.

Individual Competences in Theoretical and Empirical Research

Language Proficiency

In addition to its great significance in the frameworks above, **language proficiency** is also reflected in the following 20 reports, often in combination with **(pedagogical) content knowledge**. First of all, Morton (2016) reinforces that language proficiency alone is insufficient for successful bilingual education and argues that a specialised pedagogical content knowledge is needed. Therefore, he introduces content and language knowledge for teaching (CLKT) as a conceptual heuristic for CLIL teachers, which belongs to the facet of how to merge language, content and learning (Figure 6). CLKT encompasses common and specialised language

knowledge, knowledge of language and students, and knowledge of language and teaching. Later, he elaborates in detail on the aspect of language proficiency for CLIL and proposes language knowledge for content teaching (LKCT) as an overarching concept (Morton, 2018). LKCT, in turn, consists of common language knowledge and specialised language knowledge for content teaching. The former describes linguistic competences shared with non-teaching professionals in the content area whereas the latter is teaching-specific knowledge of how to use language to convey the content in a way which makes it highly accessible to students (Morton, 2018). This request – for teaching-specific components of language competence – is supported by Escobar Urmeneta and Walsh (2017), who analyse Walsh's (2011) classroom interaction competence (CIC) in the context of CLIL extracts. In principle, CIC describes the ability to use interaction to mediate and assist learning. Their analysis yields the harmonisation of language use and pedagogical goals, the creation of learning spaces for students, and the shaping of students' language through feedback as important components of CIC in CLIL (Escobar Urmeneta & Walsh, 2017). Although Hartono (2016) uses the term 'communicative competence' instead of CIC, she also emphasises that, apart from general language proficiency, the ability to direct efficient discourse and meaning negotiations in class is crucial for BETs. A comparison between bilingual interns and student teachers in other fields showed that the former possess clearer theoretical orientations towards second language learning and teaching; thus, their orientation is functional and prioritises communicative competence (Knudson, 1998). These teaching-specific language competences illustrate a facet of BETs' language proficiency and are depicted as communicative competence within our extended competence model (Figure 6).

In addition to the reference to cognitive academic language proficiency in some frameworks, Guerrero (1999) identifies academic language proficiency as important for BETs and defines it as a "speciali[s]ed register of language that teachers develop over time as they engage in educational activities" (p. 58). However, in his papers from the 1990s, he also sees

obstacles that BETs encounter during the acquisition of this proficiency as the U.S. society and schools favour bilingual students' transition to the dominant majority language (Guerrero, 1997). This often makes them replace their native language with English (Guerrero, 1999). In addition to teachers' own schooling experiences, students' language preferences can make it difficult for pre-service teachers to use content-specific Spanish (Vomvoridi-Ivanović, 2012). Two effects of abiding U.S. bilingualism ideologies are, thus, bilingual pre-service teachers' lack of confidence (Briceño et al., 2018) and low self-efficacy in regard to their Spanish (academic) language skills (Szwed & González-Carriedo, 2019). Similarly, anxiety concerning language use and low self-perceived language proficiency frequently occurs among Italian CLIL content teachers (Aiello et al., 2017; Robinson, 2020). Overall, Hood (2020) points out that teachers, administrators and pre-service teachers recognise academic language proficiency as being of central importance in bilingual education and recommend study time abroad, which also supports cultural competence.

So far, this review has only considered the notion of language proficiency in classroom teaching. Aquino-Sterling (2016) expands this notion in his pedagogical Spanish competences (PSC) for bilingual education. The notion of PSC is very similar to Hartono's (2016) communicative competence because it highlights the language and literacy competences needed for effective teaching in the second language. Additionally, PSC include "meeting the professional language demands of working with students, colleagues, administrators, parents, and the larger bilingual school community" (Aquino-Sterling, 2016, p. 51). The significance of this additional language register is also elucidated within the overview of competence frameworks, most of which include cooperation skills. Therefore, Aquino-Sterling and Rodríguez-Valls (2016) stress that acquiring pedagogical and teaching-specific language competences is required for bilingual teacher education. Both academic and subject-specific language proficiency are depicted as facets of language proficiency and content knowledge within our competence model (Figure 6).

While language proficiency itself is a challenging requirement for BETs, **language proficiency tests** in the USA are also criticised in the literature. For example, Guerrero (1997, 1998) criticises bilingual teacher certification and claims it is of a low standard since its tests are designed for transitional education rather than for sustained native-language instruction. Grant's (1997) criticism goes further: she states that most states in the USA do not even have specialised language proficiency tests. Johannessen and Bustamante-López (2002) further claim that Spanish proficiency tests are not adequate for bilingual education purposes since they lack academic Spanish and do not include representative tasks for bilingual classrooms. Moreover, Lemberger and Reyes-Carrasquillo (2011) show that bilingual education and English as a second language teacher certification is challenging, but not necessarily a barrier to teaching. They also highlight the low validity of certification tests to signal teacher quality because in classroom observations teachers showed teaching qualities and practices which could not be measured in the tests.

Besides, a recent study shows that language standardisation in the writing part of the Indigenous Language Proficiency Exam in Ecuador did not account for existing language variations, which discriminates against speakers of such variations (Limerick, 2020). This shortcoming is especially important as minority language preservation is one of the goals of bilingual education named by Wright and Baker (2017), however, "tensions exist relating to the ultimate goals of bilingual education, even within the bilingual education community" (Varghese, 2004, p. 234).

All in all, the quantity of reports on language proficiency emphasises its central importance for bilingual education. Therefore, bilingual teacher education is demanded to ensure access to academic language registers and a sensitisation toward teachers' own positions within society (Blum Martinez & Baker, 2010). Beyond that, Szwed and González-Carriedo (2019) point out that bilingual teacher education is obliged to counteract English language hegemony, to reaffirm language varieties and to foster the development of both languages, for

example through translanguaging. Translanguaging can be defined as “the deployment of a speaker’s full linguistic repertoire without regard for watchful adherence to the socially and politically defined boundaries of named (and usually national and state) languages” (Otheguy et al., 2015, p. 283). These recommendations found in the literature are supported by Vomvoridi-Ivanović (2012), who highlights the importance of access to academic Spanish for prospective teachers but emphasises that the most pressing concern is that prospective teachers become used to practising Spanish in their subject. Last, Robinson (2020) and Aiello et al. (2017) elaborate that the development of language proficiency within a training program also needs to address psychological aspects to reduce language anxiety.

Pedagogical Content Knowledge

In addition to the abovementioned language specific-extensions to **pedagogical content knowledge**, Banegas et al. (2020) stress that professional development on how to merge content, language and learning for bilingual education needs to take the teaching-learning context into account. For instance, Lorenzo (2008) looks at CLIL teachers’ approaches to adapting a foreign-language text about history. Teachers’ approaches differed greatly; some simplified it, elaborated or created a new discourse entirely. Consequently, teachers need to be educated in how to modify content for language learners and about the advantages of the different approaches.

Critical Consciousness

A third individual competence which is intensively debated in the reviewed reports is **critical consciousness**, which involves overcoming deficit language ideologies (Freire, 2021) and consists of both ideological reflection regarding language and culture and advocacy for students and bilingual education (Palmer et al., 2019). Even though critical consciousness was the least mentioned of the 16 competences included in all the competence frameworks (Table 4), the number of additional reports addressing it indicates that it is required for BETs. As a start, language ideologies are dealt with in three additional reports. First, in a study analysing

BETs' attitudes toward varieties of Spanish commonly spoken by students, language purism ideologies and discrimination against users of such varieties were found (Román et al., 2019). Teachers' perspectives on (language) minority students and resulting discrimination were also investigated by Maroney and Smith (2000), who show that teachers who received their education in Mexico and train to become BETs in the USA still have deficit beliefs, for example arguing that minority students' culture gives reason to their failure in school. Furthermore, research showed that pre-service teachers underestimate the influence of accents and gender-specific language learning differences and overestimate job opportunities for bilinguals (Liu & Rutledge, 2020).

In contrast, Murillo (2018) found that negative experiences with language ideology in the USA can also motivate individuals to become BETs to support bilingual or immigrant students; therefore, they implicitly act as social change agents. In comparison, European CLIL teachers emphasise the challenge of, and an interest in, the bilingual teaching approach as their driving force (Lopriore, 2020; Mattheoudakis & Alexiou, 2017).

In his theoretical paper, Alfaro (2019) recommends actively developing critical consciousness during teacher education, for instance through the inclusion of a cultural wealth model, which values different cultural backgrounds and challenges deficit perspectives (Alfaro & Bartolomé, 2017). Other researchers propose the integration of social justice education (Ekiaka-Oblazamengo, 2018) or an assessment of teachers' cultural proficiency (Quezada & Alexandrowicz, 2019). The latter is defined as "an individual's, or a group's, belief system that holds students' cultural backgrounds of language, race, gender, socioeconomic status as assets on which one is to construct their educational experiences" (Quezada & Alexandrowicz, 2019, p. 186). Concerning advocacy, Varghese (2004) found that teacher educators expect all BETs to be advocates; however, she stresses that the acquisition of advocacy is a complex process which necessitates a focus on local and contextual learning within professional development.

Cooperation Skills

Cooperation skills between teachers provide an additional aspect of BETs' professional competence (Figure 6) with four reports. Relaño Pastor and Poveda (2020) investigate the cooperation between BETs and native language assistants and reveal problems with the establishment of a professional order between the parties based on language. In comparison, Méndez García and Pavón (2012) find teacher cooperation between content teachers and language assistants to be motivating and encouraging for teachers. At the same time, they identify a lack of training on effective teacher cooperation because the collaborations considered were based on intuition alone. Cruz's (2000) study of the professional network in one middle school highlights that cooperation between mainstream and BETs can be beneficial for teaching practice in general. However, for this approach, teachers require extra time to plan together, which needs to be incorporated into the operating structure of the school (Cruz, 2000). Additionally, Rodríguez-Valls et al. (2017) propose horizontal cooperation between content teachers and language teachers because one teacher cannot fulfil all the roles and competences alone, namely (academic) language proficiency, content knowledge and teaching expertise. Last, Durán-Martínez et al. (2016) see the mentoring of novice teachers by experienced BETs as a possibility for bilingual teacher education to support cooperation and teaching quality.

Pedagogical/ Psychological Knowledge

The following three sections describe six reports on BETs' **pedagogical/psychological knowledge**. The first two studies focus on teachers' CLIL pedagogy. In van Kampen et al.'s (2020) study, teachers and CLIL specialists agree that student-centred teaching, scaffolding, opportunities for interaction and a mixture of writing and speaking tasks are central for CLIL. Comparably, Koopman et al. (2014) look at CLIL teachers' language pedagogical knowledge and find that the classroom activities teachers are able to deploy consist mainly of word-level activities, with a wider range of language learning left out. Their findings also show a lack of knowledge about language acquisition as well as monotonous correction methods. Participants

in van Kampen et al.'s study (2020) also considered language feedback and assessment of language to be the most challenging aspects of CLIL. Two further studies addressing language assessment present contradictory results. García Laborda and Alcalde Peñalver (2020) found that most participating CLIL pre-service teachers do not regard CLIL assessment as more difficult than general foreign language education assessments. In comparison, Giraldo and Murcia (2018) find high demands for training in the design of assessment instruments and enormous interest in methodologies and assessment in bilingual education.

Custodio-Espinar (2020) examines CLIL lesson methodological planning competence through the self-assessment of 383 primary and secondary CLIL teachers. In this study, all secondary teachers, except for advanced language teachers, show a need for planning competence improvement as well as training in formative and summative evaluation (Custodio-Espinar, 2020). This systematic literature review will not go deeper into the topic of empirical research on effective bilingual education methods, as doing so is beyond its scope and, indeed, could fill a whole review on its own. Moreover, listing successful methodological approaches could lead to the wrong conclusion, namely that teaching is an objectifiable craft that only requires "the mastery of technical components [although it really is] a highly contextuali[s]ed process" (Gay & Kirkland, 2003, p. 182). Furthermore, Hurajova (2019) indicates that various factors influence students' language competence and that methodology plays an important but not decisive role. Nevertheless, during the screening of the almost 4300 titles and abstracts, a strikingly high number of mentions of scaffolding, translanguaging, code-switching and the implementation of digital tools and media indicates the overall importance of methodological considerations in the field of bilingual education.

The last individual competence in the domain of pedagogical/psychological knowledge is digital competence. Cinganotto and Cuccurullo (2015) argue that CLIL teachers' professional profile must include digital competence, or, rather, technological pedagogical content

knowledge (Mishra & Koehler, 2006), as the basis for the successful implementation of digital media, specifically videos, in the CLIL classroom.

Training Needs

To conclude the findings, we next present the inferences of 14 papers on BETs' overall training needs and implications for bilingual teacher education, which are depicted as further development needs in the extended competence model (Figure 6). First, regarding **BETs' training needs**, Pavón et al. (2020) found a general demand of balanced methodological and linguistic training. Furthermore, they discovered a need for CLIL training for content teachers, due to a lack of confidence in their CLIL teaching, and that language and content teachers should be trained jointly with language assistants to foster teamwork. Additionally, Pavón et al. (2020) emphasise the importance of continuous professional development, due to the dynamic and innovative character of CLIL. Quero Hermosilla and González-Gijón's (2017) findings show a lack of methodological training and general openness for language training. However, participating teachers voiced reluctance to take up training offers if they had to bear the costs themselves. Similarly, inadequate CLIL methodology training is the weakness most frequently reported in another study (Barrios & Milla Lara, 2020). Last, Fernández Costales and Lahuerta Martínez (2014) consider the theory-practice gap of methodological training at universities the main problem of teacher training.

The training needs of pre-service and in-service teachers, teacher educators and coordinators on a European scale are highlighted by Pérez Cañado (2016a, 2016b). These results reveal that there are training needs in all the examined areas: linguistic and cultural competence, knowledge of CLIL theory (research, programs, implementation, policies), methodology, material and continuous professional development. Overall, the linguistic and cultural competence training needs were less severe, whereas the need for theoretical knowledge of CLIL and continuous professional development was remarkable (Pérez Cañado, 2016a, 2016b). The results of another study also show teachers' uncertainties and, therefore,

training needs regarding CLIL theory and methodology (Pavón & Rubio, 2010). Furthermore, Pavón and Rubio (2010) name the implementation of the integrated curriculum as a critical training field. In comparison, practising teachers emphasise training needs in the areas of language, methodology, materials and assessment, for instance, work experiences abroad, cooperation with language teachers or foreign language assessment (Coonan, 2011). Moreover, organisational, interpersonal and cooperation skills are also highlighted as a challenge for CLIL teacher training (Pérez Cañado, 2018). For CLIL teachers in Poland, Czura et al. (2009) identified CLIL-specific training needs with respect to subject-specific training, professional exchanges, and a demand for professional development in cooperation skills and international exchange programs. A Europe-wide literature review of CLIL teachers' training needs (Pérez Agustín, 2019) reveals that teachers' language proficiency, methodological skills and knowledge of material design and assessment, as well as their cooperation skills, are capable of improvement. A further systematic review by Porcedda and González-Martínez (2020) on lacks in European CLIL training shows that prior CLIL training, pedagogical/educational training and instructional/planning processes are mentioned most frequently. The reviewed articles recommended training in CLIL, the inclusion of ICT and cooperative practices as measures to counter these lacks.

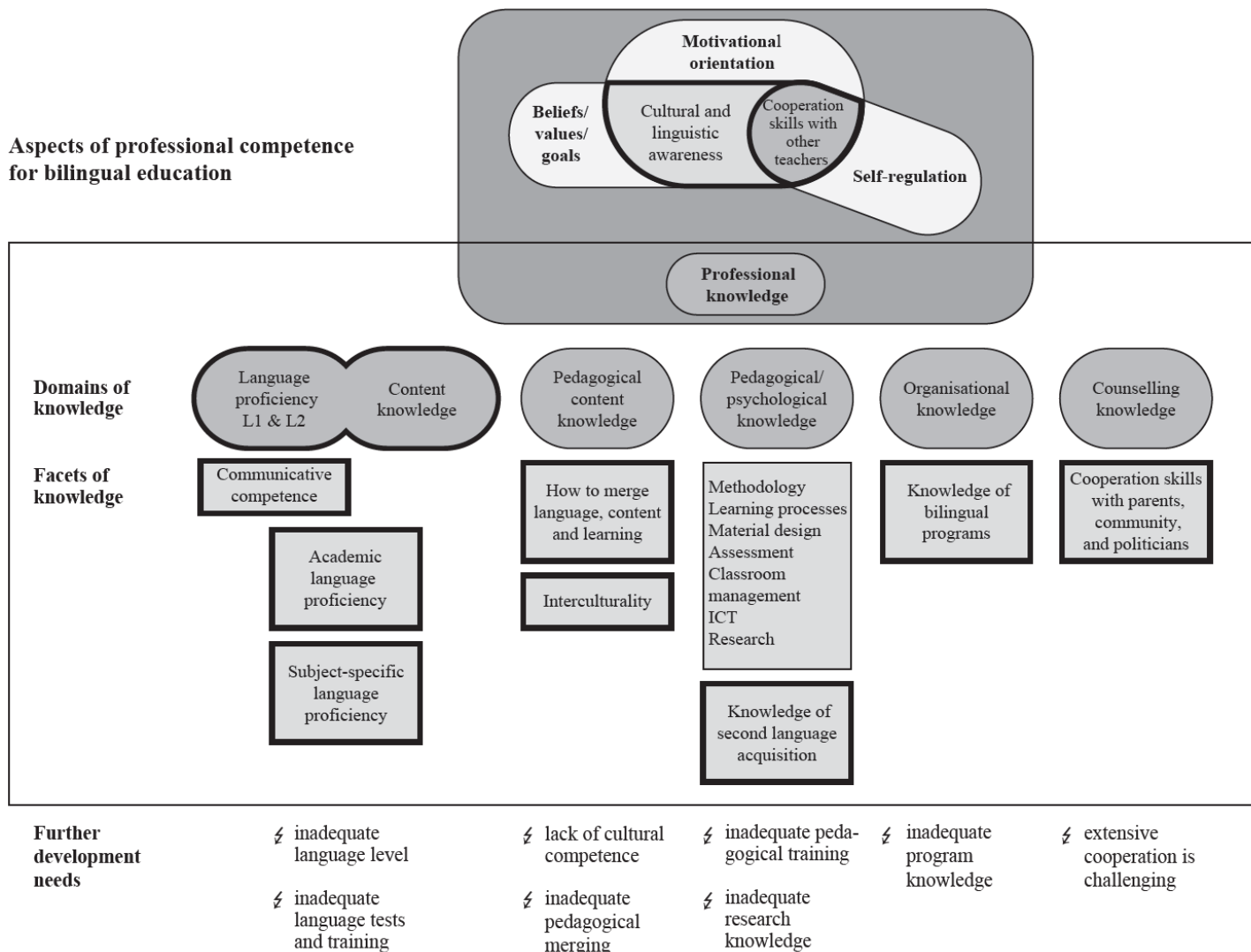
In comparison, training needs in the USA range from language proficiency, because of restricting language ideologies, to an overall need for bilingual training and preparation programs due to a current lack of bilingual faculty (Hernández & Alfaro, 2020). Cammarata and Tedick (2012) point out the need to increase immersion teachers' knowledge of how to integrate content and language in light of the misconception that teaching content in another language automatically leads to language learning. Therefore, training on language acquisition processes and more opportunities for collaboration are required (Cammarata & Tedick, 2012).

Summary of Findings

All in all, the comparison of 24 competence frameworks or competence overviews resulted in a list of 16 competences for BETs with an overall good convergence. Additional theoretical or empirical research focused, in particular, on language proficiency, critical consciousness, pedagogical/psychological knowledge and training needs and yielded some implications for bilingual teacher education which are elaborated on below. Based on the model by Baumert and Kunter (2013), Figure 6 summarises the review results through the depiction of an extended bilingual education professional competence model. The added and highlighted aspects (in bold) illustrate bilingual education-specific competences as we described them above. To begin with, critical consciousness and cooperation skills with other teachers are depicted as intersectional aspects of professional competence. In addition, deepened language proficiency and content knowledge which include teaching- and subject-specific facets are needed for bilingual education, regardless of teachers' educational background, i.e. whether they are language or content teachers. Other facets like knowledge of how to merge language, content and learning as well as interculturality fall into the category of bilingual education-specific pedagogical content knowledge. Moreover, except for knowledge of second language acquisition which is (at least for subject-oriented teachers) specific for bilingual education, all aspects of pedagogical/psychological knowledge are already included in the Baumert and Kunter (2013) model for general teaching. However, due to the emphasised lack thereof in the field of bilingual education, extensive pedagogical/psychological knowledge seems necessary for bilingual teachers. Furthermore, knowledge of bilingual programs is depicted as facet of organisational knowledge. Last but not least, cooperation skills with parents, the community or politicians are presented as additional facet of counselling knowledge.

Figure 6

Extended Model of Teachers' Professional Competence (Baumert & Kunter, 2013) for the Context of Bilingual Education



Discussion

This systematic literature review closely analysed 79 individual reports to examine how the competences of BETs in secondary schools are conceptualised within research. The discussion which follows recapitulates the results of teachers' competences and connects them with other findings in different bilingual teacher education contexts.

The analysis revealed an overall convergence of international competence frameworks or training programs and resulted in a list of **16 competences** which can be considered essential for worldwide bilingual education. Many of these competences were already present within our underlying theoretical background model of teachers' competences (Baumert & Kunter, 2013); however, BETs require even more and high-level competences. The 16 competences can most likely be generalised to bilingual education since most of the included competence frameworks or overviews were either not directed at a target group (e.g., secondary education) or were created explicitly for both secondary and primary education. Furthermore, all frameworks have a cross-curricular focus (except for that of Novotná et al. (2001), who focus on the subject of mathematics), which can also be seen as an indication of the transferability and validity of the competences found.

The excess of **CLIL competence frameworks** within our timeframe of the last 25 years could be due to the fact that CLIL was implemented relatively late – in the 1990s – in Europe (compared to the USA, for instance); hence, empirical CLIL research began to increase from mid-2000 (Dalton-Puffer et al., 2014). Furthermore, in the USA, many teacher preparation programs and, therefore, competence frameworks focus on transitional bilingual education (Guerrero & Lachance, 2018), which were excluded from this review due to their implementation in primary education and the fact that they do not value the long-term preservation and development of bilingual capabilities.

We now discuss individual BETs' competences in more detail. The literature review showed that **critical consciousness** as a competence is, to date, only considered in the bilingual

curricula of the USA. The amount of research regarding this concept has been increasing lately, in addition to its mentions in the frameworks. In the literature, possible means to foster critical consciousness were, for example, international exchanges (Alfaro & Quezada, 2010; Anthony-Stevens & Griño, 2018), personal exchanges (Fitts & Weisman, 2010; Hernández, 2017) or art- or drama-based pedagogies (Caldas, 2019). Other research showed the importance to leave space for teachers' development of language advocacy, especially in areas where there are still restrictive language policies, in order to preserve young people's language rights and bilingualism (Dubetz & Jong, 2011; Ramírez et al., 2016). Similarly, language awareness has started to receive increasing attention in Europe as well. For example, Sierens et al. (2018) conclude that language awareness interventions can help students develop "positive attitudes towards linguistic diversity and more favourable perceptions of diverse languages and of speakers of these languages" (p. 78). In qualitative research, BETs' own histories and their social background were documented to be connected to their language ideologies (Varghese & Snyder, 2018), which, in turn, are likely to influence instructional practices (Briceño, 2018). Accordingly, the situatedness of language and language ideologies, and the unfolding of and actively dealing with one's implicit ideologies and practices, can help to develop a professional identity (Zúñiga, 2019) and offers "an opportunity to break the cycle of oppression and [promote] the development of teachers as critical pedagogues" (Ostorga & Farruggio, 2020, p. 1234). These findings show that critical consciousness is increasingly discussed and also debated in the literature.

Although some competence frameworks, due to their length, have been criticised as extensive wish lists which can overstrain teacher education curricula (Morton, 2016), the comprehensive framework overview and the competence model (Figure 6) of this systematic review can help teachers to reflect on their competences and increase their interest in further professional development. One might wonder why **reflection** is not added as a competence in this framework overview even though it is explicitly listed in some frameworks (e.g., Pérez

Cañado, 2018; Escobar Urmeneta, 2010). There are at least two reasons: first, reflection is already partly included in the competence of lifelong learning and motivation. Second, it can be argued that reflection is an inherent part of teacher competences anyway (e.g., Hatton & Smith, 1995; Beauchamp, 2015), and therefore does not need to be part of a specific bilingual education competence framework. Nevertheless, it should be emphasised that reflection on personal development is necessary, in particular, because, for instance, not all countries in Europe require special teacher qualifications for CLIL (Eurydice, 2008). Furthermore, teachers need to continuously develop their competences when teaching in bilingual education and their “expertise is progressive by nature” (Jäppinen, 2006, p. 24). The first encounter with bilingual education might negatively affect teaching and cause fear and insecurities, in particular regarding linguistic competences, but these effects could be mitigated over time (Moate, 2011). Professional development and reflection can also help to further improve transition and assimilation because “the key to any future vision for bilingual education is teacher development” (Pérez Cañado & Ráez Padilla, 2015, p. 7).

Overall, our literature review illustrates the importance of BETs’ **language proficiency** but also that such proficiency is frequently inadequate. Since teachers must have more advanced linguistic capabilities than learners in order to have two-fold language competence, that is, the ability to use language to explain content appropriately and to be aware of language features at the same time (Guerrero & Lachance, 2018), the emphasis on linguistic competences is reasonable. Moreover, it is recommended for teachers preparing for bilingual education to develop an understanding and awareness of academic (Cummins, 2017) or school language (May & Wright, 2007). Actively fostering students’ language learning is sometimes even disregarded, as not all teachers are aware of the additional focus on language in CLIL (Hüttner et al., 2013). Hence, Jong and Barko-Alva (2015) highlight that teachers need to understand their changing role as instructors who integrate content and language. This in turn, requires an understanding of subject-specific literacies and their assessment (Whitehead, 2007). However,

research shows that regular courses of education can result in BETs being poorly prepared to teach in the medium of, for instance, academic Spanish (Guerrero, 2003). Accordingly, this recommendation to foster teachers' awareness of academic language in bilingual education is also supported by Sutterby et al. (2005), who stress the need for pre-service BETs to experience academic Spanish in university to become comfortable with it.

In addition to more individual competences, that is, critical consciousness and language proficiency, our systematic review demonstrates the importance of teachers' **cooperation skills** for bilingual education (e.g., Marsh et al., 2011; Rodríguez-Valls et al., 2017). This result is confirmed in other bilingual teacher education contexts, which report on the successful testing of innovative approaches to foster cooperation skills. Examples include a bilingual mentor program between experienced English students and freshman primary education teachers (Arco-Tirado et al., 2018) and mentorship programs with bilingual pre-service teachers and experienced bilingual or ESL teachers (Riley et al., 2017) or with experienced former teachers and Indigenous teachers in rural areas (La Garza, 2016). Another example features cooperation between universities and schools during teacher education aimed at the improvement of teaching the natural sciences in a foreign language (Izquierdo et al., 2016). However, research on the experiences of bilingual and mainstream primary teachers shows that cooperation in schools can be difficult (Amos, 2020) and that bilingual (education) teachers are often not sufficiently appreciated (Valenta, 2009). Consequently, fostering cooperation in teacher education in general and establishing favourable cooperation at an early stage seem advantageous ways to support high-quality bilingual education.

Knowledge of research of bilingual education was underlined as essential in just over half the frameworks (e.g., Blum Martinez & Baker, 2010; McFarland, 1995; Pérez Cañado, 2018). Also, it was absent in the additional theoretical contributions and empirical studies that we found in our review. Once, knowledge of research was mentioned as a training lack (Pérez Cañado, 2016a, 2016b). Therefore, teachers' knowledge of bilingual education research can be

seen as an important avenue for future training, research and practice. This recommendation that BETs should be aware of bilingual education research is also in line with research on primary BETs (Franco-Fuenmayor et al., 2015).

In conclusion, linguistic competences, critical consciousness, cooperation skills and knowledge of bilingual education research can be seen as important but also expandable competences for BETs. They have been shown to be a relevant part of professional education and reflection. Accordingly, these competences are also highlighted in the bilingual education professional competence model and can be seen as the central implications of this review which provide a starting point to improve bilingual teacher education programs.

From a **methodological point of view**, the systematic review revealed that most studies (37 out of 44 empirical studies) were based on interviews or questionnaires/surveys with self-assessment. Consequently, their explanatory power might be disputable. This is a major limitation of the studies included in the review and of the research field of bilingual education and therefore suggests an important avenue for future research. Further research implications are raised below in light of the review's limitations.

Limitations and Conclusion

Despite its important contributions, the present systematic review has some limitations. Although the authors thoroughly examined different literature databases and aimed to reduce publication bias through a broad range of included publication criteria, relevant but (as yet) unpublished studies might have been left out. Second, while our broad timeframe allowed for a comprehensive overview of the field, it also raised some issues; for example, some examinations of language proficiency tests (e.g., Guerrero 1997; Grant, 1997) might already be outdated. Thus, results with regard to language proficiency tests should be interpreted with caution. Moreover, except for these possibly outdated investigations, most reports do not include concrete recommendations for how to assess bilingual teachers' competences. This is noteworthy since the competence model should go hand in hand with competence assessment.

Third, merging the competence frameworks through content analysis left an interpretative margin for the authors since some frameworks used competence keywords without explanations (e.g., Dafouz-Milne et al., 2010; Lopriore, 2020). Fourth, although the authors aimed to only include reports on secondary bilingual education (frameworks, teachers or training programs) or the combination thereof with other education levels, some reports aimed at primary education might still be included because their actual target group was not always apparent within the text. Fifth, most of the included articles originated in the USA or Europe. Consequently, our results might be biased toward the specific conditions of these countries. The chosen languages (English and German) and the search string, which might not have been optimal since it elided terms like “CBI”, “dual-language education” or “indigenous language education” (May, 2013), could have skewed our findings towards these areas and caused other relevant research from different cultural backgrounds to be left out. For a future systematic review, it is recommended to expand the search string by including the terms “CLIL teacher”, “teacher program” as well as “CBI”, “dual-language education”, “two-way immersion” and “indigenous language education”.

Nevertheless, (to our knowledge) this is the first systematic research which comprehensively investigates BETs' competence frameworks. Overall, the frameworks converge satisfactorily although some competences are still debatable, for example, critical consciousness is missing in Europe while investigated in the USA. With regard to BETs necessary competences and training needs, research over the last 25 years paid special attention to language proficiency, pedagogy, methodology (in particular) and cooperation skills.

The absence of quantitative studies measuring competence development without falling back on self-assessment can thereby be taken as an important implication for future research on bilingual education. Currently, the extent to which BETs fulfil the demands raised in the competence framework remains a rather open question. In consequence, the effectiveness of bilingual teacher education programs cannot yet be assessed. Nevertheless, as bilingual

education, in particular dual-language education, “is widely supported by research as a highly effective [...] approach that is associated with significant academic and linguistic benefits as well as amplified sociocultural and socioemotional competenc[es], or what might be called 21st century skills” (Guerrero & Lachance, 2018, p. 5), teachers need to be well equipped to effectively meet its challenges. Accordingly, future research on BETs’ competences and competence development is needed.

On the whole, this systematic review contributes to the literature in at least two ways. First, it goes beyond existing literature reviews on European CLIL training lacks (Pérez Agustín, 2019; Porcedda & González-Martínez, 2020) by including research from several research contexts. Second, it closely investigates the different competence frameworks and systematically shows their convergence, resulting in an extended bilingual education professional competence model. Since most of the underlying reports do not include recommendations concerning competence assessments for bilingual teachers, developing an assessment strategy to complement the competence model would be a promising research area for the future. Nevertheless, the presented model can provide guidance or serve as sources of inspiration for bilingual educators around the world who want to improve their training approach. In conclusion, linguistic and skills training through personal and international exchanges, the inclusion of academic language and research on bilingual education are promising approaches for bilingual teacher education and should be promoted worldwide.

Additional Information

The systematic literature review was preregistered on the platform Open Science Framework (<https://doi.org/10.17605/OSF.JO/Z8JWU>) using the Rmd-template by Schneider, Backfisch and Lachner (2022). The following adjustments were made to the original criteria used in the preregistration. The setting was originally primary, secondary and teacher education; however, primary education was excluded after all abstracts and titles had been screened, due to a high focus on transitional bilingual programs in the USA which were shown to be the least

successful form of bilingual education (Collier & Thomas, 2004; Herrera, 2020). Nevertheless, articles including primary and secondary BETs were included because they are often trained together in the USA. Additionally, teacher-educators were removed from the specific target group since they were indirectly included through the setting of teacher education programs. Furthermore, the sub-questions of RQ1 were removed due to their intersecting characteristics. Last, due to the qualitative nature of most of the literature found, the originally-intended examination of the influence of bilingual teacher education programs on professional competence (RQ2) was discarded.

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3. Study 2: What Does It Mean to Be(come) a Professional Bilingual Education Teacher?

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Abstract

Due to the dual focus of content and language integrated learning on both content and language, bilingual teaching requires a profound level of teacher professionalism. This mixed-methods study aims to capture the beliefs of trainee teachers and educators regarding professional (bilingual education) teachers within the framework of teachers' professional competence models. We analysed data from a questionnaire (n = 32) and interviews (n = 11) with teacher educators and trainee teachers involved in bilingual training programs for secondary education in Germany. The findings emphasise the importance of high motivation, additional pedagogical/psychological knowledge, internationally oriented content knowledge and high language proficiency. These results yield important implications for bilingual teacher training.

Keywords: bilingual education, CLIL, bilingual teacher education, beliefs, Germany

Introduction and Theoretical Background

Climate change, fake news and disengagement processes such as Brexit and international inequality are shaping the 21st century and will affect future generations. Intercultural dialogue and mutual understanding are essential components in countering and navigating these developments. The European Union recognised this need early on by encouraging the teaching and learning of at least two foreign languages (European Commission, 1995) and highlighting the potential of content and language integrated learning (CLIL). These initiatives aim to broaden everyday communication skills acquired through general language learning programs (Council of the European Union, 2011). Scholars have defined CLIL as ‘a dual-focused educational approach in which an additional language is used for the learning and teaching of both content *and* language’ (Coyle et al., 2010, p. 1), and it is seen as the European approach to bilingual education (Nikula, 2017). CLIL intertwines content and language because people learn a language by using it, not by sequentially learning and then using the language (Genesee & Lindholm-Leary, 2013). As the 4Cs Framework (Coyle, 1999) illustrates, CLIL not only combines content and communication but also cognition and culture. Furthermore, CLIL, which is deemed an interactive and participatory approach, aligns with the underlying assumption of the social and collaborative nature of learning (Moate, 2010). Consequently, CLIL has the potential to foster students’ foreign language skills and content knowledge (Dallinger et al., 2016; Pérez Cañado, 2018a) as well as intercultural awareness (Gómez Parra et al., 2021). It is therefore in line with the aim of increasing intercultural dialogue and understanding.

Nevertheless, given the large impact of teachers on students’ learning outcomes (Hattie, 2008; Maulana et al., 2021), it is necessary to pay more attention to CLIL teachers’ competences, beliefs and practices. For example, research on CLIL subject pedagogies illustrates mixed results in educators’ beliefs regarding the necessity of integrating content and language, despite this being the core of CLIL (van Kampen et al., 2018). This is especially

significant because teachers' beliefs influence their teaching practices (Brandl, 2017). Moreover, the field of CLIL is characterised by an overall lack of learning materials (Kakenov, 2017; Lazarević, 2022), for which teachers must compensate with great effort (Ball et al., 2015; Pérez Cañado, 2016). Regarding their competences, a professional competence model specific to bilingual education was developed by Scherzinger and Brahm (2023). It is based on Baumert and Kunter's (2013) multidimensional professional competence model for generalist teachers and combines a multitude of international competence frameworks for CLIL (Hillyard, 2011; Lopriore, 2020; Marsh et al., 2011; Zhorabekova, 2015) and literature on individual CLIL-specific competences (Cinganotto, 2016; Escobar Urmeneta & Walsh, 2017; Morton, 2018). Like the generalist model (Baumert & Kunter, 2013), the bilingual education competence model encompasses teachers' professional knowledge, self-regulation, motivational orientations and professional beliefs regarding teaching and learning. Professional knowledge, in turn, is subdivided into Shulman's (1986) triplet of content knowledge, pedagogical content knowledge and pedagogical/psychological knowledge, to which organisational and counselling knowledge are added. Moreover, content knowledge is brought together with language proficiency, which in turn includes proficiency in both the foreign and the first language, both of which should be included in CLIL lessons (Canz et al., 2021; Ertugruloglu et al., 2023; Lasagabaster, 2013). Each of these domains thereby involves several fine-grained facets of knowledge (see Figure 6). When these components are present and applied, they can lead to (CLIL) teacher professionalism; however, teachers' competences and students' outcomes are related in a probabilistic – not necessarily a deterministic – manner (Cramer, 2020). Consequently, experience, reflection and lifelong learning are important factors in teachers' professionalisation (Gutierrez, 2016).

Considering the high potential of CLIL, for which teachers' various competences, beliefs and practices serve as a cornerstone, teacher professionalisation is crucial for CLIL quality. Since German CLIL teachers in training are actively developing their professionalism

under the mentorship of highly professionalised and actively in-school teaching lecturers, an intriguing research opportunity emerges. Accordingly, this study aims to compare their beliefs regarding professional (CLIL) teachers' competences.

CLIL (Teacher Education) in Germany

In Germany, the first bilingual education programs were established in the 1960s as a means to reconcile and promote international understanding between Germany and France following the Second World War. Since the expansion of English as the lingua franca in the 1990s, the quantity of German CLIL programs has increased, and English has replaced French as the most widely used CLIL language (Breidbach & Viebrock, 2012). Overall, German grammar schools, with their so-called CLIL streams, account for most CLIL implementations (Rumlich, 2017). These streams are characterised by voluntary participation and additional foreign language lessons in grades five and six, which serve as preparation for the actual CLIL content lessons that usually start in grade seven (Rumlich, 2017). The subjects currently used for CLIL extend beyond the social sciences (geography, history and political studies, sometimes combined with economics) to include biology (Kultusministerkonferenz, 2013). Furthermore, German CLIL is characterised by a strong content orientation and a lack of CLIL-specific curricula (Rumlich, 2017).

The fact that German bilingual pre-service teachers study at least two subjects could be seen as a favourable condition for bilingual education (Breidbach & Viebrock, 2012). This is especially true if they combine a foreign language with a non-language subject, as CLIL requires expertise in both (Pavón & Ellison, 2013; Pavón & Rubio, 2010). Due to students' increasing heterogeneity, Wolff (2012) stressed the need for all content teachers to be trained in CLIL; however, CLIL training for in-service and pre-service teachers is rather scarce. Moreover, CLIL training is not compulsory for teaching bilingually, which could inhibit the quality of CLIL teaching. On the positive side, an increasing number of training programs have begun to offer bilingual education as a voluntary additional qualification program to trainee

teachers during the so-called induction phase (Gnutzmann & Rabe, 2013). The induction phase follows completion of university studies, lasts one-and-a-half years and is the final step to becoming a fully-fledged teacher. During this phase, trainee teachers assume an increasingly active role in a school and, at the same time, attend accompanying teacher training. As a rule, bilingual education qualification programs encompass a seminar with theoretical input on bilingual education, work-shadowing teachers, teaching experiences, classroom visits and a colloquium (Kultusministerkonferenz, 2006).

Unsurprisingly, the CLIL trainee teachers and teacher educators involved in such bilingual education qualification programs have not yet been incorporated into the scope of research, although their different stages of professionalism and amounts of teaching experience could grant valuable insights into CLIL teachers' professionalisation processes.

This Study

To bridge this research gap and recognising the importance of teachers' beliefs for teaching practice (Brandl, 2017), this study aims to capture the beliefs of trainee teachers and teacher educators involved in bilingual education qualification programs in Germany. While the study encompasses many facets of bilingual teaching and training programs, this paper focuses on those beliefs related to necessary (CLIL) teacher competences and the differences between the two participant groups. Given the prolonged presence of social science subjects in German CLIL, the focus is on teachers for CLIL in geography, political studies or economics. The following two research questions (RQs) were posed:

RQ1. Which competences do teacher educators and trainee teachers deem necessary for professional (bilingual education) teachers?

RQ2. Regarding which competences do the beliefs of teacher educators and trainee teachers differ?

This study extends previous research by adding to the literature on bilingual education and CLIL teachers' competences (Cortina-Pérez & Pino Rodríguez, 2022; Scherzinger &

Brahm, 2023), their beliefs (Durán-Martínez et al., 2022) and their teacher training (Pérez Cañado, 2016, 2018b; Valenta, 2009). It also provides insights for practitioners in teacher education regarding which competences are deemed crucial.

Methodology

Context and Participants

The study was conducted in spring 2021 and followed a mixed-methods approach (Creswell & Plano Clark, 2018) using an online questionnaire (see Appendix B) along with semi-structured interviews (see Appendix C). It focused on bilingual education teachers' beliefs regarding professional teachers' required (CLIL) competences, and the participants were teacher educators and trainee teachers involved in voluntary bilingual teacher training programs in the German state Baden-Württemberg. The trainee teachers were trained for secondary education (grammar schools), and the educators were still actively teaching in those schools. Permission to conduct the study was obtained in advance from the university internal ethics committee and the Ministry of Education and Cultural Affairs of Baden-Württemberg, Germany.

Data Acquisition

The online questionnaire was open to all interested trainee teachers and educators in bilingual qualification programs. The subsequent interviews, which were conducted as a supplementary measure, were limited to questionnaire respondents who taught geography, political studies or economics. The teacher educators from all nine teacher training facilities with bilingual education qualification programs in the region were invited via email to complete the online questionnaire and forward it to their trainee teachers. Both unipark.com and, due to technical issues, soscisurvey.de were used for the questionnaire. The questions were in German and filtered according to the participant's status in the program. The questionnaire consisted of multiple-choice and open-ended items on the participants' backgrounds and beliefs. Additionally, participants were asked to rank CLIL competences derived from the literature on

bilingual education teachers' competences (Scherzinger & Brahm, 2023) and to assess their own competences on a scale from one to five. The derived competences were thereby adapted to the German context, where the underlying generalist teachers' professional model (Baumert & Kunter, 2013) is well known. Since the generalist teachers' model categorises knowledge of learning processes, assessment and classroom management under pedagogical/psychological knowledge, we followed suit. Other pedagogical/psychological knowledge facets, such as knowledge of information and communication technology (ICT), were named separately. Moreover, since critical consciousness is rarely used within the European CLIL context (Scherzinger & Brahm, 2023), it was left out and replaced by reflection. The average time needed to complete the questionnaire was 24 minutes.

If respondents indicated that they bilingually teach geography, political studies or economics, they were invited to an individual follow-up interview to complement the questionnaire data with subject-specific insights. The interviews were semi-structured and encompassed at least 11 questions. Due to the Covid-19 pandemic, they were conducted and recorded using zoom.us. Their duration ranged from 20 to 55 minutes.

Sample

Both parts of the study were based on a voluntary convenience sample. The questionnaire sample included 32 participants: 13 teacher educators and 19 trainee teachers. Teacher educators had between half a year and 34 years of educator and teaching experience. Four trainee teachers had already completed the bilingual qualification, but the remaining 15 were still actively participating. Most of the participants had acquired their language skills through their studies and stays abroad. Demographic information, such as the ages or genders of participants, was omitted to ensure data anonymity, a necessary precaution given the small sample size of bilingual teacher educators.

The interviews were conducted with four teacher educators, seven trainee teachers and one very experienced in-service teacher, who was included based on the strong

recommendation of another participant. The recording of one interview with a teacher educator was irreparably damaged due to technical problems during the interview, so it was excluded. The bilingual subjects taught by the questionnaire respondents and the interview partners are depicted in Figures 7 and 8.

Figure 7

Bilingual Subjects Taught by Questionnaire Participants – Multiple Responses Possible

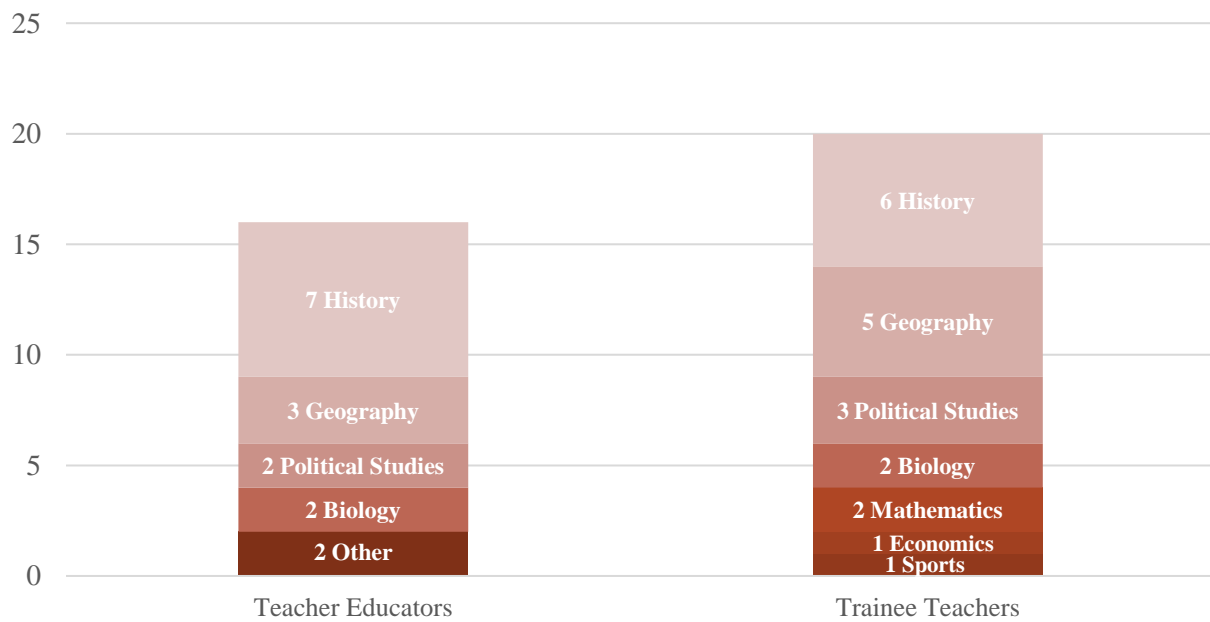
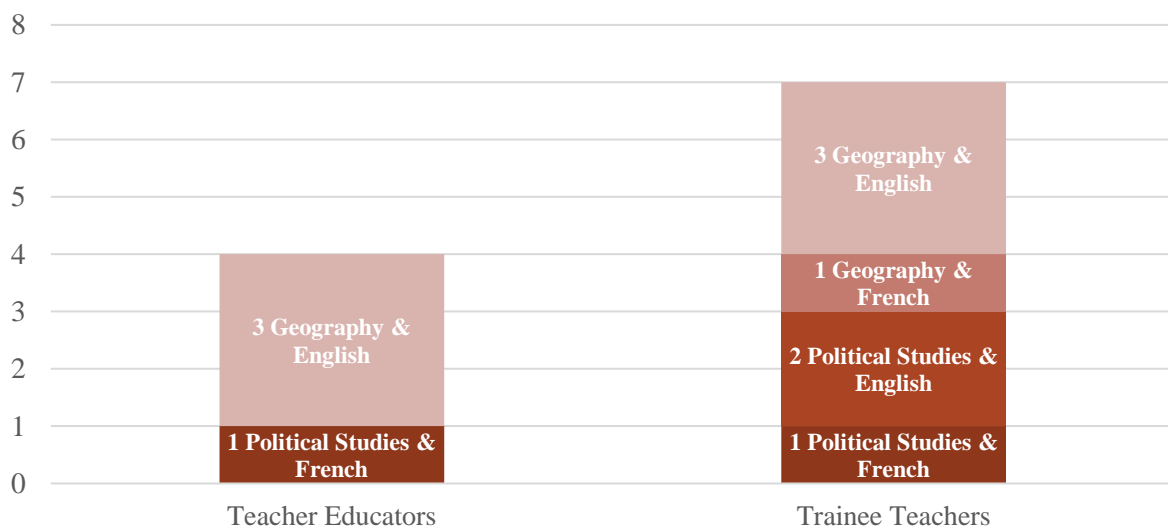


Figure 8

Bilingual Subjects Taught by Interview Partners



Note. None of the participants had actively taught economics bilingually, but three were able to make statements about it because they taught it monolingually.

Data Analysis

Questionnaire Data

The quantitative results of the competence ranking and the self-assessments in the questionnaire were descriptively analysed using JASP 0.16.01 (The JASP Team, 2018). The qualitative results from the open items were analysed and categorised in Microsoft Excel 2019 using the two professional competence models (Baumert & Kunter, 2013; Scherzinger & Brahm, 2023) and, later on, were compared with the interview-based codebook (Table 5). Only categories mentioned by at least three respondents in a group were included in the subsequent results.

Interview Data

The audio recordings of the interviews were transcribed, anonymised and analysed using qualitative content analysis (Kuckartz, 2018). The authors examined three transcriptions using MAXQDA Plus 2018 (Verbi GmbH, 2018) and discussed their assessment and coding strategies. The deductive (sub)categories derived from the interview guide were broadened through inductive subcategories. These subcategories were formulated based on the dimensions of the professional competence model (Baumert & Kunter, 2013) and their bilingual education-specific equivalents (Scherzinger & Brahm, 2023). The resulting codebook – all relevant categories, coding instructions and anchor examples – is shown in Table 5. This codebook was used to analyse four transcripts, and both authors' codings were compared. Since intercoder agreement in MAXQDA ranged from 90 to 100 per cent for the main categories and from 67 to 100 per cent for the subcategories, only the first author coded the remaining seven transcripts. The quotes in the following section were translated from German by the first author.

Table 5*Codebook for the Interview and Questionnaire Analyses*

Main category	Subcategory	Coding instruction	Anchor examples
Professional generalist teachers' competences	Content knowledge	Subject-specific content knowledge	'I definitely think content knowledge ... is a key point' (Trainee teacher 2)
	Beliefs/values/goals	Beliefs/values/goals about the importance and form of interpersonal relationships	'I find interpersonal competence very important, being able to respond to the students, being able to build up a relationship, to establish trust' (Teacher educator 2)
	Pedagogical/psychological knowledge	Knowledge of classroom management, methodology, assessment and diagnosis	'[T]his pedagogical intuition, the methodology, that you have an affinity for it and can also offer diversity' (Trainee teacher 7)
	Pedagogical content knowledge	Knowledge of pre- and misconceptions, tasks, representations, explanatory knowledge and ability to simplify content	'A good teacher communicates the content well so students can understand and work with it' (Trainee teacher 6)
	Motivational orientations	Motivational orientations related to teaching and the profession	'[T]he tactic is actually to empower oneself to develop' (Teacher educator 3)
	Knowledge of information and communication technology	Knowledge of the effective inclusion of media and technology for teaching	'Then, we must be technical experts On the other hand, we have to know about technology and media on a meta-level in order to use them effectively and, above all, we have to sensitise people to their use' (Teacher educator 3)
Professional bilingual education teachers' competences	Cross-curricular competences	Cross-curricular competences required by all bilingual teachers. Grouped according to the domains of the bilingual education-specific competence model	'[I]n bilingual education, [teachers] have to bring along the content knowledge, the language competence, which is extremely important in this combination and interlinks the whole thing' (Teacher educator 1)
	Language proficiency	Language proficiency of bilingual teachers and their knowledge of language learning	'[Teachers] should simply be able to convey the content linguistically. Because it is different when you study it then when you have to reproduce it and at a level where the children understand it' (Trainee teacher 5)

Results

Professional Teachers

The following results on professional teachers' competences are based on the *open-item responses* from the questionnaire and the *interview analyses*.

Questionnaire Results: Open Items on Professional Teachers

The questionnaire results are ordered according to the number of mentions, starting with *content knowledge*, which teacher educators almost completely agree is a requirement for professional teachers. This is followed by having a good relationship with the students, which falls into the main category of *beliefs/values/goals* and is supported by additional statements on the importance of being open and approachable. A third aspect regarded as essential by teacher educators falls into the category of *motivational orientations*, namely having fun teaching and working with kids and the subject. According to the teacher educators, *pedagogical content knowledge* and features of *pedagogical/psychological knowledge*, such as knowledge of methodology and effective class management, should also be present. Lastly, since being a teacher is a very demanding profession, teacher educators emphasise the importance of *self-regulation* and *reflection*.

In comparison, trainee teachers' agreement is highest regarding *beliefs/values/goals*; having a good relationship with their students is highest, and some stress that this relationship depends on the teacher's humour. *Motivational orientations* towards the subject, teaching and students are next in line, and only then does *content knowledge* follow. Trainee teachers also highlight various aspects concerning *pedagogical/psychological knowledge*, for example, a professional demeanour in front of the class, effective class management or knowledge of methodology and ICT. Last, a minority of trainee teachers also mention *pedagogical content knowledge*.

In addition to the differing order and number of mentions, only teacher educators highlighted self-regulation and reflection as important for professional teachers. With regard

to knowledge of ICT, professional demeanour in front of the class and humour, the situation is reversed, as only trainee teachers named these facets.

Interview Analyses: Statements on Professional Teachers

The questionnaire results are further supported by the **interview results**. All trainee teachers, teacher educators and the experienced in-service teacher emphasised *content knowledge* and *pedagogical/psychological knowledge* as indispensable. For example, trainee teacher 4 reported that ‘a good and professional teacher not only possesses content knowledge but also meets the students in a pedagogical-psychological way so they feel understood and seen.’

This quote hints at the importance of building a positive and trusting relationship with the students (*beliefs/values/goals*), which interviewees repeatedly linked to teachers being authentic, empathic, fair and ‘simply on equal ground’ with students. However, keeping an appropriate or professional distance was also emphasised.

In contrast to the consensus on the three aspects listed above, only one trainee teacher and one teacher educator mentioned the willingness to develop further (*motivational orientation*) and knowledge of ICT. Furthermore, apart from one trainee teacher, only the expert teacher and teacher educators pointed out that professional teachers need a ‘detailed knowledge of pedagogical content knowledge’ (Teacher educator 1), which encompasses the skills to adequately adapt and successfully communicate the content of the lessons.

Interestingly, self-regulation and organisational as well as counselling knowledge, as dimensions of teachers’ professional competence (Baumert & Kunter, 2013), were not mentioned in the interviewees’ elaborations.

Summary of the Results for Professional Teachers

Overall, three main aspects of professional teachers show high levels of agreement among both groups and data sets: content knowledge, beliefs/values/goals concerning the importance of a good relationship between teacher and students and a broad range of

pedagogical/psychological knowledge. Concerning the second research question, differences between teacher educators and trainee teachers are particularly evident in the questionnaire, in which only teacher educators mentioned self-regulation and reflection as relevant for professional teachers.

Professional Bilingual Education Teachers

The questionnaire results concerning professional bilingual education teachers include *open-item responses*, pre-set competence *rankings* and the participants' *self-assessments*. The interview analyses entail *cross-curricular competences* and anecdotal *subject-specific challenges* of bilingual education teachers.

Questionnaire Results: Open Items on Professional Bilingual Education Teachers

In terms of the open-item responses, teacher educators and trainee teachers listed competences aligned with those of generalist teachers, albeit with certain augmentations. First, most statements fell into the category of *pedagogical/psychological knowledge*, for instance, deepened knowledge of learning processes, assessment and methodology to provide appropriate scaffolding and feedback. Second, many respondents from both groups mentioned the necessity of (above average) *content knowledge* and *foreign language proficiency*. Third, they – primarily the teacher educators – stated that language barriers call for increased *pedagogical content knowledge* to break down content and language. Fourth, bilingual education teachers were depicted as requiring higher motivation, which corresponds to the *motivational orientation* category. Fifth, teacher educators named *interculturality* as a bilingual education-specific competence, which is needed to implement, for example, multi-perspectivity. Finally, only a clear minority of the respondents expressed the *belief* that there should not be a difference between generalist and bilingual education teachers.

Questionnaire Results: Competence Rankings

Participants were asked to rank 16 competences derived from the literature (Baumert & Kunter, 2013; Scherzinger & Brahm, 2023) and adapted to the German context. Table 6

illustrates the most frequently mentioned of the trainee teachers' and teacher educators' top five competences. Both lists entail language proficiency, motivation, pedagogical content knowledge, content knowledge and interculturality. However, most teacher educators also ranked reflection in their top five.

Table 6

Most Frequently Named Competences Across Respondents' Top Five Rankings

Teacher educators' top five competences	Trainee teachers' top five competences
Language proficiency (n = 9) (69%)	Language proficiency (n = 14) (74%)
Motivation (n = 9) (69%)	Motivation (n = 13) (68%)
Reflection (n = 9) (69%)	Content knowledge (n = 10) (53%)
Pedagogical content knowledge (n = 7) (54%)	Pedagogical content knowledge (n = 10) (53%)
Content knowledge (n = 6) (46%)	Interculturality (n = 9) (47%)
Interculturality (n = 6) (46%)	

Questionnaire Results: Self-Assessment of Competences

Next, the participants self-assessed their own competences on a five-star scale (with five stars representing very good and one star representing poor). This **self-assessment** yielded descriptive results (see Table 7) that highlight the differences between teacher educators and trainee teachers.

Overall, the values provided by the teacher educators were rather high (between 4 and 5), implying good and very good self-assessed competences. Motivation had the highest mean ($M = 4.85$, $SD = 0.38$), followed by reflection ($M = 4.69$, $SD = 0.48$), lesson planning ($M = 4.69$, $SD = 0.48$), knowledge of methodology ($M = 4.69$, $SD = 0.48$) and language proficiency ($M = 4.62$, $SD = 0.51$). Knowledge of research was rated as the teacher educators' poorest competence; however, it was still in the medium range ($M = 3.31$, $SD = 0.75$).

With respect to the highest mean, trainee teachers' results also listed motivation ($M = 4.84$, $SD = 0.50$) at the top and at a level comparable to that of the teacher educators. However, the second, third and fourth places were filled by different competences: knowledge of second language acquisition ($M = 4.58$, $SD = 0.61$), interculturality ($M = 4.53$, $SD = 0.61$) and cooperation skills ($M = 4.16$, $SD = 0.96$). The last, however, had a rather large standard deviation, which can also be observed in the teacher educators' values. The fifth highest, as well as the lowest, means once again corresponded between the groups: language proficiency ($M = 4.21$, $SD = 0.86$) and knowledge of research ($M = 1.95$, $SD = 0.78$), both with lower means for teacher trainees than for teacher educators.

Table 7

Means, Standard Deviations and P-Values of the Self-Assessed Competences

Bilingual teachers' competences	M	SD (TE)	M (TT)	SD	p-value
Motivation	4.85	0.38	4.84	0.50	0.764
Reflection	4.69	0.48	4.11	0.66	0.013*
Knowledge of methodology	4.69	0.48	3.42	0.77	< .001***
Lesson planning	4.69	0.48	3.53	0.70	< .001***
Language proficiency	4.62	0.51	4.21	0.86	0.210
Content knowledge	4.46	0.52	3.84	0.69	0.014*
Material design	4.54	0.66	3.95	0.78	0.028*
Second language acquisition	4.31	0.63	4.58	0.61	0.201
Pedagogical content knowledge	4.31	0.75	3.47	0.91	0.011*
Interculturality	4.15	0.69	4.53	0.61	0.120
Knowledge of ICT	4.08	0.86	4.00	0.82	0.807
Cooperation skills	4.00	1.08	4.16	0.96	0.0697
Pedagogical/psychological knowledge	3.92	0.86	3.42	0.77	0.167
CLIL background and theory	3.85	0.80	3.32	0.82	0.143
Self-regulation	3.69	0.63	3.63	0.68	0.750
Knowledge of research	3.31	0.75	1.95	0.78	< .001***

Note. TE = teacher educator; TT = teacher trainee. The scale ranged from 1 (poor competence) to 5 (very good competence), the highest and lowest means are greyed out and p-values are based on the Mann-Whitney U test. * indicates significance at $p < 0.05$ and *** at $p < 0.001$.

Interview Analyses: Cross-Curricular Competences of Professional Bilingual Education Teachers

In contrast to the questionnaire results, the interviewees' beliefs showed a range of seemingly individual priorities. There was no recognisable pattern, either for the teacher educators or for the trainee teachers. Nevertheless, their answers provide some reasons for their selection and ranking of bilingual education-specific competences.

First, teacher educator 1 underlined that bilingual education teachers need extended *content knowledge* due to the added intercultural focus: '[I]n addition to this level of content knowledge, we also have changes of perspective ... more than in any other subject.' However, being particularly well versed in a subject is only the first step, as they must next break down the content further (*pedagogical content knowledge*), taking into account students' language competences. A trainee teacher emphasised this challenging task of bilingual education teachers as follows: 'Studying [a subject at university and in German] is different from actually having to reproduce it [in English] at a level where the children understand it [and] where you are also able to answer the questions' (Trainee teacher 5). Other trainee teachers similarly stated that they needed to devote significant time and energy to finding and researching relevant subject-specific terms during lesson planning, and this need is also noted by teacher educator 2: '[M]any people have studied [their subject] in German, and doing all these [teaching] processes in English is a constant learning process. And you learn the language yourself in a new and different way.'

These additional challenges also give rise to an extended knowledge of methodology and assessment (*pedagogical/psychological knowledge*). Teacher educator 3 argued:

[I]t is actually possible that the student understood [the content] completely, but is not able to express it. And that is why [bilingual education teachers require] different tasks, media [and] many more diagnostic competences ... because [they] don't just do a content analysis but also a methodological and language analysis. (Teacher educator 3)

Trainee teacher 4 further stated that teachers ‘have to be careful that [bilingual education] does not become an elite class’ and pointed out that a great deal of differentiation is needed to make bilingual education accessible and fun for all students.

Due to the extensive lesson planning, research and material design, teacher educators and the expert teacher stressed that bilingual education teachers need a higher engagement (*motivational orientations*), which is not necessarily rewarded or acknowledged:

[A] professional bilingual teacher slaves away all day (laughs). That’s more or less how I can summarise it ... [W]hether you teach geography, economics or political studies [monolingually] or whether you teach it bilingually, unfortunately, you cannot tell from your payslip. (Expert teacher 1)

The only noteworthy divergence between the groups’ convictions emerged in their elaborations on the use of and *proficiency in the foreign language*. Interestingly, this contrasts with language proficiency being the number one priority in the questionnaire results. On one hand, almost all trainee teachers underscored their support for the inclusion of students’ first language during bilingual lessons. On the other hand, teacher educators either did not mention the utilisation of the first language or did so only in the sense of providing limited translations to the students while maintaining the actual interaction in the foreign language. The interviewed groups differed further in terms of the required level of foreign language proficiency. For instance, trainee teacher 1 emphasised the paramount importance of comprehensibility: ‘For me, it is not the most important thing to speak grammatically perfect French but simply that it is comprehensible.’ In comparison, trainee teacher 5 viewed language skills as more relevant but seemed to rank them below content-related competences: ‘The [teacher] could be completely competent in terms of content, but if you don’t make a good first impression in terms of language, then I think that’s a bit of a disadvantage.’ Finally, trainee teacher 6 found himself in the middle, taking a more pragmatic stance: ‘I think it is important

that [language skills are] there, but you shouldn't exaggerate it; otherwise, no one will dare to participate in the bilingual qualification program.'

In comparison, the expert teacher and the teacher educators stressed the need for high language proficiency because 'nothing works without language proficiency' (Teacher expert) and because it is required 'to stand up well in the subject area' (Teacher educator 1). Overall, 'language must never become a reducing factor in the teaching of content knowledge' (Teacher educator 1).

Interview Analyses: Statements on Subject-Specific Challenges

With regard to the long-standing CLIL social science subjects, limited anecdotal insights were provided due to the small sample size. For **political studies** and **geography**, *international content knowledge* emerged as a recurring theme: '[Y]ou not only have to prepare your own [political] system ... in the target language, but you also have to do this for the [political system of the] partner country' (Expert teacher). Moreover, for **political studies** and **economics**, a prevailing lack of learning materials was observed, which goes hand in hand with *more effort* and a need for additional *pedagogical/psychological knowledge* of material design and methodology: '[I]t requires a lot of creativity and inventiveness to create a bit of material and to try out methods because there is still no pool to fall back on' (Trainee teacher 2). In comparison, **geography** has available bilingual textbooks, but geographic 'data becomes outdated very quickly ... new facts have to be incorporated again and again' (Trainee teacher 3), which is described by teacher educator 2 as 'an insane amount of work'.

Summary of the Results for Professional Bilingual Education Teachers

In summary, our participants' *open answers* and *rankings* illustrated pronounced motivation and increased pedagogical/psychological knowledge, in particular regarding methodology, (extended) content knowledge and foreign language proficiency as the most prominent aspects and competences of professional bilingual education teachers. These were complemented by pedagogical content knowledge and interculturality, which allow the

teachers to break down and culturally enrich the content. Notably, only teacher educators were aligned about the importance of reflection.

The *self-assessment* of participants' competences revealed similar motivation levels, with teacher educators exhibiting overall higher values. Highly significant differences emerged in knowledge of methodology, lesson planning and research.

Moreover, interviewees underlined the lack of (suitable) learning materials as a *subject-specific challenge* of bilingual social science subjects, which brings forth a need for extra effort and motivation.

Discussion

This study closely analysed teacher educators' and trainee teachers' beliefs about the competences of professional generalist and bilingual education teachers by employing a combination of a questionnaire and interviews (RQ1), and our results allowed us to identify differences between the two participant groups' beliefs (RQ2). The following discussion recapitulates the results of the research questions and connects them with findings from different CLIL contexts.

Overall, comparing participants' beliefs about professional generalist and bilingual education teachers confirmed and emphasised the assumption that professional bilingual education teachers need more comprehensive and in-depth competences, which is also a central premise in the CLIL literature (Coyle et al., 2010; Marsh et al., 2011; Pérez Cañado, 2018b; Scherzinger & Brahm, 2023). Simultaneously, due to an increase in students' heterogeneity regarding languages, cultures and performance levels, the call for all teachers to receive training in bilingual education methodology has grown more pronounced (Wolff, 2012).

In both the questionnaires and the interviews, the teachers pointed out that motivation is relevant for both generalist and bilingual education teachers' professionalism. However, while regular teachers should enjoy teaching and working with students and their subjects, bilingual education teachers need increased motivation as a prerequisite for bilingual teaching

due to the lack of (suitable) materials and the additional workload required for lesson preparation. This shortage of materials and the requirement for CLIL teachers to be willing to go that extra mile are recurring themes in prior CLIL research (Ball et al., 2015; Cinganotto, 2016; Lazarević, 2022; Pérez Cañado, 2016). Furthermore, Hillyard (2011) underscores that a teacher's willingness for further development regarding CLIL basics, overall teaching approaches, working with others and designing materials are prerequisites for developing all the necessary CLIL competences.

The previously mentioned lack of bilingual teaching materials, especially in bilingual social science subjects, also highlights the need for extended pedagogical/psychological knowledge about material design. Our findings regarding this challenge were also supported for bilingual social science contexts in Kazakhstan (Kakenov, 2017). Moreover, cross-subject CLIL competence frameworks include aspects related to the selection and adaption of teaching materials (Marsh et al., 2011; Scherzinger & Brahm, 2023). For content teachers teaching CLIL, the selection of appropriate materials can therefore be difficult due to their lack of knowledge of the appropriate level of language needed by students (Lopriore, 2020).

In addition to knowledge of material design, this study's findings underlined the necessity for CLIL teachers to possess broad pedagogical/psychological knowledge concerning methodology and assessment. These results overlap with similar findings obtained from CLIL teachers in Spain (Durán-Martínez et al., 2022). Accordingly, Pavón and Ellison (2013) point out that CLIL 'entails a complete change in the pedagogical strategies used in the classroom' (p. 72). For example, they encourage participative classes and scaffolded input as indispensable strategies to ensure students' understanding. However, similar to uncertainties regarding material design, content teachers teaching CLIL have been shown to be unsure about CLIL methodology and its implementation (Pavón & Rubio, 2010).

In contrast with our study and a similar study in the Spanish context (Durán-Martínez et al., 2022), which both highlighted the need for (extensive) content knowledge, most CLIL

competence frameworks do not explicitly mention the need for that type of knowledge. However, they highlight the importance of viewing content from different cultural perspectives (Marsh et al., 2011) and that teachers need to know the content in a foreign language (Zhorabekova, 2015). Only the professional competence model for bilingual education points out that content knowledge and language proficiency should go hand in hand for bilingual education, which makes, for example, subject-specific language proficiency a necessity (Scherzinger & Brahm, 2023).

This need for professional CLIL teachers to enhance their language proficiency and tackle the often time-consuming process of acquiring subject-specific language skills emerged as an important topic among our study's participants. At the same time, the in-depth interviews revealed a broad range of viewpoints on the required level of language proficiency. This distinction regarding language proficiency requirements is not unique to our study and resonates internationally. For instance, in Italy, teachers can start CLIL training with a B1 level of competence in the foreign language, according to the Common European Framework of Reference, and aim to achieve a C1 level after the training (Cinganotto, 2016). In Serbia, a B2 is sufficient (Lazarević, 2022), whereas Hillyard (2011) points out that CLIL teachers' language skills should preferably be at the C2 level. Moreover, calls for subject-specific language skills in bilingual education settings are on the rise (Scherzinger & Brahm, 2023); this trend is evident in the concept of language knowledge for content teaching (Morton, 2018) and in classroom interaction competence (Escobar Urmeneta & Walsh, 2017). Finally, it has become apparent that content teachers teaching CLIL often lack self-confidence in their foreign language competences and face difficulties implementing new forms of assessment (Lopriore, 2020).

Interestingly, the explicit inclusion of students' first language in CLIL lessons was focused on only by the trainee teachers in our study, not by the teacher educators. Other research on experienced CLIL teachers also supports the value of actively including the first

language in lessons. This strategic use of the first language serves as a scaffold for improving language and content learning and can be used to, for instance, explain abstract vocabulary and concepts (Ertugruloglu et al., 2023; Lasagabaster, 2013). However, a review of Dutch CLIL subject pedagogies reveals a neglect of the potential for the integration of students' first language in the Dutch context (van Kampen et al., 2018). Moreover, some findings advocate for the usage of the first language in content knowledge tests, since utilising 'the foreign language as test language would underestimate students' content-subject knowledge and competences' (Canz et al., 2021, p. 11).

As expected, the trainee teachers self-assessed their competences to be lower than those of the teacher educators. This finding is in line with the results of a European self-assessment study involving different CLIL stakeholders (Pérez Cañado, 2016). However, the European study also indicated that teacher trainers exhibited rather pessimistic assessments of their own competences. In contrast, our results included very optimistic self-assessments. Lastly, our study revealed that knowledge of CLIL research emerged as the least developed competence across both participant groups, thus indicating a training need. This deficiency is also acknowledged as a training need in the aforementioned European study (Pérez Cañado, 2016).

Limitations and Future Research

Despite its valuable contributions to CLIL research, the present study has certain limitations. First, the participants were drawn from a convenience sample in southwest Germany, and are, therefore, not necessarily representative of CLIL teachers in secondary education in Germany as a whole. Second, our study centred on teachers' beliefs about professionalism and their self-assessed competences, devoid of direct observation of their classroom performance or objective competence measurements. However, research shows that teachers' self-assessments are quite reliable (Flores et al., 2010), and our study also demonstrates the assumed differences in competences between teacher educators and trainee teachers.

Nevertheless, these limitations have important implications for future research in bilingual education. For instance, it is necessary to complement the self-assessment of teacher competences with classroom observations, thus connecting educators' and trainee teachers' beliefs about professional bilingual education with their actual performance. Furthermore, future research should include other (European) countries to investigate country-specific beliefs about CLIL and professionalisation processes. While the focus on social science subjects aligns with their prevalence in German bilingual education (Kultusministerkonferenz, 2013), this can also be seen as a shortcoming of the study. Accordingly, another interesting field for future research is assessing how suitable certain teachers' subjects (and subject combinations) are for bilingual teaching in general. Interestingly, some of our trainee teachers mentioned doubts about the suitability of their subject, although we did not actively enquire about this.

Conclusion

Overall, the analysis of beliefs on professionalism, derived from bilingual education teacher educators and trainee teachers participating in bilingual teacher training programs in southwest Germany, revealed a convergent depiction of the perceived competence requirements. Central among these requirements were higher motivation and additional pedagogical/psychological knowledge concerning material design, methodology and assessment. These requisites were particularly relevant to bilingual social science subjects. Furthermore, expanded language proficiency and international content knowledge were perceived as fundamental aspects of professional bilingual teachers. These results actively contribute to the literature on bilingual education teachers' competences (Cortina-Pérez & Pino Rodríguez, 2022; Scherzinger & Brahm, 2023), their training (e.g., Pérez Cañado, 2016) and their beliefs (e.g., Durán-Martínez et al., 2022).

Since it is not easy to acquire these extensive competences, and European CLIL teachers still indicate profound training needs (Pérez Cañado, 2016), our research calls for more

training opportunities for in-service teachers. Furthermore, our results underscore the need for more subject-specific materials to alleviate teachers' planning burdens. Additionally, we recommend that all pre-service teacher training facilities draw attention to bilingual education in the early stages of initial training. This recommendation is based on the observations made by bilingual education teachers, who emphasised that CLIL teaching not only entails a change in their teaching approaches and classroom practices (San Isidro, 2017) but also represents a welcome challenge to their professional lives (Lopriore, 2020). Moreover, interested pre-service teachers could begin to pay attention to the improvement of the required CLIL teacher competences early in their development. Last, the introduction of all teachers to CLIL methodologies, multi-perspectivity and interculturality might be an effective measure to raise their awareness of language-/culture-sensitive and differentiated approaches and could address students' increased heterogeneity. This, in turn, could be a first step towards countering the disengagement-oriented challenges and crises of the 21st century.

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4. Study 3: Linguistic Complexity Analysis of English Bilingual Economics Materials from Germany

Scherzinger, L., Brahm, T., De Kuthy, K., & Meurers, D. (2023). Linguistic Complexity Analysis of English Bilingual Economics Materials from Germany. [Manuscript in preparation]. Faculty of Economics and Social Sciences, University of Tübingen.

Abstract

In the era of globalisation, trade and cooperation have become increasingly international, with English serving as the lingua franca of global economic processes. Consequently, integrating intercultural and international topics into economic education and enhancing students' language competences are becoming increasingly important. This drives the adoption of bilingual economic education with English as an additional language, which in turn facilitates the use of authentic task-based language teaching. For the successful integration of bilingual education in schools, textbooks need to balance two simultaneous demands: comprehensibility for the target group and potential for language development. In light of this, we systematically analysed English bilingual economics learning materials in terms of linguistic complexity, considering grade level, text types and potential adaptation processes. The learning materials encompassed all existing English bilingual economics materials from Germany ($n = 30$), ranging from textbooks to single lesson plans. The analyses revealed a non-systematic and possibly disadvantageous progression in complexity across secondary grade levels and unanticipated differences between text types, notably in lexical richness. These results underline the necessity of a stronger focus on language (level) sensitivity for the development and selection of bilingual economics materials, for instance, through the cooperation of publishers, linguists and teachers. Furthermore, given the lack of learning materials in bilingual economic education, they underscored the critical nature of fostering knowledge of material design in bilingual training programs.

Keywords: linguistic complexity, bilingual education, economic education, learning materials, secondary school

Introduction

Learning materials are indispensable in educational contexts. They can be characterised as information and knowledge depicted in various formats and media and usually employed with the goal of attaining the intended learning outcomes (Mehisto, 2012). Learning materials play a crucial role in shaping daily classroom teaching, as they exert a significant influence on teachers' decisions and students' learning (Ball & Cohen, 1996; Roblin et al., 2018). Students recognise learning materials, for instance in the form of textbooks, as a cost-effective opportunity for revision and progress (Tomlinson, 2012), since materials, in contrast to teachers, are always present (Ball et al., 2015). Moreover, they can make learning requirements and goals visible to students (Mehisto, 2012). Additionally, teachers' use of existing materials may save preparation time and influence their teaching because learning materials are often enriched through pedagogical guidance for teachers (Roblin et al., 2018). Finally, for administrators, learning materials can serve as a basis for more standardised teaching (Tomlinson, 2012). Therefore, learning materials not only provide necessary information but also actively facilitate learning (Filardo Llamas et al., 2011), teaching and administrative processes.

However, the process from material development to effective implementation in the classroom is complex. Existing materials must be carefully selected and adapted to accommodate various student and teaching requirements. Sometimes, teachers even have to create materials, which is particularly time-consuming in the context of content and language integrated learning (CLIL) due to its dual focus on content and language. With this in mind, it is unsurprising that CLIL is marked by a lack of available materials (Ball et al., 2015; Coyle et al., 2010; Scherzinger & Brahm, 2023a). As CLIL, which employs an additional language as the medium of instruction in non-language subjects, is the European approach to bilingual education (Nikula, 2017), it is appropriate that CLIL materials serve a dual purpose of fostering (academic) content knowledge while simultaneously immersing students in the additional

language (Morton, 2013). High-quality CLIL materials are characterised by, for instance, authentic language use, clear learning goals, a safe and cooperative learning environment and the inclusion of different kinds of formative assessments (Mehisto, 2012). Additionally, since learning in a foreign language can be very demanding for students, appropriate scaffolding regarding language, content and learning within the materials becomes all the more important (Mehisto, 2012). In the process of creating or adapting high-quality CLIL learning materials, it is a major challenge for CLIL teachers to adhere to these quality criteria. This challenge is connected to the necessity of choosing an appropriate language level that facilitates learning while avoiding cognitive overload for students. All in all, CLIL material development puts high demands on teachers' expertise and entails a considerable workload (Morton, 2013).

For many years, the development and examination of general language learning materials were disregarded by applied linguists, and these only gained recognition in the 1990s (Tomlinson, 2012). In comparison to this development in the field of second and foreign language education materials, research on CLIL materials is still scarce. Although guidelines and criteria for CLIL material development or evaluation are available on a theoretical level (e.g., Ball et al., 2015; Coyle, 1999; Filardo Llamas et al., 2011; López Medina, 2016; Mehisto, 2012), to our knowledge, only two studies have employed such criteria to discursively (Filardo Llamas et al., 2011) or quantitatively (Marongiu, 2019) analyse the suitability of materials for a CLIL classroom. On the whole, there remains a notable lack of linguistic research on the adequacy of existing materials. Therefore, we follow Banegas and Hemmi's (2021) call for more research on locally or teacher-generated CLIL materials. Consequently, this study aimed to linguistically examine the English texts within CLIL materials designed for economics instruction in Germany. The research was undertaken through the lens of complexity analyses.

Material Guidelines for CLIL

In this section, the previously mentioned broad range of theoretical guidelines for CLIL materials is broken down into four criteria relevant to linguistic analyses of CLIL textual

materials. The criteria are framed within the 4Cs Framework (Coyle, 1999, 2007) and its successor, the pluriliteracies approach (Meyer et al., 2015). The 4Cs Framework comprises content, communication, cognition and culture as intertwined pillars for effective CLIL education (Coyle, 2007); however, it does not provide practical guidance for implementation. Meyer et al.'s (2015) pluriliteracies approach uses the 4Cs as its basis but emphasises the importance of subject-specific literacies for deep learning processes; it includes practical advice.

The first relevant criterion is the comprehensible input theory, which originated in second and foreign language education but is equally pertinent to bilingual education and CLIL (Krashen, 1996). This theory emphasises that the learning materials' language level must be comprehensible to facilitate language learning – slightly above the learner's current proficiency level (Krashen, 1981; Vygotsky, 1978). Additional CLIL-specific material guidelines support the centrality of comprehensible input. For example, Meyer (2010) highlights that input needs to be challenging. Moreover, communication, content and cognition, as three intertwined aspects within the CLIL-guiding 4Cs Framework (Coyle, 1999), further support the connection between the comprehensibility of learning materials and successful (language) learning, and these recommendations are further supported by empirical research. A meta-analysis of meta-analyses by McField and McField (2014) illustrates that bilingual education programs featuring comprehensible language input have a modest positive effect on students' academic English achievements in comparison to all-English (non-CLIL) students' achievements.

Two additional criteria for high-quality CLIL learning materials are meaningfulness and authenticity regarding language input and use (e.g., Mehisto, 2012; Meyer, 2010). Here, meaningfulness means that materials should relate to global phenomena and problems as well as to students' everyday lives (Meyer, 2010). The latter implicitly touches on the theme of culture, which is the last aspect of Coyle's (1999, 2007) 4Cs Framework.

The fourth criterion for CLIL material development is language support through scaffolding (Ball et al., 2015; López Medina, 2016; Mehisto, 2012). In general, scaffolding entails the provision of temporary support measures to aid students in completing previously unsolvable tasks (Belland, 2014; Ertugruloglu et al., 2023). Scaffolded language support is all the more important for CLIL because cognitive load theory stresses that conscious effort is needed to acquire either foreign language or content knowledge (Sweller, 2016). Consequently, the unsupported and cognitively demanding task of simultaneously learning a language and content might result in counterproductive effects on CLIL students' language and content learning (Roussel et al., 2017). For instance, reading a text in a foreign language without any language support has been shown to be suboptimal for the retention of subject-specific vocabulary (Gablasova, 2014). This drawback is noteworthy because subject-specific literacies are of great importance for the internalisation of conceptual knowledge, as the pluriliteracies approach emphasises (Meyer et al., 2015). Therefore, scaffolding to foster academic language proficiency (Mehisto, 2012) and subject-specific literacies (Meyer et al., 2015) are crucial aspects of the fourth criterion.

Overall, these four CLIL guidelines emphasise the importance of comprehensive, authentic, meaningful and scaffolded input for learning. Therefore, a text-based analysis of learning materials that focuses on linguistic features such as clause or phrase complexity and lexical density (e.g., Filardo Llamas et al., 2011) seems promising for (the training of) bilingual economics teachers and the future production of learning material.

Teachers' Challenges Concerning CLIL Materials

The use of materials within the classroom is markedly contingent upon teachers; therefore, their challenges with CLIL material development are worthy of discussion. A first challenge stems from the overall lack of CLIL materials. This is mainly caused by publishers perceiving CLIL materials as an expensive and often not worthwhile investment since CLIL is (still) a niche market (Ball et al., 2015). Nevertheless, as teaching requires at least some

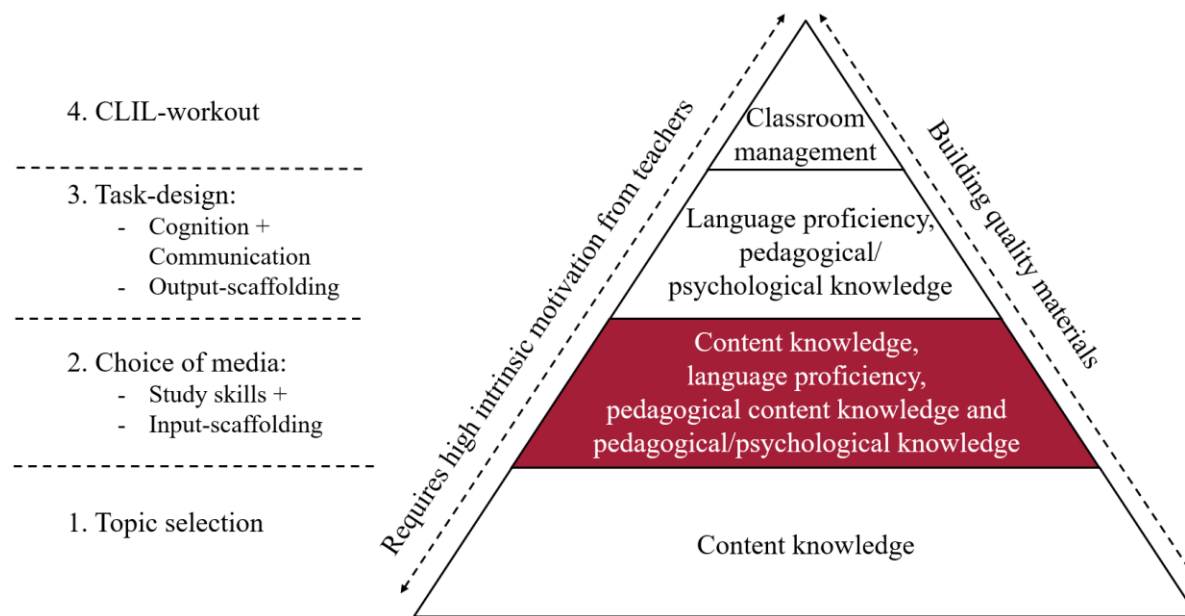
materials, teachers utilise various coping strategies. A first possibility is to directly translate existing content materials from the first language. However, this approach has been shown to be insufficient because such materials do not consider the additional hurdles of learning in a supplementary language (Ball, 2018). This deficiency could potentially demotivate learners (Czura, 2017). A second possibility involves sourcing native language books on the subject, which fulfils the criterion of authentic input since these books provide learners with realistic examples of genuine language use. However, this is also suboptimal since these materials were designed for native speakers and often lack language support (Ball et al., 2015). Consequently, teachers must ensure that authentic materials match their students' linguistic level and affective needs and are cognitively accessible (Lorenzo, 2008; Morton, 2013). The latter is also relevant to existing CLIL materials, as some have been shown to be oversimplified regarding content or to lack higher-order thinking tasks (Banegas, 2014). Finding the right balance between content and linguistic explanations is, therefore, crucial when adapting materials (Moore & Lorenzo, 2007). A last option is to produce one's own learning materials, which is a very time-consuming and effortful endeavour that is frequently undertaken by many CLIL teachers (Lorenzo, 2008). However, this coping strategy demands increased teacher competences (Scherzinger & Brahm, 2023a).

Necessary Competences for CLIL Material Development

To illustrate the CLIL-specific competences necessary to meet with the high requirements of CLIL material production, this section brings together the CLIL-Pyramid (Meyer, 2010) and the bilingual education-specific professional competence model developed by Scherzinger and Brahm (2023b). The CLIL-Pyramid depicts the process of creating high-quality CLIL materials and can be linked to many of the bilingual education teacher competences summarised in the CLIL-specific professional competence model (see Figure 9).

Figure 9

Extended CLIL-Pyramid (adapted from Meyer, 2010, p. 24; Scherzinger & Brahm, 2023a, p. 11)



The foundational level of the pyramid concerns topic selection, which requires CLIL teachers to possess sufficient content knowledge. On the second level – most relevant for our study – teachers should choose suitable (multimodal) media and learning materials, as well as decide on the degree of scaffolding that students need to cope with the input. In addition to language proficiency and pedagogical content knowledge (Baumert & Kunter, 2013), particularly with regard to merging language, content and learning, this level demands several facets of pedagogical/psychological knowledge (Baumert & Kunter, 2013), namely knowledge of material design, of learning processes, of information and communication technology and of second language acquisition (Scherzinger & Brahm, 2023). The third level of the pyramid aims to encourage students' higher-order thinking and give them opportunities to use language authentically through a scaffolded and appropriate task design. This level underlines once more the need for teachers with language proficiency and knowledge of learning processes and second language acquisition; additionally, it requires knowledge of assessment, methodology and, ideally, research. CLIL-Workout, which is the topmost level of the extended CLIL-Pyramid, describes the actual materials used within the classroom and requires CLIL teachers to possess knowledge of classroom management. At each level of material production, the

teachers must exhibit high (intrinsic) motivation, as CLIL material development is a laborious process. In fact, the strenuous challenge of creating bilingual education materials is even seen as a reason for teachers to leave bilingual education altogether (Amanti, 2019).

In summary, the lack of available CLIL materials is at least partially caused by the challenge of their creation, which is very demanding and requires many CLIL competences. Consequently, there are calls for a general increase in teachers' skills regarding material preparation and for the establishment of material-sharing networks (Morton, 2013). Another suggestion involves the inclusion of material evaluation in CLIL teacher training (Marongiu, 2019). One possibility to reduce teachers' burdens is the inclusion of technology in CLIL material development (Abril, 2017). For example, innovative online text search tools like FLAIR (<https://flair.schule/FLAIR/>) that possess filters for linguistic text features could support teachers in choosing suitable texts for CLIL.

CLIL (in the Subject of Economics) in Germany

As preparation and reasoning for the subsequent complexity analysis of English economics materials for CLIL in Germany, the following section elaborates on the circumstances of CLIL in Germany and the general suitability of economics for a CLIL format. The reconciliation of Germany and France in the 1960s represents the start of CLIL or bilingual education in Germany (Breidbach & Viebrock, 2012). At first, programs used French as the additional language; however, due to the advancement of English as the lingua franca in the 1990s, the quantity of English-language programs has since far outnumbered those in French (Breidbach & Viebrock, 2012). German CLIL is generally content-oriented, as it lacks CLIL-specific curricula and follows the general curriculum of the subject instead (Rumlich, 2017). Additional recommendations related to CLIL-specific learning objectives or materials are therefore a rarity.

In Germany, CLIL programs usually begin in secondary education and are offered on a voluntary basis. German CLIL students typically receive additional English classes in grades

five and six before they are taught a non-language subject, such as geography or economics, in English (Siepmann et al., 2021). Bringing forth students' subject-specific literacy in German and English gives reason for the usage of both languages in the classroom (Siepmann et al., 2021). A speciality of teacher education in Germany is that teachers are formally trained in a minimum of two subjects, which explains why German CLIL teachers are often qualified to teach a foreign language and a non-language subject (Breidbach & Viebrock, 2012). However, specialised CLIL training is not necessarily included or offered during initial teacher education (Siepmann et al., 2021). Nonetheless, CLIL teachers with training in two subjects provide a good precondition for quality CLIL teaching.

At the same time, the strong content orientation of German CLIL emphasises that the suitability of the subject for CLIL is important. The subject of interest for this study is economics, which was introduced in 2016 as a mandatory subject for grades eight, nine and ten in grammar schools in the German state Baden-Württemberg. However, it is also present as a subject in other secondary school types and German states, often in combination with social science. Economics has not yet been established as a common bilingual subject; yet, it has great potential as a bilingual format with English as the additional language. One reason is that economics curricula regularly cover topics such as international affairs and globalisation, while also applying multi-perspectivity to these topics. Another reason is the recognition of English as the lingua franca of the business world (Hernandez-Nanclares & Jimenez-Munoz, 2017), which allows for authentic and student-centred task-based language learning. Nevertheless, bilingual economic education is still a niche phenomenon and is, therefore, accompanied by a lack of available learning materials (Scherzinger & Brahm, 2023b).

This Study

Given that economics is well-suited to being a CLIL subject and that there is a lack of related CLIL learning materials and a general shortage of linguistically focused research on such materials, this study bridges both a practical and a theoretical research gap. It contributes

to the literature by exploring the linguistic complexity of all available English bilingual economics materials from Germany. Of particular interest is the variability of the resulting linguistic features and their differentiation between grade levels and between adapted, directly quoted and redactional texts, as is the modification of linguistic complexity to prepare and low-level scaffold adapted sources. The following research questions guided this study:

RQ1. Does the materials' variability in linguistic complexity features differ between secondary grade levels?

RQ2. Does the analysis of the materials reveal a difference in text complexity between adapted, quoted and redactional texts?

RQ3. Which linguistic features were changed during the modification (scaffolding) of externally quoted texts?

Since learning materials should neither challenge students too much nor too little and as students' language abilities improve over time, the complexity of the linguistic features should increase from grade to grade (Berendes et al., 2018; Bryant et al., 2017). However, a previous linguistic complexity analysis of German geography textbooks has shown that this does not happen systematically (Berendes et al., 2018). This makes a close examination of the development across grade levels and across text types all the more relevant.

Overall, this study extends the prior research on bilingual education materials (e.g., Mehisto, 2012), on subjective perceptions of CLIL materials' quality (e.g., Barrios & Milla Lara, 2020; Morton, 2013; Waloyo et al., 2021) and on practical workshops on material development (e.g., Banegas, 2016) by exploring the use of computational analyses to identify characteristic linguistic features of bilingual economics learning materials. The results can guide the creation of bilingual economics learning materials and provide practical implications for publishers and CLIL teachers. Therefore, our research contributes to a better understanding of bilingual economic education and its requirements concerning materials as well as the further training of bilingual economics teachers.

Methods

Bilingual Economics Materials

We compiled a total of 30 teaching and learning materials for bilingual economic education with English as the additional language to German. The materials are from 10 publishers and range from whole textbooks to single lesson plans. Most ($n = 18$) are aimed at bilingual economics and bilingual social science education, as some German states only teach economics in combination with social science (see section CLIL (in the Subject of Economics) in Germany). The target group of the materials are secondary school students in community schools, secondary modern schools, grammar schools and vocational schools. Consequently, some materials cover the so-called secondary level 1, ranging from grades 5 to 10 ($n = 11$). Others address secondary level 2, which ranges from grade 11 to grade 13 ($n = 12$). Finally, some can be used at both secondary levels ($n = 7$). To gain insight into publishers' processes of modification of sources, the original external sources of one exemplary material with many adapted texts were additionally researched and gathered digitally.

Preparation of Bilingual Economics Materials

After acquisition, all hard copy materials were scanned because we needed digital formats of all materials to extract the plain texts with Adobe Acrobat Pro's optical character recognition. Since only the English content-related plain texts of the learning materials were of interest to us, the texts were closely revised in the sense that author information, instructions for teachers, solutions to tasks, German texts, headings or vocabulary and source references were removed.

As preparation for the insertion into the actual analysis tool, the texts needed further modification on a textual level. First, misrecognised letters were corrected, and any remaining German mutated vowels were replaced (ä, ö and ü became ae, oe and ue). Second, the individual texts were manually categorised with labels such as expository text, summary,

instruction, definition, interview, exercise, modified source or original source. After all plain texts had been labelled, they were split into individual files.

For this study, only the texts' main bodies, consisting of redactional and externally quoted texts, were of interest. Redactional texts describe a superset of all texts labelled expository text, summary or instruction. Originally, interviews were also included but were later excluded because there was only one interview in all of the materials. Externally quoted sources encompass two distinct subsets, adapted sources (e.g., paraphrased or shortened material) and directly quoted sources. Table 8 shows the sample sizes for these sets and their secondary levels.

Table 8

Overview of the Number of Texts and Their Assigned Secondary Levels

Secondary level (Sec)	Number of texts		
	Redactional texts	Externally quoted sources	
	<i>Expository texts (n = 920)</i>		
	<i>Summaries (n = 93)</i>	<i>Adapted</i>	<i>Directly quoted</i>
	<i>Instructions (n = 57)</i>		
Sec1	96	24	28
Sec1 and Sec2	124	42	186
Sec2	846	38	145
Total (n = 1529)	1066	104	359

Linguistic Complexity Analysis

Since linguistic complexity measures are indicative of educational language development (Weiss & Meurers, 2019), computational linguistic complexity analyses were performed for each text using the Common Text Analysis Platform (CTAP; Chen & Meurers, 2016) for English texts. A total of 889 linguistic complexity measures per text were then descriptively analysed and graphically depicted using RStudio. We initially focused on obtaining informative results regarding the linguistic measures highlighted as crucial for text

comprehension within educational settings by Berendes et al. (2018) and Bryant et al. (2017). Subsequently, all other measures were exploratively examined. Table 9 shows an overview of the chosen informative measures. The means and their 95% confidence intervals were calculated and used to depict the linguistic complexity measures across secondary levels and to distinguish between redactional and externally quoted texts (adapted versus directly quoted sources). If the confidence intervals did not overlap, the differences between the school levels or text types were considered significant. Moreover, the adapted and researched original texts of the exemplary learning material were analysed and compared using violin plots. The violin plots used here depict the median as an inherent data divider but also the density in the form of two kernel density curves. These analyses were carried out to highlight which features were changed and, therefore, deemed suitable for text adaptation.

Table 9*Overview of the Informative Linguistic Complexity Measures*

Measure	Description and reasoning for inclusion	Included linguistic complexity feature	Relevant RQ
Surface measures	Surface measures like sentence and word length are well established in research on complexity and readability (Berendes et al., 2018).	Average sentence length in words	RQ1, RQ2, RQ3
		Average word length in syllables	RQ1, RQ2
		Number of words	RQ3
Lexical complexity measures	Type-token ratios (TTR) compare the unique terms (types) with all words (tokens) included in a text and give insights into a text's lexical richness (Berendes et al., 2018; Torruella & Capsada, 2013).	Measure of Textual Lexical Diversity	RQ1, RQ2, RQ3
		Root TTR (NGSL easy lexical words)	RQ1, RQ2
		Root TTR (NGSL sophisticated lexical words)	RQ3
Syntactical complexity measures	Syntactical complexity features like dependent clauses can negatively affect text comprehension due to an increase in cognitive load (e.g., Berendes et al., 2018; Karlsson, 2007).	Dependent clauses per sentence	RQ1, RQ2, RQ3
		Complex nominals per clause	RQ1, RQ2
		Verb phrases per sentence	RQ3

Note. NGSL = New General Service List (Brezina & Gablasova, 2015).

Results

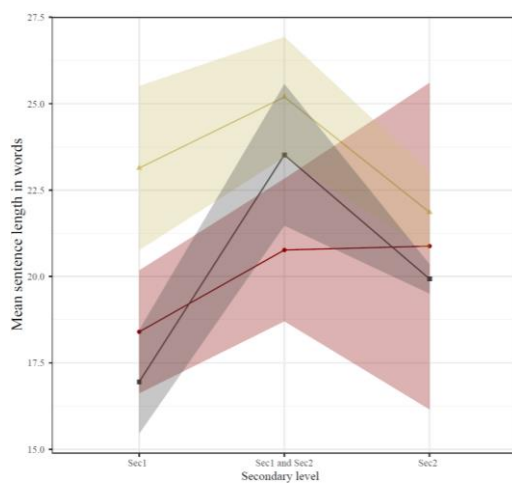
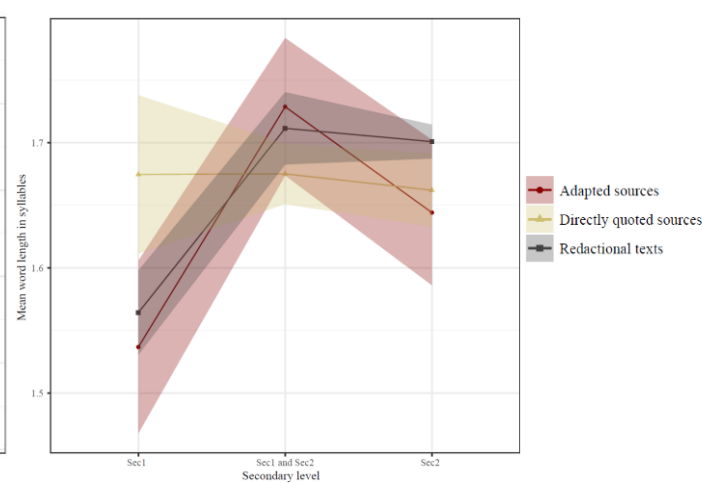
This section presents the results of the text-based linguistic complexity analysis of the bilingual economics materials, including surface, lexical and syntactical measures. To answer the first and second research questions, it begins with a presentation of figures that depict the difference in complexity between redactional texts and externally quoted sources, as well as their secondary levels. Then, the linguistic differences between modified and original texts are illustrated to show the changes made and address the third research question.

Redactional Texts Versus Externally Quoted Sources

Linguistic *surface measures* concerning sentence and word length present the first included measures. These consist of average sentence length in words (Figure 10) and average word length in syllables (Figure 11). Figure 10 shows that the average sentence length in words of all text types intended for secondary level 1 is lower than that of texts for the combination of secondary levels and, except for directly quoted sources, for texts for secondary level 2. However, in comparison to the sentence length of texts for secondary level 2, the texts for both levels have, on average, longer sentences (directly quoted sources and editorial texts) or sentences of approximately the same length (adapted sources). Overall, the mean sentence length of directly quoted sources is not only always higher than that of the other text types, but these differences are statistically significant for all text types on secondary level 1 and for adapted sources on the combined secondary level. The latter can be derived from the non-intersecting confidence intervals (see Figure 10).

A first observation regarding the average word length in syllables (Figure 11) concerns the narrower confidence intervals compared to the first figure, which indicates a generally lower fluctuation across text types. Moreover, the mean word length of directly quoted sources is similar across all levels, whereas adapted sources and redactional texts show the highest values for texts intended for both the secondary 1 and 2 levels, followed by those for secondary

level 2 and, the lowest, for level 1. Finally, the mean word length of directly quoted sources for secondary level 1 is significantly higher than that of the other text types on that level.

Figure 10*Average Sentence Length in Words***Figure 11***Average Word Length in Syllables*

The third and fourth measures are *lexical complexity features* based on type-token ratios. The higher the value of the features, the higher the lexical richness/diversity. Figure 12 depicts the Measure of Textual Lexical Diversity (MTLD; McCarthy, 2005) of all words, excluding punctuation and numbers. The MTLD calculates type-token ratios for segments of a text and is independent of text length (Torruella & Capsada, 2013). In comparison, Figure 13 shows the root type-token ratio (TTR) between easy lexical words and all words. Lexical words include nouns, adjectives, verbs and adverbs, and CTAP (Chen & Meurers, 2016) defines easy words as the top 1000 words within the New General Service List (NGSL; Brezina & Gablasova, 2015). Both graphs show similar characteristics and progressions; therefore, they are presented and interpreted together. The most striking feature of both is that the lexical diversity values of the directly quoted sources and the redactional texts for secondary level 2 are lower than their values for level 1 and the combined level. Additionally, the lexical richness concerning all words and easy lexical words only increases throughout the levels for adapted sources, whereas for the other text types it peaks at the combined secondary level. Last, both measures for lexical richness show significant differences between all three text types used in

secondary level 2, with redactional texts having the lowest values, followed by directly quoted sources and then adapted sources.

Figure 12

Measure of Textual Lexical Diversity

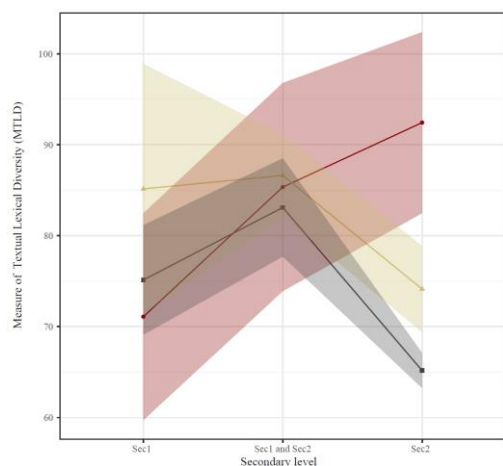
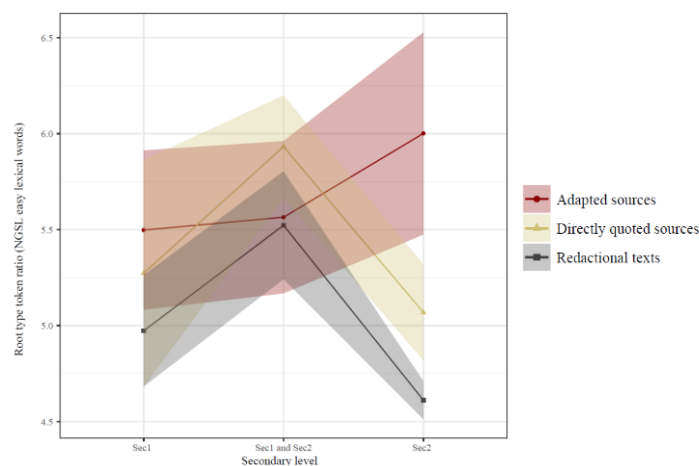


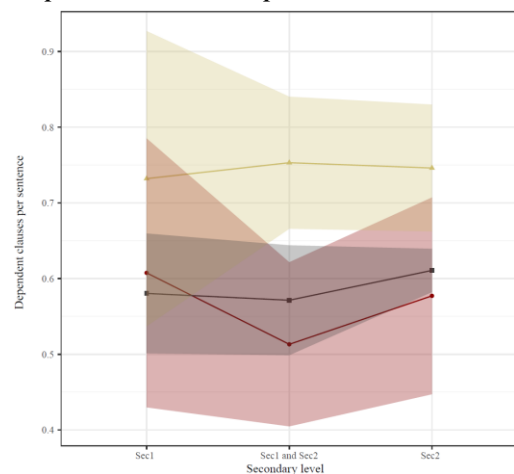
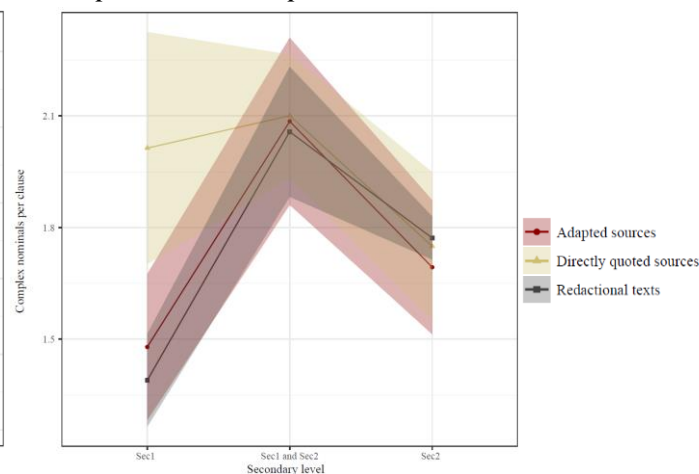
Figure 13

Root TTR (Easy Lexical Words)



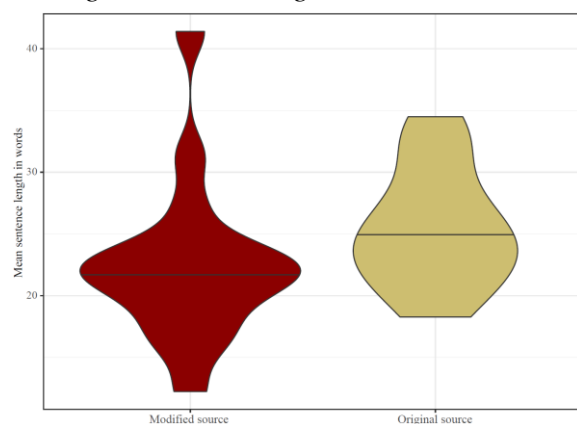
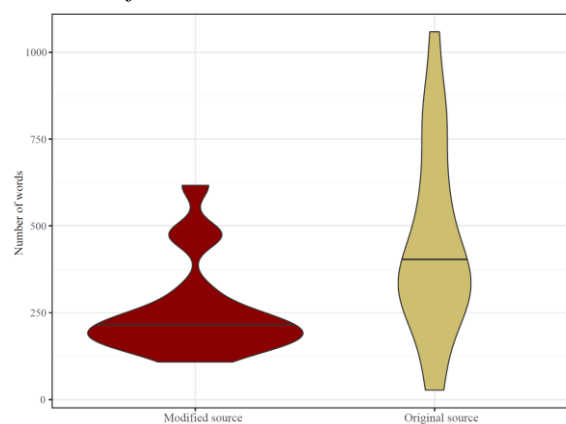
The fifth and sixth measures examine the text types through *syntactical complexity features*, namely the number of dependent clauses per sentence (Figure 14) and the average number of complex nominals per clause (Figure 15). Both can influence text comprehension. Figure 14 illustrates that the number of sentence-based dependent clauses is relatively comparable across all secondary levels. However, there are significant differences in the relative numbers among certain text types and their corresponding levels. Specifically, directly quoted sources appear to use dependent clauses, on average, more often than redactional texts and adapted sources. For texts used in secondary levels 1 and 2 and for redactional texts on secondary level 2, this difference is statistically significant.

In contrast, except for secondary level 1, where the number of complex nominals per clause is significantly higher in directly quoted sources than in other text types, all the remaining means are quite similar. Additionally, for all text types, values increase from level 1 to the combined level and decrease from the combined level to secondary level 2 (see Figure 15).

Figure 14*Dependent Clauses per Sentence***Figure 15***Complex Nominals per Clause***Comparison of Modified Versus Original Exemplary Texts**

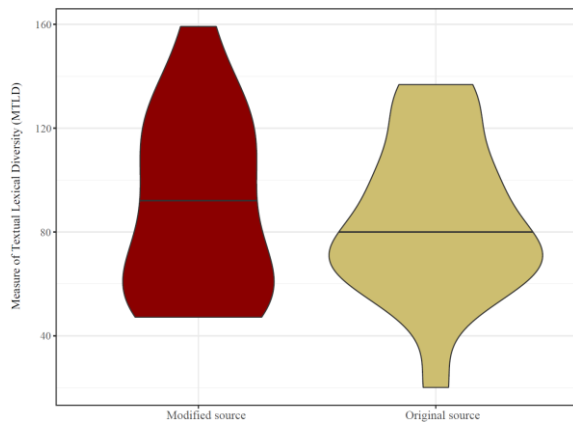
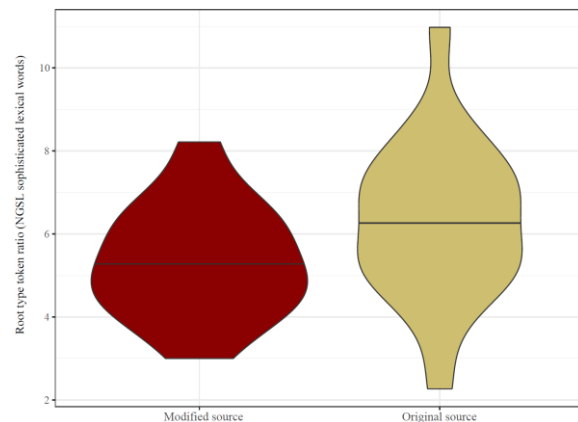
This section outlines the change results of a comparison between the modified sources of one exemplary learning material (which featured many modified sources) and the additionally researched original sources. The changes represent possible scaffolding approaches by the author/publisher of the learning material to enhance text comprehension for students. The analysis began with informative results regarding the previously used surface, lexical and syntactical complexity measures. Additionally, supplementary exploratory features were added to clarify the results.

The two violin plots, representing the mean sentence length of the texts (Figure 16), show a lower median for the modified source (depicted in red). The wide body around the median illustrates the high frequency of sentences with this length. While the upper outliers of the modified sources indicate that some sentence lengths exceed the originals' lengths, the adapted sentence lengths tend to be similar to or shorter than the original sentence lengths. This observation is also supported by Figure 17, which depicts changes in the overall text length. Although the distribution of the number of words for modified texts is multimodal, the widest section of the violin plot being slightly below the median of 230 words indicates a high density of texts with this lower word count. In contrast, the respective median for original texts is 375 words, and the overall data distribution of the original texts' length is less concentrated.

Figure 16*Average Sentence Length in Words***Figure 17***Number of Words*

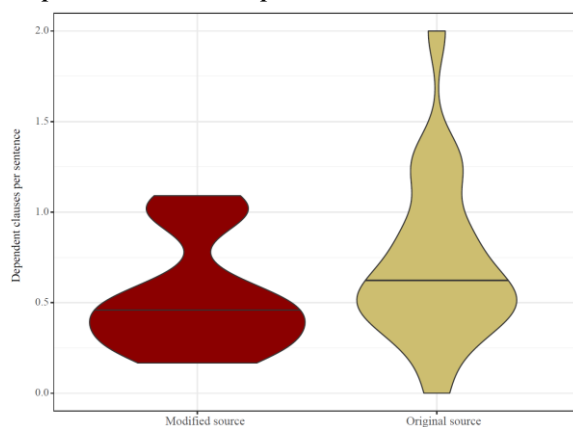
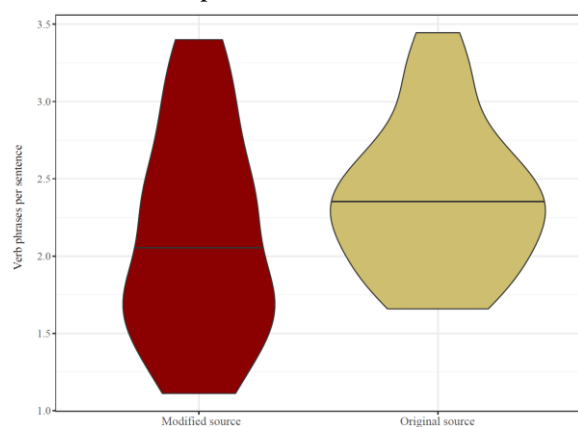
The following two measures encompass the lexical complexity features MTLD (Figure 18) and the root TTR of sophisticated words (Figure 10) and give insight into the lexical richness of the texts. First, the two MTLD violin plots illustrate a median of 80 for the original sources, which is lower than the median of 95 for the modified sources. Furthermore, the MTLD densities of the original sources show a clustering of MTLD values below the median, whereas the values for the modified sources are spread out more evenly. Finally, the lowest and highest values of modified sources are higher than the respective values for original sources.

In comparison, Figure 19 depicts the root TTR of sophisticated words (Chen & Meurers, 2016). This lexical feature defines sophisticated words as words that are not present in the NGSL (Brezina & Gablasova, 2015). The violin plots show a lower median for the root TTR concerning sophisticated words of modified sources than for that of original sources. Moreover, the wide and short violin plot for the modified texts represents a smaller range and a higher concentration of values for the root TTR concerning sophisticated words than for that of the original sources.

Figure 18*Measure of Textual Lexical Diversity***Figure 19***Root TTR (Sophisticated Lexical Words)*

Next, we analyse two syntactical complexity features, dependent clauses (Figure 20) and verb phrases per sentence (Figure 21). First, the violin plots of the texts' dependent clauses per sentence show a comparatively narrow bimodal distribution for modified sources and a more dispersed multimodal distribution for original sources. Both plots depict the highest concentration of values below the median. However, the median for the original sources is slightly higher than that for the modified sources.

In Figure 21, the two violin plots of verb phrases per sentence show unimodal distributions for both sources, but the overall range of values for the modified sources is less concentrated and broader in the sense that it includes texts with verb phrase values below the smallest value of the original texts. Additionally, the median of the modified sources is lower than that of the original sources.

Figure 20*Dependent Clauses per Sentence***Figure 21***Verb Phrases per Sentence*

Discussion

Contributing to the literature on CLIL material quality, this study explored the linguistic complexity features of multiple diverse bilingual economics learning materials. The results of the three research questions on linguistic differences in the learning materials will be discussed next, along with subsequent implications.

The *first research question* focused on variabilities in linguistic complexity between materials intended for different secondary levels. Based on previous linguistic complexity analyses of German geography textbooks (Berendes et al., 2018; Bryant et al., 2017), we expected the linguistic complexities of the materials to show a progression between grade levels but not a systematic one. Our analyses revealed a progression insofar as bilingual economics materials for the combined secondary levels tend to have longer sentences, longer words and higher linguistic complexity values than materials designed for levels 1 and 2. A possible explanation for this could be that a particular publisher was responsible for six out of the seven materials for combined levels. This argument is further supported by the geography textbook study, which showed that publishers follow different approaches and complexity requirements during the process of material development (Berendes et al., 2018; Bryant et al., 2017).

A further interesting result regarding the *first research question* were the low values for the lexical richness of texts for secondary level 2, which tended to be lower even than the values of secondary level 1 materials and therefore do not reflect a progression in complexity. Since the same publisher was responsible for the majority of secondary 1 ($n = 6$) and secondary 2 materials ($n = 7$), there must be another explanation for this phenomenon. As the materials designed for secondary level 2 mainly target vocational education, which brings together students from diverse schooling and language backgrounds, the publishers might have deliberately chosen a lower language level to address these students' needs (e.g., Denman et al., 2013) and to accommodate their lack of previous CLIL experience.

Regarding the *second research question* on linguistic differences between externally quoted and redactional texts, an initial observation was that the overall frequency of externally quoted sources was considerably lower than that of redactional texts. As anticipated, directly quoted texts showed a tendency to have longer sentences and to be more complex than redactional texts. In contrast, adapted sources generally had similar complexity properties to redactional texts, except for lexical richness in materials designed for secondary level 2. In this case, lexical richness was significantly higher for adapted texts than for either redactional or directly quoted texts. These properties of externally quoted texts might be attributed to them not being written for educational purposes or for language-learning students. Nevertheless, despite their limited presence in the materials, they still have a *raison d'être* because they fulfil the criterion of authentic input (Mehisto, 2012) and could serve internal differentiation purposes.

The *third research question* focused on the linguistic changes made during the adaptation process of one exemplary bilingual economics learning material. The results of the surface measures indicated a general tendency by the publisher to reduce both the overall length of the original texts and the sentence lengths. This conclusion was supported by the two syntactical measures, which indicated a lower number of dependent clauses and verb phrases within sentences after modification. However, simply reducing sentence or text length does not automatically ensure better comprehensibility; on the contrary, texts could become unnatural and incoherent, which could hinder actual understanding of the content (Fillmore & Snow, 2003). Nevertheless, Lorenzo (2008) showed that CLIL teachers regularly apply this sometimes disadvantageous strategy while adapting authentic texts.

Finally, just like the adapted texts from research question two, the modified sources also showed a higher text richness than their original counterparts. However, this could be explained by the fact that some modified texts were based on two original texts. By combining these two texts, the overall lexical richness increased.

In summary, our overall results are in line with previous studies on bilingual learning material. First, the low number of available bilingual economics materials for our research confirms the general lack of CLIL materials (e.g., Ball et al., 2015). However, this contradicts the high potential of economics for bilingual education (Hernandez-Nanclares & Jimenez-Munoz, 2017). There is clearly a need for more ready-made materials in order to expand bilingual economic education.

In our detailed analyses, we observed some unexpected changes in the linguistic complexity of the material, notably regarding lexical richness across grade levels and text types as well as in the adaptation of original sources. In line with Marongiu (2019), this leads us to the conclusion that at least a large proportion of the materials were developed without consulting language experts, which could have been beneficial. Consequently, even with some CLIL materials present, bilingual economics teachers still need to go to great lengths to produce or adapt their own materials. The increasing heterogeneity of students further emphasises this challenge because CLIL teachers need materials that consider students' differing levels of ability and, at the same time, offer opportunities for internal differentiation among students (Siepmann et al., 2021). Overall, CLIL teachers stress that material development and adaptation, as well as the appropriate language level within materials, are central concerns (Scherzinger & Brahm, 2023a). Although 'there is no shortage in the CLIL literature of prescriptions about "what should be there" in terms of their contents and design' (Morton, 2013, p. 118), applying these criteria during material production and adaptation is very challenging for teachers. German CLIL teachers are often trained in both the foreign language and the subject (Breidbach & Viebrock, 2012). Nevertheless, criteria-guided material development involves significant effort because most CLIL teachers do not study their content subject in the foreign language and thus need to learn the subject-specific literacy themselves (Siepmann et al., 2021). Moreover, the extended CLIL-Pyramid (Meyer, 2010; Scherzinger & Brahm, 2023b), which was presented in the introduction, highlights that intrinsic motivation

and many competences are required for the production of high-quality CLIL materials. These competences are needed not only by teachers but also by publishers. For example, the selection and design of learning materials already require a broad variety of (pedagogical) content knowledge, language proficiency and pedagogical/psychological knowledge. That teachers are not able to trust the quality and appropriateness of existing materials further complicates the task (Banegas, 2014). A possible solution would be to provide CLIL teachers with a sound basis of knowledge of material development and evaluation during bilingual teacher training (Marongiu, 2019). A second solution could be to educate all CLIL teachers to be educational linguists who possess deep knowledge of language in educational settings and can guide material development by publishers (Fillmore & Snow, 2003). However, guiding material production would only increase CLIL teachers' responsibilities. One possibility for counteracting this is the joint production of materials. Publishers should work closely with language experts, such as linguists or foreign language teachers and content teachers (Marongiu, 2019), to meet the criteria of comprehensible input, authenticity and the right amount of language support through scaffolding. Through the pedagogical input of teachers, material development can further consider locally relevant circumstances (Banegas, 2014) and, consequently, fulfil the criterion of meaningfulness.

However, since this process takes time and bilingual economic education as a niche phenomenon is still not an attractive investment to publishers, we suggest another approach to support bilingual economics teachers, namely making use of advantageous technology for CLIL material production (Abril, 2017), such as the tool FLAIR (<https://flair.schule/FLAIR/>). FLAIR allows a keyword-driven online text search and a check of self-produced texts. Both search and check are based on self-determined linguistic complexity features, and teachers can thereby choose and determine language complexity with reference to the levels of the Common European Framework of Reference for Languages. Additionally, it is possible to use FLAIR to highlight important vocabulary or linguistic features within texts, which is advantageous for

highlighting learning goals and making subject-specific literacy features salient (Ball, 2018; Ball et al., 2015; Mehisto, 2012). This procedure not only saves preparation time but also includes language support measures for students and allows teachers to find differentiated texts more easily. By choosing authentic and, at the same time, age-appropriate texts and topics with local relevance, FLAIR can help to fulfil the criteria of authentic, meaningful and comprehensible input and provide a practical solution to counter the lack and problems of bilingual economics materials.

Limitations

Our study provided important insights into the linguistic complexity features within bilingual economics materials and allowed us to highlight practical implications for future material production. However, the following aspects limit our study and results.

First, although the selection of our linguistic measures was predominantly based on the geography textbook study (Berendes et al., 2018; Bryant et al., 2017), it also incorporated the results of other explorative linguistic features. This inclusion was completely based on the authors' assessment, and other researchers might have chosen different features. However, since this study, to our knowledge, was the first to analyse bilingual economics materials, we invite other researchers to apply their own analyses to the data, which are available upon request. Second, as is the case with the study by Berendes et al. (2018), our results currently lack reference to students' actual linguistic and cognitive capabilities. Therefore, a meaningful next step would be to gather, analyse and include CLIL students' texts. Third, although the differences between grade levels and text types (RQ1 and RQ2) were often not significant, they still indicate important tendencies and help further develop the new research field on bilingual (economics) materials. The last limitation concerns the fact that two publishers' bilingual economics materials surpass other materials in quantity. Together, these publishers produced 19 out of the 30 learning materials, which might have biased our results towards their particular standards and approaches. Nevertheless, their dominance also holds the potential for future

fruitful collaborations, which, in turn, could rather easily affect the bilingual economics materials market as a whole.

Apart from our call for more and deeper analyses of our data and future collaborations with publishers in the field, we also want to point out some additional venues for future research. CLIL materials contain much more than text, which makes the examination of included tasks, assessments and their respective degrees of cooperation and cognitive demands a very promising research field.

Conclusion

In conclusion, this study on the linguistic complexity of bilingual economics materials identified non-systematic and possibly disadvantageous progressions across grade levels and unexpected differences in complexity between text types, particularly regarding lexical richness. These results contribute to the literature on CLIL materials (e.g., Mehisto, 2012; Morton, 2013). They also suggest that teachers should not blindly trust that the complexity of the few existing materials is appropriate for their learners. However, this adds an additional challenge for already overburdened CLIL teachers. Therefore, and although new curricula regularly demand the production of learning materials (Zalbide & Cenoz, 2008), this study emphasises the importance of a strengthened relationship between linguists, CLIL teachers and publishers for material production and calls for bilingual training programs to actively foster knowledge of material design. This is particularly relevant for the subject of economics because it holds a high potential as a bilingual format in that it prepares students for the international (labour) market (Hernandez-Nanclares & Jimenez-Munoz, 2017).

Additional Information

This study was preregistered on the OSF platform in April 2023 (https://osf.io/gtwzy/?view_only=e9c2d4049b444c299ff85fe9e17ccdf5). Since the preregistration, three changes regarding the data and the general research interests have been instituted. First, the number of included materials increased from 26 to 30, as we decided to

count individual chapters within a compilation volume, as well as chapters from different authors within the same material collection, as separate materials. Additionally, we discarded the focus on differences related to school types and tracks because we had only two materials that were solely intended for the academic track. Finally, we added the third research question because we found the distinctions between modified and original texts interesting.

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5. General Discussion

Successful bilingual economic education fosters students' bilingualism, biliteracy, economic competences, and intercultural competence. All of these competences are important for students in the 21st century (e.g., Hernandez-Nanclares & Jimenez-Munoz, 2017; Pérez Gracia et al., 2020), and their simultaneous enhancement within one subject underlines the great potential of the widespread implementation of bilingual economic education. However, such implementation is challenging because bilingual education is influenced by many external and internal factors (Kirss et al., 2021), and teachers require many extended competences (e.g., Marsh et al., 2011). Moreover, researchers have already pointed out the immensity of the training needs for bilingual education teachers in general (Pérez Agustín, 2019; Pérez Cañado, 2016a, 2016b; Porcedda & González-Martínez, 2020), and such needs are presumably even greater for bilingual economics teachers because bilingual economic education is still a niche phenomenon and lacks overall research. Nevertheless, given its tremendous potential and possible future expansion, there is a need to bridge this research gap and study bilingual economics teachers more closely. Doing so will enable the preparation of bilingual training programs as well as (future) bilingual economics teachers themselves for the implementation of a bilingual format of economic education. These circumstances motivated the preparation of this dissertation on bilingual (economics) teachers' competences, which was guided by the following overarching research question:

Which competences of bilingual (economic) education teachers

- a) are deemed necessary within the literature?*
- b) are considered essential by practitioners?*
- c) can be deduced from a linguistic analysis of existing learning materials?*

To address these research questions, three studies were conducted as part of this dissertation. However, the topic, research interest, and theoretical background of the

dissertation as a whole were introduced first. Thorough elaborations of the history, motivation, and types of bilingual education, its effectiveness and criticisms made of it, factors influencing its success, its underlying guidelines, and the training of bilingual education teachers thereafter laid the groundwork for the subsequent three studies.

The contribution of each study was important in achieving the overall aim of this dissertation, namely, the investigation of bilingual (economic) education teachers' competences. The first study formed the basis for the other studies by summarising the literature on bilingual education teachers' competences through a systematic literature review and developing a competence model specific to this cohort. The second study gathered insights on trainee teachers' and teacher educators' beliefs about (bilingual education) teachers' professional competences through a questionnaire and interviews. Some questionnaire items and the interview analysis codebook were based on the competence model from the first study. Moreover, by focusing on interviewees with bilingual social science subjects that are closely related to economics (political studies and geography), the results served as a first approximation of the competences required for bilingual economics teachers. The third study deepened this approximation by analysing the linguistic complexity of bilingual economics learning materials and deriving the necessary language adaptation competences for bilingual economics teachers.

Thus, this dissertation brings together insights from theory (systematic literature review, study 1), teacher training (practitioners' beliefs, study 2), and practice (analysis of bilingual economics materials, study 3). This combination was chosen to optimally support future professional bilingual economics teachers in three ways: first, by raising awareness of bilingual education teachers' competences in general; second, by pointing out practitioners' beliefs about professional competences, which also imply the essential contents of bilingual teacher training; and third, by supporting practitioners to produce and evaluate high-quality materials. Furthermore, this dissertation includes qualitative, mixed, and quantitative research methods

and integrates the expertise of researchers from economic education, second language acquisition, and linguistics to adequately examine bilingual (economic) education teachers' competences from different perspectives, an approach that fits well with the multi-perspectivity of bilingual education itself. Therefore, this dissertation represents a promising first approach to investigating bilingual economics teachers.

The remainder of the discussion is structured as follows: First, the three papers' findings are summarised, and the key results are discussed. Then, the strengths and limitations of the dissertation as a whole are presented. Lastly, implications for future research on bilingual (economic) education as well as implications for practice are explored.

5.1 Summary and Discussion of the Findings

5.1.1 *Summary of the Findings*

The systematic literature review on bilingual education teachers' competences (study 1) included 79 international reports that ranged from whole competence frameworks to individual competences. The comparison of the competence frameworks provided 16 converging competences that were then extended through reports on individual competences and summed up into a professional competence model for bilingual education teachers. The most prominently mentioned and/or discussed competences in the reports were language proficiency, critical consciousness, cooperation skills, pedagogical content knowledge of how to merge language, content, and learning, and several facets of pedagogical/psychological knowledge, such as knowledge of methodology or material design. Interestingly, critical consciousness was only mentioned in reports from the US, and only CLIL settings referred to motivation as an important aspect of professional competence. Based on these results and the identification of considerable training needs for teachers, the systematic literature review called for a stronger focus on (academic) language proficiency, critical consciousness, cooperation skills, and knowledge of bilingual education research in bilingual education teacher training.

In study 2, we used a mixed-methods design to investigate the beliefs of bilingual education practitioners – trainee teachers and educators involved in a bilingual qualification program – about professional (bilingual education) teachers. Overall, 32 participants filled in the questionnaire, and 11 follow-up interviews with participants bilingually teaching political studies or geography were conducted. A comparison of beliefs about generalist and bilingual education teachers' professional competences revealed that bilingual education teachers' competence requirements are more pronounced than those of generalist teachers. Specifically, expanded language proficiency, international content knowledge, and pedagogical content knowledge of how to merge content, language, and learning and enrich them culturally were assumed to be necessary. Furthermore, higher motivation and enhanced pedagogical/psychological knowledge of material design, assessment, and methodology were emphasised as important. These last aspects were especially stressed for bilingual social science teachers since their subjects lack learning materials. Finally, two notable differences between the two participant groups concerned the required level of language proficiency and the importance of reflection, on which only teacher educators agreed. However, they named this aspect as present in both generalist and bilingual education teachers' professionalism.

Last, the linguistic complexity analysis of 1529 English main body texts included in 30 bilingual economics learning materials from Germany (study 3) showed a lack of systematic complexity progression across grade levels. This lack was pointed out as possibly detrimental for students since learning materials should match students' continuously improving language skills throughout secondary education. Moreover, the analysis revealed substantial fluctuations in lexical richness in not only text type and grade level but also adaptation processes. On the whole, the demonstration of the small number of ready-made learning materials and their (at least partly) unsuitable complexity levels implied that bilingual economics teachers still need to create or adapt their own materials, which led to further inferences on the required competences. Language proficiency, pedagogical/psychological knowledge of material design

and learning processes, and (pedagogical) content knowledge were identified as necessities for high-quality material production and included in the extended CLIL-Pyramid. Furthermore, teachers' high intrinsic motivation throughout the whole process of producing and applying materials was emphasised as a prerequisite.

In sum, the investigation of bilingual (economics) teachers' competences through three different methodological and interdisciplinary approaches congruently indicated extended levels of language proficiency, (pedagogical) content knowledge, motivation, and pedagogical/psychological knowledge, in particular of material design and methodology, as necessities for bilingual (economics) teachers. In the next section, these coinciding findings as well as intriguing differences between the results of the studies are triangulated and discussed with regard to international research. Furthermore, the findings are integrated into a bilingual education competence model specific for economics teachers to answer the dissertation's overall research questions.

5.1.2 Bilingual (Economics) Teachers' Language Proficiency and (Pedagogical) Content Knowledge

Previous research underscores that the dual focus of content-based bilingual education requires teachers to adjust their role as instructors and their teaching practices (Coyle, 2018; Jong & Barko-Alva, 2015; Pavón & Rubio, 2010). In line with this reasoning, this dissertation argues that bilingual (economics) teachers must also possess extended competences in terms of language proficiency and (pedagogical) content knowledge.

First, comprehensible but simultaneously challenging input is well established as a facilitator of language learning, a finding which reinforces that second or foreign language teachers' language proficiency needs to be more advanced than that of learners (Krashen, 1981, 1996; Vygotsky, 1978). The systematic literature review of this dissertation complemented this rationale by highlighting that such proficiency must cover both the foreign or second language used for instruction and the students' first language (see study 1). Publications released after

the inclusion period of the review further support this argument by recommending the integration of both languages in bilingual lessons (e.g., Canz et al., 2021; Ertugruloglu et al., 2023; Siepmann et al., 2021).

Moreover, although the second study's insights into practitioners' beliefs showed some differences between trainee teachers and educators regarding the required level of language proficiency, overall, participants still agreed that bilingual education teachers not only need higher foreign language proficiency than learners but also than generalist (foreign language) teachers. This argument is also supported by the systematic literature review (study 1), which found that subject-specific and academic language proficiency as combinations of language proficiency and content knowledge, as well as communicative competence, are emphasised as essential facets of teachers' professional competence. The general lack of bilingual economics learning materials (studies 2 and 3) and the unsystematic progression and varying lexical richness of the available materials (study 3) further underpin this finding, as it became clear that teachers cannot avoid evaluating, adapting, and creating materials for bilingual economics themselves, which, in turn, requires strong (subject-specific and academic) language skills.

Another central and related competence of bilingual (economic) education teachers on which all three studies agree is pedagogical content knowledge, for example, to enable context-related and subject-specific deep learning processes for students (Coyle, 2018; Meyer et al., 2015). The professional competence model developed in the first study explicitly named the facets of knowledge required to enrich content culturally and merge content, language, and learning. Moreover, the responses of the practitioners in the second study showed that the importance of pedagogical content knowledge is consistently high. Finally, the inclusion of pedagogical content knowledge in the extended CLIL-Pyramid developed in paper three further underlines its importance for high-quality material production. In addition to these bilingual education-specific reasonings, cognitive psychology research emphasises the beneficial effects of intertwining content and language on students' deep learning processes (Stoller &

Fitzsimmons-Doolan, 2017), which also supports the relevance of knowledge of how to merge language, content, and learning.

However, the international literature considered in the systematic literature review already pointed out some discrepancies between theory and practice regarding language proficiency and (pedagogical) content knowledge: For example, studies mentioned a lack of bilingual education teachers' confidence in their language competences (e.g., Aiello et al., 2017; Briceño et al., 2018) and distinctive training needs regarding not only language competences (Pérez Agustín, 2019; Porcedda & González-Martínez, 2020) but also overall CLIL planning and instructional processes (Porcedda & González-Martínez, 2020) that have a mixture of pedagogical content and pedagogical/psychological knowledge.

Nevertheless, the overall results of the three studies affirm the relevance of teachers' language proficiency and (pedagogical) content knowledge for successful bilingual (economics) education. Since these were not the only congruent competences found, the following section further discusses the findings on pedagogical/psychological knowledge with respect to learning materials.

5.1.3 Bilingual (Economics) Teachers' Pedagogical/Psychological Knowledge

Firstly, bilingual education teachers' pedagogical/psychological knowledge of material design was revealed as crucial in all three studies. This finding supports the assumption of study 3 that materials are invaluable assets in (bilingual) educational settings and can assist learning, teaching, and even administrative processes. Even though the competence model developed in the first study depicted knowledge of material design as a general skill relevant to all teachers, the previously mentioned training needs and aspirations of teachers also comprised knowledge of material design (Pérez Agustín, 2019; Pérez Cañado, 2016a), thus indicating that it is indeed vital for bilingual teaching and learning. Given the widespread lack of bilingual social science learning materials (study 2), this conclusion has been supported by social science teachers from

Germany (study 2) as well as Kazakhstan (Kakenov, 2017), and knowledge of material design is also comprised in the extended CLIL-Pyramid developed in study 3.

Moreover, the lack of (suitable) economics materials demonstrated in study 3 forces teachers to assess, adapt, and create materials on their own. Consequently, they themselves have to take into account the four criteria (study 3) (meaningfulness, authenticity (Mehisto, 2012), degree of scaffolding, and appropriate linguistic level of the inputs (López Medina, 2016)), for example, with respect to lexical density or phrasal complexity (Filardo Llamas et al., 2011). Carrying out such a task, however, is not possible without knowledge of linguistic features and of when learners acquire these features. Although practitioners did not mention such knowledge in their elaboration of bilingual education teachers' professionalism (study 2), knowledge of second language acquisition was emphasised as a bilingual education-specific competence in the professional competence model (study 1) and included in the extended CLIL-Pyramid (study 3). Therefore, this dissertation concludes that knowledge of second language acquisition is a second important facet of the pedagogical/psychological knowledge needed by bilingual (economics) teachers.

Concerning the selection and evaluation of suitable texts as learning materials for bilingual economic education, the FLAIR tool demonstrated a first possibility to support teachers to meet the four previously mentioned criteria of material development through technology (study 3). This finding underlined the potential of information and communication technology (ICT) as a teaching and learning resource, an argument further supported by the recognition of knowledge of ICT as a general competence required by all professional teachers (studies 1 and 2). For bilingual education, the enhancement of materials through technology has several possible benefits. First, the inclusion of multimedia and multimodal tools can support and scaffold students' content and language learning processes (Cinganotto & Cuccurullo, 2015), for example, by providing direct (computer-based) feedback and assessment to students or by depicting their learning behaviour and development, which could help teachers to

diagnose and intervene if necessary (Abril, 2017). Second, the inclusion of social media or other internet resources produced by native speakers as learning materials allows for authentic language input (Kramsch, 2017).

Lastly, the studies pointed out the importance of knowledge of methodology and bilingual education research for the production of learning materials. First, both types of knowledge were included in the bilingual education-specific professional competence model (study 1), and practitioners emphasised teachers' knowledge of methodology as a necessity to provide appropriate scaffolds, feedback, and tasks. Additionally, the third level of the CLIL-Pyramid named both competences as prerequisites to evoking students' higher-order thinking through suitable task designs (study 3). At the same time, both competences were stressed as considerable training needs for bilingual teachers in the systematic literature review (study 1), and knowledge of research even received the lowest mean of all 16 self-assessed competences from practitioners (study 2). Consequently, this dissertation supports the conclusion of the review of European CLIL teachers' training needs (Pérez Agustín, 2019) that knowledge of methodology and research requires further attention and development.

Overall, the study results and additional literature on pedagogical/psychological knowledge of bilingual learning materials call for bilingual (economics) teachers to possess knowledge of material design, second language acquisition, and ICT. Additionally, they point out that teachers' knowledge of methodology and research leaves room for improvement. Next, the results of the studies on teachers' motivation and critical consciousness are discussed.

5.1.4 Bilingual (Economics) Teachers' Motivation and Critical Consciousness

Studies 2 and 3 in particular (and, to a lesser extent, study 1) emphasised (intrinsic) motivation as a prerequisite for bilingual education teachers. Interestingly, the systematic literature review additionally revealed that motivation was only mentioned in the CLIL literature and settings (study 1). Teachers are being forced to put considerably more time into lesson preparation because they need to acquire subject-specific language proficiency

(Siepmann et al., 2021). The widely known lack of published CLIL materials, curricula (Ball et al., 2015; Li et al., 2020), and material-sharing networks (Morton, 2013) as well as extensive CLIL training needs (e.g., Pérez Cañado, 2016a; Porcedda & González-Martínez, 2020) might explain this CLIL-specific observation. Another reason may be that participation in CLIL programs is usually voluntary for both teachers and students. Therefore, CLIL teachers have to actively choose to take part in CLIL (Pecorari, 2020), which already requires a basic motivation to undertake CLIL. One of the rewards of this voluntary aspect of the nature of CLIL might be that CLIL students are often also more motivated and high performers (Dallinger et al., 2018).

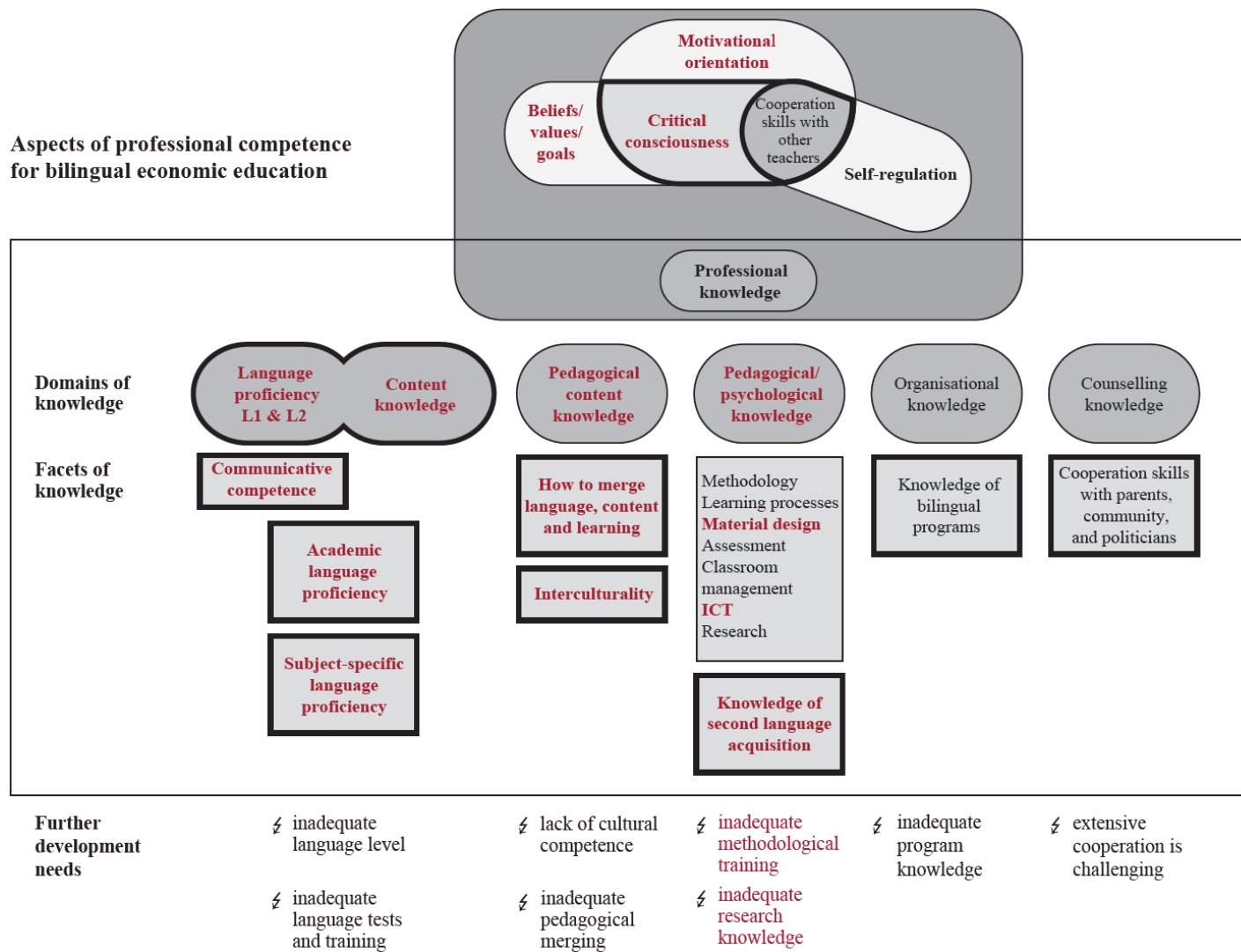
The last aspect to be discussed and included as relevant for bilingual (economics) teachers is critical consciousness. Since this concept involves both reflection on (confining) language or cultural ideologies and advocacy for bilingual education and students (Palmer et al., 2019), it was categorised as a combination of beliefs and motivational orientation (study 1). Its inclusion might come as a surprise because critical consciousness was only addressed in the systematic literature review of study 1 and only occurred in the U.S. literature. However, given that teachers influence students' learning outcomes (Maulana et al., 2021), their beliefs influence practice (e.g., Briceño, 2018; Wilkins, 2008) and the diversity of CLIL students is continuously increasing (Cenoz, 2015; Siepmann et al., 2021), a thorough reflection on teachers' own beliefs (Buehl & Beck, 2014), for instance, with respect to their language ideologies (Zúñiga, 2019), becomes essential for professional competence. The latter proves to be all the more important because the practitioners in study 2 did not touch on this topic, which indicates that they are not aware of it or do not deem it a requirement for professionalism. However, even if they do not need this competence today, as heterogeneity will most likely continue to increase, critical consciousness will be crucial for future professional bilingual (economics) teachers. Furthermore, this emphasis on critical consciousness is in line with recent calls for more criticality in CLIL (Sakamoto, 2022) and more critical pedagogues (Ostorga & Farruggio, 2020).

5.1.5 Bilingual (Economics) Teachers' Competence Model

Finally, to answer the overall research questions of this dissertation on bilingual (economics) teachers' required competences (derived from theory and inspired by practitioners and the analysis of learning materials), a competence model specifically for bilingual economics teachers was developed (see Figure 22). It is based on the competence model from study 1 and highlights all previously discussed and particularly relevant competences or training needs in red. As the first subject-specific competence model in the field of bilingual education, it has the potential to guide bilingual economics teacher educators in prioritising competences for both qualification and in-service teacher development programs. In addition, the model can serve as a reflective tool for generalist economics teachers interested in bilingual education, as it highlights precisely those competences they would need to cultivate to teach economics bilingually.

Figure 22

Extended Model of Teachers' Professional Competence (Baumert & Kunter, 2013) for the Context of Bilingual Economic Education



5.2 Strengths, Limitations, and Possibilities for Future Research

Both strengths and weaknesses should be taken into consideration when interpreting the findings of the three studies and in regard to the quality of this dissertation in general. A first strength is that this dissertation approached the topic of bilingual (economic) education teachers, which, in itself, has many interdisciplinary aspects, through the lenses of three different disciplines, namely, economic education, second language acquisition, and linguistics (see Figure 3). Moreover, to make optimal use of these interdisciplinary perspectives, the first and second authors of the studies, who are trained experts on teaching economics and English as a foreign language and who have acquired extensive theoretical knowledge of bilingual education teachers through the systematic literature review, sought external expertise whenever necessary. Therefore, the second study included bilingual education practitioners' insights, and the third study presented a collaboration with computational linguists. All in all, this dissertation responds to Nikula et al.'s (2016) call for more interdisciplinary bilingual education research between linguists, educational researchers – ideally with dual academic backgrounds – and (bilingual education) content educators. Nonetheless, a next step would be to involve international researchers to tackle the lack of multi-country research projects in bilingual education (Sánchez-Pérez & Manzano-Agugliaro, 2021). For example, it would be valuable to examine bilingual education teachers' beliefs about professionalism and the complexity of learning materials from other countries in order to compare the findings and make them more generalisable.

Furthermore, the use of the generalist (Baumert & Kunter, 2013) and, later, the self-developed bilingual education teachers' competence model (study 1) as comprehensible theoretical frameworks for the studies provided the dissertation with a clear leitmotiv that facilitated the comparison of the findings. The project was further refined by the employment of three methodologically different empirical approaches; giving the dissertation as a whole a mixed-methods design. This overarching design made it possible to obtain more corroborated

and comprehensive results (Creswell & Plano Clark, 2018) and to depict a congruent competence model for bilingual economics teachers (Figure 22) based on triangulation of the individual findings. In general terms, this model is a first attempt to develop a subject-specific competence model for bilingual education teachers and might serve as the basis for future research on this cohort.

Since preregistrations and accessible data help to counter the ongoing replication or credibility crisis – which is also noticeable in the field of educational research (e.g., Merk & Rosman, 2019; Plucker & Makel, 2021) – the undertaken preregistrations of the first and third study², as well as the provision of the interview transcripts, the questionnaire (study 2), and the plain text learning materials (study 3) on request, also strengthen this dissertation. These actions are all the more important because these practices are not the norm in the field of bilingual research, although they could facilitate much-needed international research through data-sharing and the replication of whole studies in different contexts. On the whole, the applied open science practices and consistent cooperation of the raters and/or authors during the rating and inclusion process of the systematic review (study 1), the drafting of the analysis codebook (study 2), and the selection of the informative linguistic complexity features (study 3) helped to protect the studies from researcher bias as much as possible (Chenail, 2014).

The respective data bases of the studies represent a limitation for the overall dissertation but also an opportunity for future research. For example, the systematic literature review (study 1) might have excluded additional relevant literature due to its search string and the language restriction to English and German reports. A future update of the review would, therefore, not only include additional terms, such as CBI, dual-language, or indigenous education but also involve a collaboration with Spanish-speaking researchers to include Spanish reports. The Spanish-language literature is relevant because CLIL research is very strong in Spain (Pérez

² The second study was not preregistered due to its highly explorative nature and large proportion of open items; however, the general study outline was approved by the ethics committee of the university and the local Ministry of Education and Cultural Affairs, which confirmed the good quality of the study project as a whole.

Cañado, 2016a), and Spanish is the most used additional language in bilingual education programs in the U.S. (Freire & Feinauer, 2022).

The data base of the second study was a small convenience sample from southwest Germany, which was not representative of German bilingual education teachers in general. Similarly, it can be argued that the sample of English bilingual economics learning materials from Germany used in study 3 was not representative of all internationally existing English bilingual economics materials that could be integrated into German bilingual economic education. Nevertheless, both sample selections have several *raison d'être*. First, it is stressed that the implementation of bilingual education programs is context-dependent (Coyle, 2018; San Isidro, 2018), which makes initial examinations within a fixed region or country reasonable. Second, the competences of German bilingual teachers have only rarely been addressed in research (Gnutzmann, 2015; Leisen, 2015; Schauwienold-Rieger, 2012), and bilingual learning materials, to the author's knowledge, have not been addressed at all. Consequently, studies 2 and 3 create a solid foundation for the specifics of bilingual (economic) education teachers and materials from Germany. Nonetheless, the previously mentioned inquiry and comparison of teachers' beliefs from other countries, the expansion of the linguistic complexity analysis through texts written by students, and the addition of further learning materials (e.g., economics materials from other countries or materials for a different bilingual subject) are promising research projects for the future.

Another auspicious research project arises from the lack of quantitative studies not relying on self-assessments to investigate bilingual education teachers' competences and training programs (study 1), namely, the development and validation of a survey instrument based on the dimensions of the professional competence model for bilingual education teachers. Such an instrument could, in turn, be used to investigate the extent to which bilingual education teachers possess the competences set out in the competence model. Additionally, it could be used to analyse the effectiveness of bilingual education qualification programs on teachers'

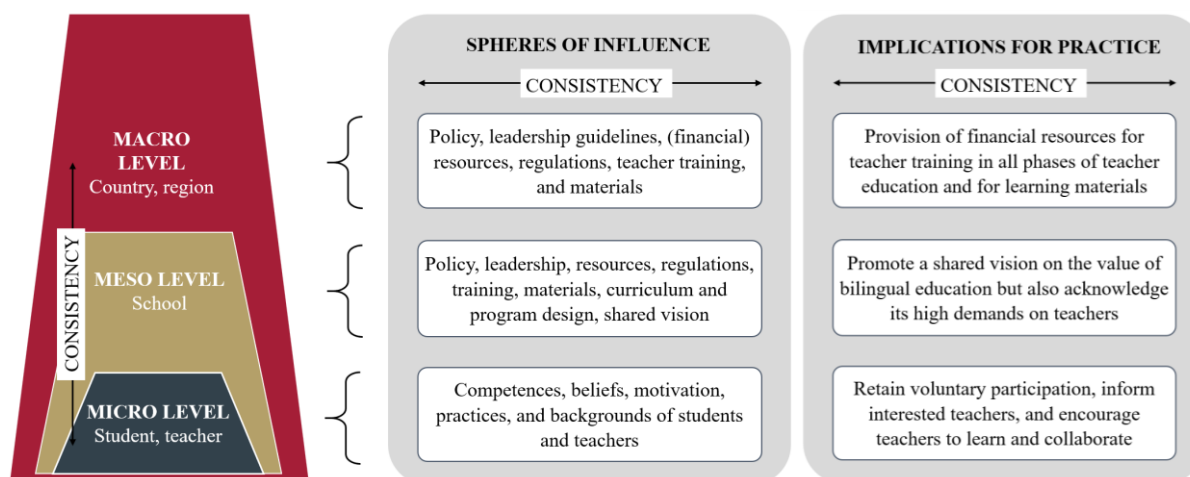
competence development and help bilingual education (trainee) teachers identify their training needs. By extension, such an instrument and additional classroom observations could further be deployed to research the impact of bilingual education teachers' competences on students' learning outcomes. For instance, the level of language proficiency required by bilingual teachers – a controversial issue also discussed in this dissertation – remains an open question because the effect of teachers' bilingualism and biliteracy on students' bilingualism is still unclear (Guerrero & Lachance, 2018). Overall, this dissertation opens up many intriguing research possibilities for the future through both its strengths and limitations.

5.3 Implications for Practice and Policy

In addition to the implications for research, various implications for educational practice and policy can be derived from the findings and are illustrated and explained with the help of Figure 23, the further extended framework of factors shaping bilingual education (see Section 1.5).

Figure 23

Implications for Practice and Policy Based on the Factors Shaping Bilingual Education



Note. Adapted from Kirss et al. (2021).

Due to the immense teacher training needs emphasised in all three studies, a first implication for the *macro level* is the provision of financial resources to enable additional and continuous bilingual education teacher training and raise awareness of bilingual education

among all pre-service teachers. In general, it is necessary to take these steps because bilingual education teaching can be very challenging, whether teachers have previous teaching experience or not (Moate, 2011). Based on the merged findings of the studies, training in the field of bilingual social science/economic education should, in particular, pay attention to several dimensions of language proficiency, pedagogical/psychological knowledge of material design and methodology, critical consciousness with regard to the increasing heterogeneity of the student population, and pedagogical content knowledge of merging content, language, learning and culture. Additionally, they should address current research findings to enhance knowledge of research.

Funding is also needed to counteract the shortage of bilingual education materials by incentivising publishers to produce the urgently required learning materials on condition that language and content experts are involved in the process. This is all the more important because high-quality materials can play a double role: not only do they support learners but they also have the potential to support teachers' (pedagogical) content knowledge and influence their instructional practices and beliefs about the learning and teaching of their subject and their self-efficacy (Roblin et al., 2018). Moreover, teachers might even perceive the burden of always creating their own materials as unbearable, which may result in their leaving bilingual education (Amanti, 2019), or, if the incongruence between beliefs and practice is too great, even quitting the teaching profession altogether (Buehl & Beck, 2014).

At the *meso level*, the most important thing for schools is to promote a shared vision of bilingual education, in particular, regarding its general value and its many competence requirements for teachers. At first, the additional burdens of bilingual education teachers should be acknowledged, for example, by giving them additional preparation time and supporting their attendance of in-service training. Furthermore, the cooperation between content, language and bilingual teachers, but possibly also researchers or publishers, should be encouraged for bilingual material creation. Moreover, since all teachers face an increase in student

heterogeneity and need practical (methodological) guidance as well as critical consciousness to address this development appropriately, experienced bilingual education teachers could act as method and awareness coaches to foster language- and culture-sensitive approaches in mainstream education. However, such additional tasks would require a reduction of bilingual education instructors' teaching load.

A first implication for the *micro level* is that all students should be enabled to participate in a bilingual education program due to the predominantly positive effects of such programs on students' competence development (Pérez Cañado, 2018; San Isidro & Lasagabaster, 2019). However, participation should remain voluntary for both teachers and students due to the high learning and teaching demands. Therefore, prospective bilingual education teachers should be made aware of the need for advanced competences, the lack of learning materials, and the extra effort caused by this lack. Moreover, they should be willing to continuously develop their competences and reflect on their beliefs both on their own and through training. Last, to advance bilingual education in general, they should be open to collaborations with other teachers, researchers, and publishers but also point out to the school management that such collaborative projects require a reduction in teaching load.

5.4 Conclusion

On the whole, this dissertation has emphasised the great potential of bilingual education – bilingual economic education in particular – and stressed the importance of teachers to its successful implementation. Its overarching objective was to closely investigate the competences of bilingual (economic) education teachers through three interdisciplinary studies, each using a different methodological approach and focusing on a distinct research area. The first study summarised theory via a comprehensive systematic literature review; the second examined the training of bilingual education teachers by exploring practitioners' beliefs about professionalism; and the third integrated practice through the linguistic analysis of bilingual economics materials (study 3). The overall findings underline the importance of enhanced

levels of motivation, language proficiency, (pedagogical) content knowledge, and pedagogical/psychological knowledge of materials design, methodology, and second language acquisition as prerequisites for professional bilingual economics teachers. As a final step, these findings were triangulated and graphically brought together in the professional competence model of bilingual economics teachers (Figure 22).

This dissertation has made a significant and detailed contribution to the literature on bilingual education teachers regarding their competences and beliefs and the development of learning materials. It has enhanced the understanding of teachers' competence requirements for bilingual (economic) education and introduced the first (subject-specific) competence model in the field of bilingual education. Additionally, it has identified central competences and training needs that can be used for the further development of bilingual education qualification programs as well as professional development initiatives, ultimately benefitting bilingual education practitioners and their students. Finally, it has provided valuable insights into the linguistic composition of bilingual economics learning materials that can guide the future development of bilingual (economics) learning materials by ensuring that educational resources are finely tuned to meet the needs of diverse language learners.

Overall, this dissertation not only stands as a comprehensive exploration of bilingual education teachers that is of value to policy, schools, teachers, and students alike, but it also lays a solid foundation for future research endeavours. More precisely, the compelling findings of this dissertation and the intriguing implications for research promise to inspire and guide future research projects, fostering continued growth and innovation in the field of bilingual (economic) education.

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Appendix A

Table A1. Critical Appraisal of Non-Peer Feedbacked Qualitative and Mixed Method Studies

<i>Author(s), Year</i>	<i>Clear aims of the research</i>	<i>Appropriat e method- logy</i>	<i>Appropriat e research design</i>	<i>Appropriat e recruitment strategy</i>	<i>Appropriat e data collection</i>	<i>Relation researcher & participant s</i>	<i>Ethical issues considere d</i>	<i>Data analysis sufficientl y rigorous</i>	<i>Clear finding s</i>	<i>Overal l quality rating</i>
Cruz, 2000	✓	✓	✓	✓	✓	✗	✗	✓	✓	H
Czura et al., 2009	✓	✓	✓	✗	✗	✗	✗	✗	✓	M
Ekiaka- Oblazamengo, 2018	✓	✓	✓	✓	✓	✗	✓	✓	✓	H
Escobar Urmeneta & Walsh, 2017	✓	✓	✓	✗	✓	✗	✗	✓	✓	M
Menken & Antunez, 2001	✓	✓	✓	✓	✓	✗	✗	✓	✓	H
Murillo, 2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	H
Robinson, 2020	✓	✓	✓	✓	✓	✗	✗	✓	✓	H
Schauwienold -Rieger, 2012	✓	✓	✓	✓	✓	✗	✗	✓	✓	H

Note. Each study that was not peer-reviewed in the publishing process was confronted with the quality appraisal questions from the Critical Appraisal Skills Program for qualitative studies (CASP, 2018).

✓ = appropriate or information present, ✗ = not appropriate or missing information, H = high quality, M = medium quality.

Appendix B

Questionnaire Items (*Cursive items were relevant for this study*)

Multiple Choice Items

1. Which subjects do you teach?

- | | | |
|---|--|--|
| <input type="checkbox"/> Biology | <input type="checkbox"/> Political studies | <input type="checkbox"/> Physics |
| <input type="checkbox"/> Art | <input type="checkbox"/> History | <input type="checkbox"/> Religion/Ethics |
| <input type="checkbox"/> Chemistry | <input type="checkbox"/> Computer science | <input type="checkbox"/> Spanish |
| <input type="checkbox"/> English | <input type="checkbox"/> Italian | <input type="checkbox"/> Economics |
| <input type="checkbox"/> French | <input type="checkbox"/> Mathematics | <input type="checkbox"/> German |
| <input type="checkbox"/> Geography | <input type="checkbox"/> Music | |
| <input type="checkbox"/> Others: <input type="text"/> | | |

2. Which subjects do you teach bilingually?

- | | | |
|---|--|--|
| <input type="checkbox"/> Biology | <input type="checkbox"/> Political studies | <input type="checkbox"/> Physics |
| <input type="checkbox"/> Art | <input type="checkbox"/> History | <input type="checkbox"/> Religion/Ethics |
| <input type="checkbox"/> Chemistry | <input type="checkbox"/> Computer science | <input type="checkbox"/> Spanish |
| <input type="checkbox"/> English | <input type="checkbox"/> Italian | <input type="checkbox"/> Economics |
| <input type="checkbox"/> French | <input type="checkbox"/> Mathematics | <input type="checkbox"/> German |
| <input type="checkbox"/> Geography | <input type="checkbox"/> Music | |
| <input type="checkbox"/> Others: <input type="text"/> | | |

3. What is the basis of your language skills?

- University studies
- Language test
- Stay abroad
- Bilingual upbringing
- Native speaker

Open Items**Questions specific for teacher educators**

4. *How long have you been in the teaching profession and furthermore worked as a teacher educator in a bilingual education qualification program? Please state in years.*
5. What made you decide to become an educator in the bilingual education qualification program?
6. What content areas are important to you for the training of bilingual education teachers?
7. What challenges do you or the trainee teachers encounter during the training?
8. How would you organise the bilingual education qualification program if there were no organisational and institutional boundaries?
9. To what extent does the bilingual education qualification program support the professionalisation of trainee teachers as bilingual teachers?

Questions specific for trainee teachers

4. What made you decide to take part in the bilingual education qualification program?
5. *How many bilingual education qualification sessions have you already had?*
6. What kind of expectations do you have for the bilingual education qualification program?
7. What content areas do you expect to be part of the bilingual education qualification program?
8. What challenges do you see with regard to the bilingual education qualification program?
9. To what extent do you expect to become more professional in the bilingual education qualification program?

Questions for both groups

10. *What is your general understanding of a good teacher?*
11. What is your general understanding of teacher professionalisation?
12. *How is a professional bilingual education teacher different from a regular teacher?*
13. How can the professionalism of a bilingual teacher be recognised or measured?

Ranking item for both groups (drag and drop)

14. *What do you think makes a bilingual education teacher professional?* From the competences (knowledge, skills, abilities and attitudes) listed, choose the ones that are most important to you and rank them.

- | | |
|--|--|
| <input type="checkbox"/> Motivation | <input type="checkbox"/> Pedagogical content knowledge |
| <input type="checkbox"/> Reflection | <input type="checkbox"/> Interculturality |
| <input type="checkbox"/> Knowledge on methodology | <input type="checkbox"/> Knowledge on ICT |
| <input type="checkbox"/> Lesson planning | <input type="checkbox"/> Cooperation skills |
| <input type="checkbox"/> Language proficiency | <input type="checkbox"/> Pedagogical/psychological knowledge |
| <input type="checkbox"/> Content knowledge | <input type="checkbox"/> CLIL background and theory |
| <input type="checkbox"/> Material design | <input type="checkbox"/> Self-regulation |
| <input type="checkbox"/> Second language acquisition | <input type="checkbox"/> Knowledge of research |

Self-assessment item for both groups

15. *How would you rate your own skills in the following areas (specifically for bilingual teaching)?* 1 star = poor competences, 5 stars = very good competences

- | | | | | | |
|--|---|---|---|---|---|
| <input type="checkbox"/> Motivation | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Reflection | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Knowledge on methodology | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Lesson planning | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Language proficiency | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Content knowledge | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Material design | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Second language acquisition | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Pedagogical content knowledge | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Interculturality | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Knowledge on ICT | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Cooperation skills | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Pedagogical/psychological knowledge | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> CLIL background and theory | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Self-regulation | ☆ | ☆ | ☆ | ☆ | ☆ |
| <input type="checkbox"/> Knowledge of research | ☆ | ☆ | ☆ | ☆ | ☆ |

Follow-up interview item for both groups

16. You indicated that you teach one of the subjects geography, political studies or economics bilingually and thus fall within the target group of our second survey. Would you be willing to give a short follow-up interview (approx. 20 minutes) on professionalism in bilingual subject teaching?

Appendix C

Interview Guideline Questions (*Cursive questions were relevant for this study*)

1. *Which subjects do you teach?*
2. What do you find fascinating about bilingual teaching?
3. *We already asked about this in the questionnaire but now we would like to go into more detail: What is your general understanding of a good teacher?*
4. What is your general understanding of teacher professionalisation?
5. *What are the characteristics of a professional bilingual education teacher in your subject (geography, political studies, economics)?*
6. *How can you recognise whether a bilingual teacher is a professional?*
7. *How does a professional bilingual education teacher in your subject differ from other teachers (bilingual and generalist teachers)?*
8. Has your perception of professional bilingual teachers changed or developed over time?
9. To what extent does the bilingual education qualification program support the professionalisation of trainee teachers or your personal professionalisation?
10. What challenges do you or the trainee teachers encounter in the qualification program?
11. Are there areas of the program where you see a need for further development?

Declaration on Authors' Contributions

This publication-based dissertation includes three manuscripts that were written together with other authors. The proportional contributions to the manuscripts are presented in the subsequent tables.

Chapter 2:

A Systematic Review of Bilingual Education Teachers' Competences

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Luisa Scherzinger	first	80	100	90	70
Taiga Brahm	second	20	0	10	30
Status in publication process:		Published			

Chapter 3:

What Does It Mean to Be(come) a Professional Bilingual Education Teacher?

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Luisa Scherzinger	first	80	100	70	80
Taiga Brahm	second	20	0	30	20
Status in publication process:		Submitted			

Chapter 4:

Linguistic Complexity Analysis of English Bilingual Economics Materials from Germany

Author	Author position	Scientific ideas %	Data generation %	Analysis & interpretation %	Paper writing %
Luisa Scherzinger	first	70	100	60	70
Taiga Brahm	second	10	0	10	20
Kordula de Kuthy	third	10	0	20	10
Detmar Meurers	fourth	10	0	10	0
Status in publication process:		In preparation			