CLIL Teachers as Materials Designers

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Tiivistelmä – Abstract

Content and language integrated learning (CLIL), an approach in which school subjects are taught through a foreign language, has become popular especially in Europe. Its results in content and language learning are generally good but CLIL is laborious for the teacher mainly because almost no CLIL materials are available. Searching for, adapting and preparing suitable materials is time-consuming and may require special competencies. Materials-related support is a prerequisite of successful CLIL programs. This can take the form of producing materials, establishing materials banks, facilitating the sharing of materials or training teachers in materials development. Information is needed on the actual processes employed by teachers in CLIL materials development. The aim of this study was to examine the materials development process of CLIL teachers when preparing materials for their own pupils. Three CLIL teachers were asked to prepare materials while thinking aloud. The think-aloud protocols were analyzed on two levels: large-scale stages and individual actions. Four common stages were found: 1) reading design brief, 2) topic planning, 3) materials preparation and 4) lesson preparation. The materials preparation stage, which included both planning and preparation, varied considerably between teachers. Their approach could be described as either activity-oriented or materials-oriented. Three types of materials design behavior were found: design-related, information-related and design process -related. CLIL materials is an important topic that merits more research attention in the future.

Asiasanat – Keywords

CLIL, content and language integrated learning, materials, materials development, concurrent verbalization

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Tiivistelmä – Abstract

Vieraskielinen sisällönopetus (CLIL), jossa kouluaineita opetetaan vieraalla kielellä, on kasvattanut suosiotaan varsinkin Euroopassa. Sisällön ja kielen oppimisen tulokset CLIL-opetuksessa ovat yleisesti hyviä, mutta menetelmä on opettajalle työläs pääasiassa siksi, että CLIL-materiaaleja on tuskin ollenkaan saatavilla. Sopivien materiaalien etsiminen, muokkaaminen ja valmistaminen on aikaa vievää ja voi vaatia erikoisosaamista. Materiaaleihin liittyvä tuki on onnistuneiden CLIL-ohjelmien edellytys. Tuki voi tarkoittaa materiaalien valmistamista, materiaalipankkien perustamista, materiaalien jakamisen tukemista tai opettajien kouluttamista materiaalien valmistuksessa. Tarvitaan tietoa prosesseista, joita opettajat käyttävät valmistaessaan CLIL-materiaaleja. Tämän tutkimuksen tarkoitus oli tarkastella materiaalien valmistusprosessia, kun CLIL-opettajat tuottavat materiaaleja omille oppilailleen. Kolmea CLIL-opettajaa pyydettiin ajattelemaan ääneen materiaaleja valmistaessaan. Ääneenajatteluprotokollat analysoitiin kahdella tasolla: laajempien vaiheiden ja yksittäisten toimien. Neljä yhteistä vaihetta löydettiin: 1) suunnitteluohjeen lukeminen, 2) aiheen suunnittelu, 3) materiaalien valmistus ja 4) tunnin valmistelu. Materiaalien valmistus -vaihe, sisältäen sekä suunnittelun että valmistuksen, vaihteli paljon opettajien välillä. Heidän lähestymistapaansa voi kuvata joko aktiviteetti- tai materiaalipainotteiseksi. Kolmenlaista materiaalien valmistustoimintaa esiintyi: suunnitteluun, informaatioon ja suunnitteluprosessiin liittyvää. CLIL-materiaalit on tärkeä aihe, joka ansaitsee jatkossa lisää tutkimusta.

Asiasanat – Keywords

CLIL, vieraskielinen sisällönopetus, materiaalit, materiaalien valmistus, ääneenajattelumenetelmä

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Muita tietoja – Additional information

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1 INTRODUCTION

Content and language integrated learning (CLIL), an educational approach in which non-language subjects are taught through a foreign language (Dalton-Puffer 2008; Dalton-Puffer, Nikula & Smit 2010a), has become progressively more popular in Europe and elsewhere during the past few years. The reasons are not far to seek: using a language as the medium of instruction is believed to result in "naturalistic language learning", facilitate meaningful language use and thus reduce target language anxiety and boost motivation (Dalton-Puffer & Smit 2007, 8–9). Research results on student achievement are mostly positive as well. As regards content learning, CLIL students are generally found to possess knowledge and skills equal to their non-CLIL counterparts (Dalton-Puffer 2008), even outperforming them in learning certain topics (Jäppinen 2005). The language skills of CLIL students, especially in the areas of receptive skills, vocabulary, morphology, fluency and affective outcomes, among others, are generally higher than those of mainstream students (Dalton-Puffer 2008; see also Lasagabaster 2008). Since these advantages are apparently achieved without an increase in the amount of instruction given – as European CLIL at least tends to take place during normal content lessons (Dalton-Puffer, Nikula & Smit 2010a, 1) – it is hardly surprising that the approach has won the warm approval of policy-makers and parents alike.

There are, however, challenges as well. Lack of CLIL teacher training (Banegas 2012a, 47), the laboriousness of the approach (Gierlinger 2007) and the pressure of national examinations felt by teachers (Mehisto 2008, 107–108) are all serious difficulties, but perhaps the most pressing concern in CLIL teaching, voiced by teachers and researchers alike, is the lack of appropriate teaching materials. Banegas (2010; 2013), drawing on a number of CLIL authors, states that the lack of ready-made coursebooks and other CLIL materials is often seen "as a

drawback in CLIL" (Banegas 2010). This lack of suitable CLIL materials is a well established – and often lamented – fact in several countries (see e.g. Alonso, Grisaleña, & Campo 2008; Gierlinger 2007, 96; Lucietto 2008). The lack of suitable CLIL materials is also considered a problem in Finland (Lehti, Järvinen & Suomela-Salmi 2006; Marsh, Järvinen & Haataja 2007), a country where textbooks have a prominent role in education and especially language teaching (cf. Luukka et al. 2008). In Finland, CLIL "[t]eachers use materials from a number of different sources: textbooks from Finland and abroad, and the Internet. They write, translate and modify texts and prepare worksheets themselves" (Marsh, Järvinen & Haataja 2007, 74).

Searching for and adapting existing materials as well as preparing new materials when needed takes up a considerable amount of time and results in a greater workload for CLIL teachers compared to L1 mediated teaching (Floimayr 2010, 21; Gierlinger 2007, 80–81; Mehisto, Marsh & Frigols 2008, 22). Teachers might also lack the "professional competences" required in materials adaptation, supplementation and design (Coonan 2007, 628).

McGrath's (2002) observation about language learning processes needing "the mediation of semiotic resources" applies also to content and language integrated learning: print and non-print materials are clearly essential in CLIL. Since ready-made textbooks are hardly ever available for CLIL programs, teachers must prepare materials of their own either by searching for and possibly adapting authentic materials or by producing materials from scratch (Moore & Lorenzo 2007, 28). Considering the importance of materials for teachers and their frequently voiced sense of frustration at the workload and difficulties resulting from the nonexistence of ready-made materials, it is surprising that hardly any research to date has actually focused on these topics. The problematic situation with CLIL materials is mentioned in virtually every report on CLIL (e.g. Floimayr 2010; Gierlinger 2007; Mehisto, Marsh & Frigols 2008; Ziegelwagner 2007) but, in the words of Morton (2013), the comments on CLIL materials seem to center around "what isn't there" or "what should be there".

There is a crying need for studies on materials used in content and language integrated learning and even a greater shortage of research on the procedures employed by CLIL teachers while searching for, adapting and designing materials for their teaching. Darío Luis Banegas, one of the few researchers explicitly studying CLIL materials, believes "we need to pay more attention to what teachers do by researching how they adapt marketed textbooks and what principles they follow when engaged in producing their own CLIL materials to suit their unique realities" (Banegas 2010). Since skills in materials development are crucial for a CLIL teacher – in fact, these are often included in lists of CLIL teacher competences (see e.g. de Graaff, Koopman & Westhoff 2007; Marsh 2002) – research on CLIL teachers as materials designers could greatly benefit both teachers and teacher educators. This paper is meant to be a modest contribution to the mapping of this largely under-researched area. I also hope that it will spur interest in CLIL materials design and research into teachers as materials designers and perhaps even inspire and help individual teachers and CLIL teacher educators in their work.

I will begin by outlining the context of content and language integrated learning – its commonalities as well as the variety inherent to it – and then move on to describing the research area of materials development in general and CLIL materials in particular. Then I will describe a small-scale empirical study on the actual processes employed by CLIL teachers when involved in developing materials for their classrooms. Special attention is given to concurrent verbalization, a data collection method still rarely used in materials development research though providing "the most informative data available on thinking during cognitive tasks" (Ericsson 2003, 13) such as CLIL materials design.

2 LITERATURE REVIEW

2.1 Content and language integrated learning

2.1.1 What CLIL

European CLIL has its roots deep in other bilingual approaches. The model has especially drawn upon the Canadian French immersion programs, but it also bears close resemblance to content-based instruction (CBI) practiced mostly in North-American contexts (Dalton-Puffer 2008; Dalton-Puffer, Nikula & Smit 2010a; Marsh 2002). CLIL has even been described as "the most recent developmental stage of the communicative language teaching" (Georgiou 2012; see also Dalton-Puffer 2007). The term content and language integrated learning, whence the popular acronym CLIL, was created by a group of bilingual education specialists of differing backgrounds in the 1990s as an umbrella term covering all educational activities where "a foreign language is used as a tool in the learning of a non-language subject in which both language and the subject have a joint curricular role" (Marsh 2002, 58).

Since the early 1990s, CLIL – both as a term used by researchers and policy-makers and as a practical pedagogical approach – has soared in popularity. Yet CLIL has no one universally accepted definition but rather several partially overlapping ones, most of them quite broad and inclusive. The definition from Marsh (2002) cited above is very similar to that of Coyle, Hood and Marsh (2010), according to whom "Content and Language Integrated Learning (CLIL) is a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language" (see also Georgiou 2012). Both definitions can be divided into at least two parts: firstly non-language content is taught or learnt through a foreign language and secondly the curriculum contains both language and non-language subject matter. The

first of these premises can be found, in one form or another, in all definitions of CLIL. Perhaps the simplest way to define the term is to refer to it as "the use of an L2 in the teaching of nonlanguage subjects" (Dalton-Puffer 2008; see also Dalton-Puffer, Nikula, & Smit 2010a) without an express demand that the approach be "dual-focused". This view conceives of the language in CLIL programs as the medium of instruction, not as the explicit objective in teaching (Bruton 2013), and language-learning goals, however ambitious, "remain implicit" (Dalton-Puffer, Nikula, & Smit 2010a; see also Marenzi et al. 2010). Stricter conceptualizations include the proviso that both subject and language must be taught, some even specifying the proportion of content and language (e.g. Ting 2010).

Although the all-inclusiveness of the popular definitions of CLIL as well as the comparative lack of conceptual clarity can complicate attempts at rigorous study (Cenoz, Genesee & Gorter 2013; Georgiou 2012), this latitude within CLIL and the resulting "transferability" across contexts has also been one of the reasons behind its popularity (Coyle, Hood & Marsh 2010). In fact, one of the most noticeable "features" of CLIL is the wide variety of curricular models it encompasses. Grin (2005, cited in Coyle 2007) suggests the existence of as many as 216 types of CLIL programs differing from each other according to variables such as intensity, duration and age of learners when first enrolled into the program. These also differ in terms of why teachers or educational authorities choose CLIL teaching in the first place. In the next sections I will examine various reasons for taking on CLIL and then some of the characteristics that demarcate different CLIL models.

2.1.2 Why (not) CLIL

There are several possible reasons why a teacher, a school or even an entire educational system might wish to take on CLIL. The approach is expected to be advantageous in one way or another or educational actors would not undertake to do the extra work attached to it. However, CLIL also involves certain chal-

lenges and, some argue, even disadvantages. In this section I will present some of the reasons for the adoption of CLIL and popular pro-CLIL arguments but also common challenges in CLIL implementation.

The driving forces behind CLIL are often represented as twofold: reactive and proactive (Coyle, Hood & Marsh 2010) or top-down and grassroots (Dalton-Puffer 2008; Lorenzo 2007; Lorenzo & Moore 2010). Reactive reasons refer to situations where teachers and educational authorities actively search for solutions to existing linguistic problems in schools. In proactive situations CLIL is introduced as an enhancement measure (linguistic or otherwise) before actual problems arise (Coyle, Hood & Marsh 2010, 6–9). Top-down initiatives such as those of The Council of Europe and the European Union may certainly have facilitated the rise of CLIL (cf. Georgiou 2012) but in many countries such as Finland (Nikula 2007) and the Netherlands (Admiraal, Westhoff & de Bot 2006) it has been the grassroots action of enthusiastic teachers, parents and schools that has most contributed to the popularity of the approach.

Marsh and Hartiala (2001) describe five reasons for introducing CLIL, calling these "CLIL dimensions". They represent the primary motives for doing CLIL but the different dimensions are "inter-linked" and in reality a CLIL school might hope to achieve results in several areas. The dominant reason may also change when time goes by. The five dimensions are "based on issues relating to *culture, environment, language, content* and *learning*." (Marsh & Hartiala 2001, italics in original.) Also Dalton-Puffer and Smit (2007) list common rationales behind the adoption of CLIL. These range from creating "conditions for naturalistic language learning" and a purpose for language use to efficiency, positive effects on motivation and the learning of communicative competence. But as Dalton-Puffer and Smit note, these pro-CLIL arguments still "lack a direct research base" (Dalton-Puffer and Smit 2007; see also Bruton 2013; Davison & Williams 2001).

Research on CLIL is just beginning to gather momentum and more solid evidence behind the arguments in favor of the approach is still needed. Even

while rigorous research on the effects of CLIL is still somewhat patchy (cf. Bruton 2011) and there are countries where CLIL does not seem to work (e.g. Sylvén 2013), the overall results of the approach tend to be positive both in terms of language acquisition (Dalton-Puffer 2008; Lasagabaster 2008) and content learning (Dalton-Puffer 2008; Jäppinen 2005).

While the popularity of CLIL continues to climb in many countries, CLIL researchers should naturally continue to study its effectiveness but also start looking into some of the practical challenges faced by different stakeholders such as students, administrators and teachers when implementing the approach. These include, for example, the additional difficulties experienced by students when studying through a foreign language (Coonan 2007) and teachers' inadequate foreign language proficiency (Gierlinger 2007, 94). In countries like Estonia, teachers' and school managers' concern over the results of national examinations might impede successful integration of language and content in CLIL teaching (Mehisto 2008, 107–108). According to Banegas (2012a, 48), problems arise when CLIL programs are implemented top-down and the teachers do not have the resources or the training needed. The shortage of CLIL teachers and their training, student selection measures that might make CLIL programs elitist and the lack of suitable CLIL materials are all challenges that schools attempting to establish successful CLIL programs must face (Mehisto, Marsh & Frigols 2008, 20–23).

One of the greatest challenges – if not the greatest – in CLIL implementation is in fact the lack of suitable materials. In a study on Austrian CLIL teachers' experiences, "[t]he search for the right material as a major source of irritation came up like a mantra" (Gierlinger 2007, 96). Finding, adapting and developing materials takes a considerable amount of time and constitutes a major part of the additional workload CLIL teachers must face (Banegas 2013; Floimayr 2010, 21; Gierlinger 2007, 80–81; Mehisto, Marsh & Frigols 2008, 22). Coonan (2007, 628) considers it a disadvantage that CLIL teachers must "devote time searching for materials suitable for the learning objectives, to render the content acces-

sible, to elaborate learning activities on these materials. Such work requires professional competences the teachers may not have, especially if such work has to be done in the L2."

2.1.3 How CLIL

There are several factors, some more fundamental than others, that affect the practical realization of CLIL. Reviewing bilingual schooling, "William Mackey claimed that up to 3 000 variables could potentially intervene to account for the nature of the bilingual classroom" (Baetens Beardsmore 1997, cited in Marsh 2002). In the following, I will present a selection of these variables and suggest some of the effects the resulting diversity of models might have on the use of materials by CLIL teachers. The variances of CLIL contexts also serve as a backdrop for research on CLIL materials in general and this study in particular, as all procedures of materials evaluation, selection, adaptation and design must be seen against the context they stem from.

One of the most basic considerations in content and language integrated learning is the relationship between content and language in different programs. The different approaches to content and language integration can be positioned along a continuum going from content-driven to language-driven (Genesee 2003; Met 1998). At the language end of the continuum it is the language learning that matters, and non-language content is mainly used in order to teach language (Met 1998). When applied to CLIL, the content end of the continuum contains the models in which content learning is considered far more important than language learning (Marsh 2002, 72; Tedick & Cammarata 2012; cf. Met 1998, 40). Dalton-Puffer and Smit (2007) suggest that, as regards the European CLIL situation, "it is fair to say that most CLIL models in use tend to be of the content-focused kind" (see also Dalton-Puffer, Nikula & Smit 2010a, 2).

Apart from the central factor of language-content ratio, there are other important variables that influence how CLIL is carried out. One of these is the language of instruction, sometimes called "CLIL language" (Mehisto, Marsh &

Frigols 2008), "additional language" or "CLIL vehicular language" (Coyle, Hood & Marsh 2010, 1). This can be any language other than the learners' mother tongue; either a second language, a foreign language or a heritage, indigenous or community language (Coyle, Hood & Marsh 2010, 1; Tedick & Cammarata 2012, S28; but see Lasagabaster & Sierra 2010). In CLIL programs around the world, the CLIL language used is usually English, so much so that the approach might more accurately be called "CEIL, Content and English Integrated Learning" (Dalton-Puffer, Nikula & Smit 2010b). In Finland, the most common CLIL language by far is, unsurprisingly, English, although CLIL programs using Swedish, German, French or Russian also exist (Lehti, Järvinen & Suomela-Salmi 2006, 301–304; Marsh, Järvinen & Haataja 2007, 70). The choice of the CLIL language has the potential to impact many aspects of the program, including plans of possible international cooperation and, especially if the CLIL language selected is not English, the availability and training of teachers and finding suitable instructional materials.

How much of the instruction is done through the CLIL language, or the amount of exposure, is another important variable, and one closely connected to it is the choice of subject matter or school subjects taught through CLIL. Exposure is usually reported either as the exact percentage of L2-medium teaching or through loose categories of "Low - about 5-15% of teaching time", "Medium - about 15-50% of teaching time" and "High - over 50% of teaching time" (Marsh 2002, 17). Some of the most common subjects taught through CLIL Finnish primary schools are environmental science, history, mathematics, geography and biology (Lehti, Järvinen & Suomela-Salmi 2006, 304–305; Marsh, Järvinen & Haataja 2007, 69).

The age of learners when they are first enrolled into a CLIL program is also a consideration, as well as the program's compulsory status and the types of measures employed in the possible selection of students. A voluntary CLIL program with rigorous entrance examinations and high requirements of language and/or scholastic proficiency is very different from a model in which

CLIL teaching is compulsory and is given to a whole school. In Finland, most of the CLIL schools "do not use any specific selection procedures", although tests have been used in "schools in which the experience of CLIL is fairly intensive" (Marsh, Järvinen & Haataja 2007, 74–75).

Enumerating all the possible combinations of even the few variables presented above would result in hundreds of different CLIL models – and many of these are in fact practiced in classrooms all over the world. This diversity in CLIL models affects CLIL research and teachers in various ways, but especially when it comes to the use of materials in teaching. The availability of materials, authentic or prepared especially for CLIL, depends on the theme or subject taught (Coyle, Hood & Marsh 2010, 93) and maybe even the CLIL language chosen. Also the general variability in CLIL models has its effects on the question of materials. First of all it is unlikely that publishers will produce coursebooks to suit the myriad of different CLIL models and contexts currently in existence (Banegas 2012b; Georgiou 2012, 500). It is more probable that published CLIL textbooks will be mostly made for the global market and need much adaptation on the teachers' part. Secondly, the great differences in CLIL models are likely to hinder the sharing of materials between teachers. In addition, just as research on effective CLIL pedagogies is made more difficult by the differing CLIL approaches (Georgiou 2012, 498), so is research on CLIL materials.

Before presenting research on CLIL materials in particular, I will look into research on materials in general. The next section includes definitions of materials, descriptions of what teachers do with the materials they have and what they do if and when there are no suitable materials at hand.

2.2 Materials

Much of the research on materials to be cited in this section has been conducted among the sphere of language teaching. There are two reasons for this: Firstly, studies concentrating on materials design per se abound in language teaching

literature but are rarely found as separate branches of research among other subject pedagogies. Secondly, since content and language integrated learning is closely connected to language learning and teaching, it may be inferred that CLIL materials – the topic of this research – have much in common with language learning materials, as well as with those prepared for first language (L1) subject lessons.

Learning materials, teaching materials and materials, all of which I shall consider as synonymous in this text, tend to be conceptualized either as texts and tasks (Mishan 2005; see also Banegas 2010; Harwood 2010; Morton 2013) or as anything that helps students learn (Tomlinson 2011). In addition, lists of different media and the kinds of materials the author includes in his understanding of the term are common both as adjuncts to actual definitions and as independent "semi-definitions" of sorts. Tomlinson, for example, supplements his definition of language learning materials as "[a]nything which is used to help language learners to learn" with just such a list: "Materials can be in the form, for example, of a textbook, a workbook, a cassette, a CD-ROM, a video, a photocopied handout, a newspaper, a paragraph written on a whiteboard: anything which presents or informs about the language being learned" (Tomlinson 2011, xiii–xiv).

Materials have traditionally been researched as a minor part of general methodology but in recent years a growing awareness of the importance of this topic, especially among English language teaching research, has lead to the growth of a whole body of research concentrating on materials (Tomlinson 2001, 66–67). Just as studies on textbooks (Harwood 2013), research on materials in general can be studied on three distinct but interrelated levels: content, consumption and production. Content naturally refers to studies analyzing what is included and excluded in the materials; what kind of pedagogical thinking is behind them, which topics are common or allowed and how visible are minorities in the illustrations, for example. Studies on consumption look into the actual use of the materials by teachers and learners in classrooms. Production-

oriented studies, such as this one, concentrate on the processes involved in the design, writing or distribution of materials by professional materials writers, publishers and teachers (cf. Harwood 2013).

The field of materials development, therefore, "studies the principles and procedures of the design, implementation and evaluation of language teaching materials" (Tomlinson 2001, 66). But as Brian Tomlinson, one of the pioneers of the field, states, materials development is also "a practical undertaking" involving "the production, evaluation and adaptation of language teaching materials, by teachers for their own classrooms and by materials writers for sale or distribution" (Tomlinson 2001, 66). In the area of materials preparation, the research so far has largely concentrated on professional materials writers. However, this trend is gradually changing as the importance of teacher-made materials and teacher training in materials design are being recognized (cf. Canniveng & Martinez 2003). The modern teacher "needs to be able to evaluate, adapt and produce materials so as to ensure a match between the learners and the materials they use" (Tomlinson 2003b, 1). This is especially true for CLIL where few ready-made materials are available and thus CLIL teachers must all become materials designers. This study concentrates on teachers who develop materials for their own CLIL classrooms.

Materials development is often seen to branch into separate processes, perhaps the most common of these being "materials evaluation for selection, materials evaluation for lesson planning and the processes of adaptation, supplementation and the preparation of 'stand-alone' materials" (McGrath 2002, 16).

2.2.1 Evaluation and adaptation

The evaluation of materials can take place by teachers, administrators or even learners for a number of different purposes but perhaps the most common situation concerns teachers or educational authorities evaluating textbooks in order to find the most suitable one for a prospective course or a fixed set of learners.

Whatever the cause, materials evaluation always includes comparing the materials against a specific context or criteria. It "is a procedure that involves measuring the value (or potential value) of a set of learning materials" and "involves making judgments about the effect of the materials on the people using them" (Tomlinson 2003d, 15).

A related procedure, analysis of materials, can be distinguished from evaluation. According to McGrath (2002, 22), analyses produce objective descriptions whereas evaluations involve making judgments. Although it is questionable whether complete objectivity can ever be reached, analysis should indeed result in a description of the materials without attempting to determine their value in general or for a set of learners. Evaluation, on the other hand, is always subjective and focuses on the users. However, the two procedures are by no means completely separate since evaluation "can include analysis or follow from one" (Tomlinson 2003d, 16).

There are practically as many procedures of evaluation as there are evaluators – teachers, students, materials writers or researchers – but materials evaluation can nevertheless be divided into three broad categories based on the time of evaluation: 1) pre-use evaluation, 2) whilst-use evaluation and 3) post-use evaluation (Tomlinson 2003d, 23–26). The first of these, most often relating to textbook selection, has been widely discussed in materials development literature, the other two receiving less attention. One of the most persistent topics in evaluation literature is the call for more principled textbook evaluation procedures. Criticism of the subjective and ad hoc nature of teachers' pre-use evaluations of textbooks is widespread (McGrath 2002, 12; Tomlinson 2003d) and on this account innumerable evaluation checklists have been compiled (e.g. Saraceni 2003, 73–77).

Evaluation and adaptation of materials have much in common and they are in a direct relationship "both in terms of the reasons for doing so and the criteria used" (McDonough, Shaw & Masuhara 2012, 63). Teachers evaluate coursebooks when choosing them for a course but also to see if a particular part

of the materials works for a particular topic and a particular set of learners. In other words, teachers evaluate whether or not they must adapt or add to the existing materials. In addition, adaptation cannot be carried out effectively without an understanding of what needs to be changed, so some kind of evaluation is a prerequisite for successful adaptation. (McDonough, Shaw & Masuhara 2012, 64.)

Tomlinson (2011, xiv) defines materials adaptation as "[m]aking changes to materials in order to improve them or to make them more suitable for a particular type of learner". Adaptation happens because no coursebook can totally correspond with the needs of a whole classful of individual learners (McDonough, Shaw & Masuhara 2012, 64; see also McGrath 2002). According to McDonough, Shaw and Masuhara (2012), adaptation is about matching the external criteria such as learner characteristics, class size or resources with the internal criteria – what the materials offer in terms of, for example, choice of topics, skills covered or proficiency level (McDonough, Shaw & Masuhara 2012, 65). What follows is that the need to adapt does not automatically mean that the materials are "defective" though sometimes adaptation can take place to counteract actual shortcomings (McDonough, Shaw & Masuhara 2012, 67).

Saraceni (2003) claims that materials adaptation is mostly based on teachers' "intuition and experience" and calls it a "relatively underresearched process". However, she considers materials adaptation "as probably the most relevant and useful link between the reality of the classroom and the research findings" and thus well worth developing and systematizing (Saraceni 2003, 73). The specific reasons for undertaking adaptation vary. Adaptation can mean personalizing, individualizing, localizing or modernizing (McDonough, Shaw & Masuhara 2012, 65), adding choice or catering for different learning styles, among others (Islam & Mares 2003, 89).

McGrath (2002) distinguishes two main categories of adaptation: addition and change. Several different kinds of procedures or techniques can be found within these categories. Adaptation as addition, for example, includes extempo-

risation, extension and exploitation. (McGrath 2002.) McDonough, Shaw and Masuhara (2012, 70) list even more categories or techniques for adapting materials: adding, deleting, modifying, simplifying and reordering. Especially simplification, in fact a type of modification, has received plenty of research attention and has even been studied in terms of CLIL materials. Simplification can be done in terms of 1) sentence structures, 2) lexical content and 3) grammatical structures (McDonough, Shaw & Masuhara 2012, 75). Either the language or the content can be simplified, or task complexity may be reduced without tampering with the text itself. One has to be especially careful when simplifying, since simplification may easily lead to changes in meaning or coherence. (McDonough, Shaw & Masuhara 2012, 75.)

2.2.2 Preparation

The next step from adaptation towards fully self-made materials is supplementation. If adaptation has to do with adding to or working with a single set of materials, usually a coursebook, supplementation involves adding something new either from other published materials or by making new materials oneself (McGrath 2002, 65–82).

Descriptions of the different processes engaged in by professional materials writers when producing textbooks abound in materials development literature (e.g. Hadfield 2013; Mares 2003; Popovici and Bolitho 2003). When materials developers describe their process of writing materials, they often refer to creative, spontaneous, intuitive measures (Maley 2003; Prowse 2011; Tomlinson 2003a). However, some authors have also suggested guidelines and frameworks for materials preparation. Tomlinson (2003a) outlines two frameworks he has used when guiding teachers in materials development: one that is text-driven and more for writing materials and one that is task-driven and can be used for localizing and personalizing materials. He also advocates the use of certain principles taken from second language acquisition research as a basis of materials development (e.g. Tomlinson 2009).

Maley (2003) has attempted to systematize materials writing in the form of a chart including columns for 1) different input types (e.g. texts, realia, visuals, games), 2) processes, referring to what is done with the input (e.g. time, mode, techniques, task-types) and 3) intended outcomes (e.g. material, educational, pedagogical). By choosing and combining items from these columns the materials writer may easily come up with different kinds of materials. (Maley 2003, 190–192.) Jolly and Bolitho (2011), targeting teachers writing materials for their own classrooms, suggest a general framework for the process of materials development. The procedures of the framework are: 1) identification of need for materials, 2) exploration of need, 3) contextual realization of materials, 4) pedagogical realization of materials, 5) production of materials, 6) student use of materials and 7) evaluation of materials against agreed objectives. These steps are not presented as a simple sequence but as a pathway with several possibilities of returning to previous steps. (Jolly & Bolitho 2011, 112–113.)

Apart from prescriptive frameworks and professional materials writers' self-reports of their work, few descriptive studies of the principles and procedures employed by teachers when designing materials exist. One exception is Johnson (2000; 2003; see also Samuda 2005) who studied the design procedures of specialist and non-specialist task designers by analyzing the think-aloud protocols of the participants designing tasks for English language teaching. The main stages of the design process were identified as 1) read brief, 2) analyse, 3) explore, 4) instantiate, 5) write worksheet(s) and 6) write teachers' notes. (Johnson 2003, 51–52.)

The research project also compared the design strategies of specialist designers, who were in fact published textbook writers, and practicing teachers, who were considered to be non-specialist in task design (Johnson 2003, 8–9). Several differences in design behavior were found between the two groups. Based on these, Johnson presents hypotheses about the characteristics and behaviors of good task designers. These fall into two categories: logistical control and enrichment. For example, good task designers tend to visualize possibilities

by simulating prospective learner and teacher talk and by mapping out their options quickly but concretely and in detail. They are also prepared to abandon plans that do not seem to work, concentrate on one thing at a time and spend considerable time in analyzing any problems they face and what is required of them. Good task designers often make higher-level decisions before lower-level ones and review several alternatives before fixing on one to develop in more detail (so called breadth-first strategy). They show metacognition and constantly review what they have done. (Johnson 2003, 128–135.) Good task designers also tend to create complexity and choices for themselves, use their repertoire and spend time exploring different options (Johnson 2003, 136–137).

2.3   CLIL materials

When moving from research on materials in general and in English language teaching to materials used in content and language integrated learning, there is much less research available, although the importance of materials in CLIL contexts is generally admitted to be paramount. The availability of materials is in fact one important factor of successful CLIL programs (Mehisto 2008; Navés 2009) and the willingness and ability to design materials is often listed as an important CLIL teacher competence (de Graaff, Koopman & Westhoff 2007; Hillyard 2011; Marsh 2002).

When CLIL materials are mentioned in literature, it is often to deplore their scarcity (Morton 2013). Materials in CLIL teaching are systematically described as a source of difficulty and increased workload for teachers (Alonso, Grisaleña, & Campo 2008; Floimayr 2010; Gierlinger 2007; Mehisto, Marsh & Frigols 2008; Morton 2013; Ziegelwagner 2007). CLIL teachers have several alternatives in dealing with the issue of materials. In contexts where published CLIL textbooks actually exist, those may of course be used. But although Morton's (2013) study indicates that in some countries textbooks designed specifically for CLIL are beginning to emerge, they are by no means used by or availa-

ble to everyone as yet. If there are no appropriate CLIL coursebooks available, the teacher can use L1 coursebooks or textbooks designed for native speakers. Both approaches have their problems. For obvious reasons L1 textbooks do not support language learning in CLIL. Textbooks written for native speakers are in fact used by some CLIL teachers (Banegas 2013, 4) but most teachers report a low use of this type of material (Morton 2013, 125, see also Lasagabaster & Sierra 2010, 372). Native speaker materials often do not fit CLIL students in terms of either linguistic level or content (Banegas 2012b; Gierlinger 2007; Morton 2013; Novotná & Moraová 2005) as CLIL generally necessitates "pedagogical adaptation" (Lasagabaster & Sierra 2010, 372).

Due to the absence of suitable textbooks, CLIL teachers often resort to developing materials themselves – a process "including materials evaluation, their adaptation, design, [and] production" (Tomlinson 2012, 143–144). Moore and Lorenzo (2007, 28) list three basic alternatives CLIL teachers have when developing materials: using authentic material as is, adapting authentic materials, and producing materials "from scratch". To these I would add searching for, adapting and using materials made and shared by other CLIL teachers. As Morton (2013) notes, materials prepared and contextualized by CLIL teachers can be shared "with other CLIL teachers in similar contexts" (Morton 2013, 118).

Each alternative has its advantages and disadvantages. Perhaps the most commonly discussed characteristic of CLIL materials is authenticity, here understood to mean "texts which have been written for any purpose other than language teaching" (Saraceni 2003, 73–77; cf. Moore & Lorenzo 2007; for a singularly exhaustive review of authentic materials in language learning, see Gilmore 2007). The use of authentic and/or native speaker materials in CLIL teaching is recommended (Lucietto 2008; Mehisto 2012) for it is believed to boost student motivation (Marenzi et al. 2010; Sylvén 2007) and increase teacher innovation (Morton 2013). On the other hand, it is difficult and time-consuming – if not impossible – to find authentic materials suited to CLIL learners both in terms of their language and content (Gierlinger 2007). Adaptation is also a time-

consuming enterprise although it ensures a better comprehension for the learners than using unadapted authentic texts (Yano, Long & Ross 1994). An overwhelming majority of CLIL teachers use and adapt authentic materials: nearly 90 % of CLIL teachers in Morton's (2013) study reported doing so either "most of the time" or "quite often" (see also Gierlinger 2007).

Producing one's own CLIL materials from scratch is also a common undertaking among CLIL teachers (e.g. Gierlinger 2007; Morton 2013). It enables teachers to adjust the content and language of materials to fit the learners, curricula and cultural context the materials are meant for (Moore & Lorenzo 2007, 28–29). Although the context-responsiveness of self-made materials is clearly an advantage, the process of making them is extremely laborious and requires time and competences "the teachers may not have" (Coonan 2007, 628; see also Moore & Lorenzo 2007; Morton 2013, 117).

Support concerning materials – both in terms of providing suitable materials and fostering teacher competences – is a prerequisite for good CLIL teachers and successful CLIL programs (see e.g. de Graaff, Koopman & Westhoff 2007; Marsh 2002; Mehisto 2008). Apart from producing textbooks for CLIL teaching, providing suitable materials could mean setting up material banks and promoting cooperation and sharing among CLIL teachers (Morton 2013, 118). Already in 2002 Marsh recommended founding national Internet Material Banks for CLIL in order to facilitate CLIL program implementation (Marsh 2002, 202). In Andalusia, for example, the material bank of the government website (http://www.juntadeandalucia.es/educacion/webportal/web/aicle/contenid os) successfully provides primary and secondary school CLIL teachers with materials in three different languages and several school subjects. Smaller-scale "material banks" also exist as individual teachers upload materials they have prepared on their websites (Morton 2013, 118).

Sharing CLIL materials and setting up CLIL material banks are by no means trouble-free endeavors. In Finland, for example, there have been attempts at establishing such material banks, but these have failed due to "lack of

financial investment, which could allow for coordination" (Marsh, Järvinen & Haataja 2007, 74). Furthermore, even with established platforms for sharing, the wide variety of CLIL models with diverse subjects, topics, languages and linguistic levels to cater for makes it difficult for any one teacher to find exactly what he/she needs. As Mewald (2007, 169) points out, the freedom of teachers to choose the topics by themselves and the absence of CLIL curricula in some contexts "impedes organized exchange of self-made materials". It can also be hypothesized that even materials made by other CLIL teachers must sometimes be adapted to suit the specific competences and contexts of their new users. However, facilitating the sharing of CLIL materials is one promising way to solve the CLIL materials issue – although this solution can only be a partial one as long as teachers need to search for, evaluate, adapt and prepare even some of the CLIL materials themselves.

The second possible way of dealing with the issue of CLIL materials is by fostering teacher competences in materials development (Morton 2013, 117) – in other words, through teacher training in materials development. There are some reports in literature of pre-service or in-service CLIL teacher training courses with a material-related component, for example in Spain (Fernández Fontecha 2009), Germany (Marenzi et al. 2010), the Czech Republic (Novotná & Moraová 2005), Malaysia and Argentina (Banegas 2012a), but since supporting CLIL teachers in their inevitable materials preparation is of paramount importance, training in materials development should form an essential part of all CLIL teacher training. It is important that courses in materials development be both practical and research-based (cf. Tomlinson 2003c). This type of training should naturally be CLIL-specific but could also draw from research on subject-specific and EFL materials, and move gradually from evaluation and adaptation to design (McGrath 2013, 204). Further suggestions for outlines and contents for materials development courses can be found in McGrath (2013, 203–219) and Tomlinson (2003c), among others.

In terms of materials development for CLIL contexts specifically, there is at least some literature available on what CLIL materials should be like. Several prescriptive frameworks for CLIL materials design and a few checklists of desired characteristics of CLIL materials have been suggested (see e.g. Banegas 2010; Fernández Fontecha 2010; 2012; Filardo Llamas, Jiménes & Canduela 2011; Floimayr 2010; Mehisto 2010; 2012; Sudhoff 2010). For example, Mehisto (2010; 2012) provides a list of general and CLIL-specific criteria of quality CLIL materials. These include using formative assessment, fostering cooperative learning and promoting authentic language and language use (Mehisto 2012). Guerrini (2009), drawing on the Spanish CLIL context, lists features of CLIL materials that work as scaffolds to learning through four broad categories: "illustrations with labels and captions, content area texts or genres with content vocabulary, language and organisation, graphic organisers and ICT applications".

Some researchers advance suggestions of how CLIL materials can be adapted or produced. Mehisto, Marsh and Frigols (2008, 33) mention that texts can be adapted by "cutting information into manageable chunks and adding synonyms or a glossary" and by providing "visual or textual organizers". Meyer (2010) provides criteria for materials evaluation and selection based on second language acquisition research and Coyle's (2007) 4Cs-Framework but also suggests a complete framework for CLIL materials development. According to this framework, called the "CLIL-Pyramid", CLIL materials design should start with topic selection, then move on to the choice of media and then task-design. The design process should end with "CLIL-workout" – the review of "key content and language elements". (Meyer 2010, 23–24.)

Apart from suggestions and recommendations, there is not much empirical research done on the actual procedures of CLIL materials development. A rare exception to this rule is a study reported in Moore and Lorenzo (2007). They asked twenty three teachers either currently teaching CLIL or otherwise familiar with the approach to adapt a linguistically challenging text for bilingual students. Three different approaches to adaptation for CLIL were found in

the analysis: simplification, elaboration and discursification. (Moore & Lorenzo 2007.) Gierlinger (2007) also mentions a couple of different ways of adapting materials, found in interviews of Austrian CLIL teachers. They adapted by "trimming difficult parts in texts, replacing complex words with easier ones, rewriting sentences or paragraphs, using translation etc."(Gierlinger 2007, 98). Coonan (2007), analyzing the interviews of Italian CLIL teachers, found four stages of CLIL materials production: "(i) search for materials; (ii) select materials according to criteria of adequacy; (iii) 'intervene' on the materials and create tasks; (iv) plan the alternation between teachers for team teaching using the materials" (Coonan 2007, 637).

Suggestions and procedures such as the ones presented above could be useful CLIL-specific additions to teacher training courses in CLIL materials development. However, much still needs to be done in order to transform CLIL materials development into an educational practice based firmly on theory and empirical research. We still need more knowledge of the procedures of materials development employed by CLIL teachers in their work. Further knowledge of these procedures – both the typical and the efficient – have the potential to help CLIL teachers and teacher trainers in becoming more aware of the processes and actions involved in CLIL materials design. Awareness in turn opens the way for development. In the following, I will present the methods and results of a small-scale empirical study on just such procedures.

3   METHODS

The aim of this research is to examine the materials development process of CLIL teachers when preparing materials for their own classrooms in their work. Both general tendencies and individual variation are of interest in the planning process. The research questions as well as the methods employed in this study are specified below.

3.1   Research questions

1. How do teachers prepare CLIL materials?
    a. What is the process of making CLIL-materials like?
    b. What kinds of actions constitute the design process?

3.2   Participants

The empirical data of this research, comprised recordings of interview and think-aloud protocols (introduced in detail below), were collected from three individual CLIL teachers working in two different elementary schools in Finland. Two of the teachers taught mainly first-graders (7 year-olds) and one mainly fifth- and sixth-graders (11–13 year-olds). The teachers were found by contacting principals of several CLIL schools in Finland and asking them to forward an email request to their school's CLIL teachers.

Two of the participants had had formal training in CLIL or immersion and at least five years of experience in CLIL teaching. One participant had just started teaching CLIL six months earlier and had had no formal training. The CLIL language used was English in all of the three cases. One of the teachers taught a high exposure CLIL class with almost all lessons in English and one taught

CLIL classes with medium exposure. The third teacher taught a low exposure CLIL class with only a couple of lessons per week in English (cf. Marsh 2002).

The informed consent of the participants was obtained in writing after the object of the research and the consent form had been explained to the participant orally and he/she had had the possibility to ask questions about it and about the research. The anonymity and non-identifiability of the participants has been protected already at the transcription stage by the use of pseudonyms for any names of people and places, and the changing of any other features that might expose the participants' identities. The protection of the participants' identities is also taken seriously in this report where decisions have been taken to tell no unnecessary information that could be connected with the participants. Even the genders of the three teachers have been concealed. (cf. Cohen, Manion & Morrison 2011, 442–443.)

3.3   Data collection

Studying "design" and "planning" implies more than observing concrete behavior: the need to tap into the mental processes behind the observable actions such as drawing or writing. One can of course ask teachers to describe how they design CLIL materials and then analyze design stages or actions based on these self-reports (as done by Coonan 2007). These reports, though valuable, are however highly retrospective and do not offer insights into *thought processes* as they occur *during* the design. For this reason the data collection method of concurrent verbalization, providing "the most informative data available on thinking during cognitive tasks" (Ericsson 2003, 13), was chosen for this study.

In order to study the process of materials design through teachers' thought processes during CLIL materials development, the participants were asked to prepare CLIL materials according to a written design brief and to think aloud while doing so (Ericsson & Simon 1993; cf. Johnson 2003; Le Maistre 1998). After the think-aloud task, the teachers were interviewed about the task they

had just finished, the kinds of materials they usually used in CLIL teaching and the materials design procedures they used in their work. Some of the interview questions elicited background information concerning the teachers' training, work experience, language skills and possible participation in publishing materials. The interview type used was a semi-structured interview-guide approach. According to McNamara (2009), the guide approach:

> "provides more focus than the conversational approach, but still allows a degree of freedom and adaptability in getting information from the interviewee" (McNamara 2009).

Many of the interview themes and questions were thought of beforehand in order to "ensure that the same general areas of information are collected from each interviewee" (McNamara 2009). One of the teachers was a native speaker of English and was interviewed in English. In addition, the native speaker and one other teacher preferred to conduct the think-aloud task in English, but otherwise all interview and think-aloud protocols were in Finnish. All of the three teachers were interviewed individually, in their own classrooms.

The use of the teachers' own classrooms seemed to be advantageous in the materials design task as well as the interview. For example, the participants were able to refer to their pupils' work in the classroom and to show the interviewer CLIL materials they had previously prepared themselves. This helped to anchor the discussion of CLIL materials in the teachers' particular contexts. In addition, conducting interviewing may go more smoothly when the participants are "in a comfortable environment where the participants do not feel restricted or uncomfortable to share information" (Turner 2010, 757).

The audio recordings of both the think-aloud tasks and interviews were transcribed in full. The length of the think-aloud protocols of the three teachers varied between 32 and 43 minutes in time and each resulted in 6–8 pages of transcribed text. The total length of the three think-aloud recordings was 1 hour 52 minutes. The interviews were 25–56 minutes in length, 1 hour 53 minutes in total, and each resulted in 11–17 pages of transcribed text. All planning notes

and finished materials were collected and saved. In addition, if a teacher used the computer in the materials design procedure, all action on the computer screen was recorded with a screen recording software.

In the following sections I will discuss in more detail the methods and procedures of data gathering, especially concerning concurrent verbalization, and the techniques of coding and analysis followed in this study. A minute examination of the procedures followed is also intended to increase reliability (cf. Franklin & Ballan 2001, 274). Discussion of issues in data gathering and reflections on validity permeate the whole section.

3.3.1 Think-loud data

Since one of the aims of this research was to study the procedures of materials design, the data needed to be such as to reflect the cognitive actions performed by teachers while preparing materials for CLIL teaching. This lead to the adoption of a think-aloud method called concurrent verbalization (Ericsson & Simon 1993). In concurrent think-aloud methods, participants are asked "to verbalize their thoughts while performing a task. Such methods provide a basis for investigating the mental processes underlying complex task performance and can provide rich data on such cognitive processes" (Hevey 2010). Concurrent verbalizations have been used especially in studies of mathematical problem solving (Schoenfeld 1985) and expertise in several fields such as medicine, chess, language learning and task design in language teaching (Johnson 2003).

Other types of verbal data exist as well. In retrospective verbalization, the participant is asked to recall his/her thought processes during a task only after the task itself is completed, whereas in concurrent verbalizing the subjects are asked to 'think aloud' while performing a task or solving a problem (Hevey 2010). Verbal reports also differ according to the freedom of expression given to the subjects; whether participants are asked to report their thoughts "per se" or instructed to "verbalize specific information, such as reasons and explanations" (Ericsson & Simon 1993, xviii–xxii). Ericsson and Simon were able to show that

when administered according to certain standards, think-aloud experiments can result in valid representations of sequences of thoughts not changed by the act of thinking aloud (Ericsson 2003; Ericsson & Simon 1993).

Crutcher (1994) lists the three most important issues concerning the use of verbal report data as:

> "(a) whether the information in the verbal reports reflects thinking accurately – the validity issue; (b) whether asking subjects to report on their own thoughts changes and alters the course of thought – the reactive-effects issue; and (c) whether verbal report data can be treated as objectively as other behavioral data. (Crutcher 1994, 241)"

Johnson (2003) also discusses commonly voiced challenges in using verbal data. These include the fact that according to critics the method changes the processes studied and that the "naturalness" of data collection suffers when verbal reports are used. Other problems in verbal reports brought up in previous research are the incompleteness of the protocols and the frequent silent periods of the subjects during cognitively demanding times. (Johnson 2003, 35–37.)

The actual disadvantages of verbal reports vary according to the procedures used. When the tasks are of short duration, both concurrent and retrospective verbalizations are highly accurate, but for longer tasks "the validity of think-aloud reports appears to be higher than of retrospective reports" (Ericsson & Simon 1993, xxii). Based on previous research, Ericsson and Simon state that, compared to silent solutions, "think-aloud does not lead to a reliable change in the cognitive process as reflected in accuracy of response in any of the studies" and that there seems to be no reliable difference in strategies, only that "think-aloud verbalization requires more time" (Ericsson & Simon 1993, xx). Only when the instructions request the participant to articulate explanations or reasons do cognitive processes change (Ericsson & Simon 1993, xviii–xix). Since the appeal for "naturalness" in data collection usually results from the concern that "artificial" data collection changes the processes studied (Johnson 2003), it can be stated that as long as participants are not asked to explain their thought processes, think-aloud protocols can be analyzed as being comparable to "naturally" collected data (Smagorinsky 1989, 474).

The incompleteness of the think-aloud protocols, however, is a genuine limitation. The participants can only voice their thoughts, not the information retrieval processes underneath these, and it is even doubtful whether anyone can verbalize every single thought that enters his/her head (Ericsson & Simon 1993, l; Johnson 2003). It has also been noticed that sometimes when the cognitive load is very high the subjects fall silent for a short period of time (Ericsson & Simon 1993, 9l). These limitations must be kept in mind but they by no means devalue the use of think-aloud protocols – especially concurrent verbalizations – in providing "the most informative data available on thinking during cognitive tasks" (Ericsson 2003, 13).

3.3.2 Research setting

The verbal data collected for this study was in the form of concurrent verbalization; the participants were asked to think aloud while preparing materials for an imaginary CLIL lesson. After this the teachers were interviewed. The English version of the oral instructions given to the participants for the think-aloud task was adapted from Ericsson and Simon (1993, 378) and the Finnish version from Seitamaa-Hakkarainen (1999). All the three CLIL teachers conducted the materials design task in their own classrooms. The teacher was sitting at a desk with clean sheets of paper and other stationery supplies and a laptop computer with Internet access provided by the researcher. A screen recorder software was used to record everything the participant did on the computer. The teacher was free to use the Web browsers, word processors and slide show programs found on the computer desktop, but the instructions emphasized that the use of the computer was optional and up to the participant.

Computers are widely used by teachers not only in the classroom with their students but also for supportive tasks such as materials preparation and information searches (van Braak, Tondeur & Valcke 2004, 410; Korte & Hüsing 2006, 23). The Internet is a "valuable source of material" also for CLIL teachers (Coyle, Hood & Marsh 2010, 93). I decided to give the participants the possibil-

ity of using a computer with the object of capturing, as closely as possible, the materials design process used by modern teachers in their work. However, as it is possible that not all teachers use the computer for materials preparation, I also wanted to enable the use of paper and pencils. Two of the three teachers in this research used the computer in their materials design task. Both used the Internet and a word processor to write materials. When asked about the use of the computer in the interviews, both participants affirmed that they also used computers for materials preparation on a regular basis in their work. They were in the habit of searching for information and images and sometimes the teachers found ready-made CLIL materials online and adapted them or used word processors and other software for preparing materials from scratch. In short, computers were an important tool in materials design for two out of the three participants in this study.

As stated above, it is important that the subjects should not – and most certainly should not be asked to – describe what they are doing or explain their thoughts but rather just voice them, since attempts at an explanation would change the sequence of thoughts. Ericsson and Simon (1993) suggest several strategies for eliminating or at least reducing this possible problem. One of these is making "clear that social interaction is not intended" by having the experimenter sit behind the subject and explicitly warning the subject "against explanation and verbal description". Both of these were done in this study, as was another strategy for reducing explanations: giving the subjects "practice problems" after the instructions. These warm-up tasks and their usefulness are elaborated further in the next section. Having the subject concentrate on completing the task, the thinking aloud coming second is one more way of reducing explanations in concurrent verbalization. This is why the task of the think-aloud procedure needs to have a clear focus. Materials design is a very product-oriented exercise and thus suits the purpose extremely well. The last of the strategies is minimizing social interaction during the task (Ericsson & Simon 1993, xiii–xiv).

Social interaction was indeed attempted to be kept minimal during the think-aloud tasks in this study. According to standard think-aloud procedure, I was prepared to prompt the participant to "keep talking" – a form of address discouraging social interaction – after pauses of ten seconds or so (Ericsson & Simon 1993, 256). However, I was never required to use the prompt for any of the participants. Three types of actual interruptions occurred during the think-aloud tasks: dealing with equipment-related issues, researcher's answers to participant's questions and one outsider interruption (the participant's phone rang). Equipment-related issues included a couple of computer problems, quickly solved, and three interruptions regarding the audio recording. One participant, for example, was asked to take the recorder along when moving to the other end of the classroom to find something. Participants' questions to the researcher, mostly seeking further definition of the instructions given, were rare and answered as concisely as possible, often in monosyllables to further discourage interaction.

In addition to the three types of interruptions during thinking aloud, the researcher always intervened at the end of the think-aloud procedure. When the participant seemed to have finished, the researcher confirmed that this was indeed the case and, whenever the computer was used, made sure the files had been saved.

3.3.3   Warm-up tasks

In order to prepare the participants for the actual think-aloud task, they were given short practice problems to solve while thinking aloud. The use of warm-up tasks allows participants to practice "expressing thoughts directly without explaining or interrelating the information" (Ericsson & Simon 1993, 257) and to become comfortable in thinking aloud (Ericsson & Simon 1993, 379).

Each participant was given 3–4 practice problems to solve and important parts of the instructions were repeated between the different warm-up tasks. Some of the practice problems, such as "name 20 animals" were taken directly

from Ericsson and Simon (1993, 378) and some invented for the purpose of this study. Some of the tasks only required "talking aloud", simply verbalizing oral codes, whereas others encouraged also to verbalize "information that was encoded in non-verbal form" (Ericsson & Simon 376–379).

Johnson notes that some subjects are naturally more skilled at thinking aloud than others and some just do not like it (Johnson 2003, 35–37). This was found to be true for this study: some participants seemed to be comfortable thinking aloud almost immediately. One teacher, for example, stated in the interview that thinking aloud was easy and professed to thinking aloud sometimes, although not as extensively as was required in the materials design task. On the other hand, some participants clearly benefited from the warm-up tasks. One teacher noted that in the first warm-up task not all of the teacher's thoughts were yet voiced but that thinking aloud became easier after a while. In sum, the use of warm-up tasks was found to be extremely helpful.

3.3.4   Design brief

After the warm-up tasks, the teachers were given a written "design brief" with instructions for the actual materials design task (the English version can be found in Appendix 1). In order to facilitate comparisons in the subsequent analysis, the design brief limited the topic of the materials design by defining a school subject and a topic to be followed in the design. The brief varied slightly from participant to participant. The native speaker of English received the brief in English and the others in Finnish. The school subject mentioned was "biology" for upper grade teachers and "environmental science" for lower grade teachers, according to the division in the Finnish core curriculum (Opetushallitus 2004).

The guiding principle in designing the instructions for the task was to promote a materials design process as close to the reality of the CLIL teachers' work as possible. The school subject given in the design brief was chosen to reflect the CLIL situation in Finland where environmental science is the most common subject in CLIL teaching at the primary level (Lehti, Järvinen & Su-

omela-Salmi 2006, 304; Marsh, Järvinen & Haataja 2007, 69). This made it more probable that the participants would have experience in teaching the subject through CLIL and that they wouldn't feel forced to prepare materials they would never have made in their work. It was also for this reason that I attempted to choose a popular topic in CLIL teaching. A small-scale analysis of the CLIL curricula of four primary schools in Finland revealed that three of the most common topics within environmental science (and its upper grade equivalents of biology and geography) were animals, plants and the human body. Out of these I chose the topic of the human body for the materials design task.

In the event, all three teachers in this study either had taught or were about to teach about the human body in English. One teacher had the topic coming up in a couple of weeks and one teacher was about to teach it during the following week. Both were able to design materials they were actually going to use in their CLIL teaching. The popularity of the topic had also one unforeseen disadvantage: the two teachers with most experience in CLIL all stated that they had previously prepared materials for the topic and with one teacher this slightly affected the materials design process. Although the design brief asked the teachers to imagine a situation where they could not find ready-made materials, it was understandably difficult for some to exclude the existing self-made materials from their plans. In fact, one of the teachers incorporated some previously made materials in plans of materials use.

An attempt to foster a design process close to the realities of CLIL teachers was also behind the decision to have the teachers develop the materials as if for their own students. Contrary to Johnson (2003), whose study concentrated on the expertise of published task designers, the focus of this research was on CLIL teachers as materials designers. Unlike "professional" designers preparing published coursebooks for wide audiences of differing contexts, CLIL teachers prepare materials for their own specific classrooms and for students they know and have taught before. In fact, underlying the planning of this research was the belief that design processes in these two cases might actually be different. And

like Jolly and Bolitho, I believe that "materials writing as a process is pointless without constant reference to the classroom" (Jolly & Bolitho 2011, 110). The participants of this study were thus encouraged to design for their own students – just as they normally would in their work.

Having discussed the use of concurrent verbalization – the main data collection method of this study – at some length, I will now move on to describing the analysis methods used in this research.

3.4   Analysis

Johnson (2003), interested in expertise in task design, notes that there are two analytical directions this kind of research can take: attribute analysis or procedural analysis. In a similar vein, when studying materials designers one can either look into what they are like (attributes), or what they do (procedures). The aim of the present study was to research mostly the latter (cf. Johnson 2003, 2). Since the processes of CLIL materials design remains a virtually unexplored research area, it was necessary that the analysis depart from the data themselves. Therefore the analytical procedures used relied heavily on Strauss and Corbin's (1990) grounded theory – an approach especially suitable for studying processes and for "grounding" research results in data (cf. Saldaña 2013, 96; Strauss & Corbin 1990, 25). The analysis was also considerably influenced by Johnson's (2000; 2003) work on task designers – research very similar to this one both in terms of topic area and data collection.

The main data analyzed were the transcribed think-aloud protocols of the teachers. The screen recordings were only used to interpret the speech when needed. Since the focus was on cognitive processes and not on physical behavior, the screen recording was not used, for instance, in order to fill in what a participant was doing while completely silent. The computer programs used for coding and the accompanying memo writing were MAXQDA 11 and Microsoft Word.

The initial analysis proceeded one case at a time, first with a careful reading of the think-aloud protocol and then with preliminary open coding. Strauss and Corbin (1990) see coding as "operations by which data are broken down, conceptualized, and put back together in new ways" and as a necessary step toward building theories of phenomena. It can even be said that, for Strauss and Corbin, coding equals analysis (Strauss & Corbin 1990, 57). Open coding, one of the three basic coding procedures of grounded theory, entails "breaking down, examining, comparing, conceptualizing, and categorizing the data" (Strauss & Corbin 1990, 61).

The aim of the analysis was to capture both the broad stages of the overall design process and the individual small-scale acts such as designer decisions – I will call these *stages* and *actions*, respectively. In consequence, the coding of the think-aloud protocols moved on two analytical levels: the macro-level of stages, and the level of individual actions (cf. Johnson 2003, 51–52). The analysis proceeded one case at a time, the broad stages being analyzed first and the smaller-scale actions only after an initial coding of the stages was finished. To be more precise, the think-aloud protocols of this study were segmented and coded by examining the similarities and differences of stretches of data and giving "each discrete incident, idea, or event, a name, something that stands for or represents a phenomenon" (Strauss & Corbin 1990, 63). As befits a study on processes, the actions were all given "process codes" that use gerunds to mark action in the data (Saldaña 2013, 96). In addition, each of these process codes representing designer actions was followed by what I call the *object* of the action, a type of subcode given in order to explain the primary code (cf. Saldaña 2013, 77). This procedure was again considerably influenced by the work of Johnson (2003). Examples of the final action-object codes in this study include *evaluating source material*, *rejecting content*, *simplifying vocabulary* and *surveying agenda*.

I endeavored to keep the coding truly open and during the first round of coding did not compare the protocols with each other. After the initial open coding of the three protocols, however, the *action* and *object* coding schemes of

the three protocols were merged and continued to be recoded and refined throughout the analysis. Concentrating especially on the actions, the individual codes were grouped together in order to form categories around phenomena found in the data. Later each "phenomenon represented by a category" was "given a conceptual name", a more abstract one than the names of the codes pertaining to the category (Strauss & Corbin 1990, 65). Also the stages were compared with each other and similar stages were given the same code. Similarly to Johnson's (2003) description of his coding process, I also found it useful to include a third level of coding that could be called *substages*. These codes in fact allow a description of what happens within the stages but above the level of individual actions.

4   RESULTS

In this section, I will first present the overall CLIL materials design process of the teachers studied through broad design stages found in the individual think-aloud protocols. Then I will give an overview of the materials design behavior of CLIL teachers based on the analysis of the small-scale design actions. The three teachers studied are given the pseudonyms Alexis, Jo and Sasha in this report. The names are deliberately gender-neutral and do not reflect the teachers' nationalities. I decided on this course because I wanted to avoid the neutral but dehumanizing options such as "teacher 1" but at the same time protect the teachers' anonymity.

4.1   CLIL materials design stages

The three teachers studied all approached the task of CLIL materials design in slightly different ways but their design processes can also be drawn together into four composite stages:

1) Reading design brief
2) Topic planning
3) Materials preparation
4) Lesson preparation

The first two of these stages, *reading design brief* and *topic planning*, were very similar with all of the teachers. The third composite stage of *materials preparation*, including both the planning and the actual preparation of the materials, was subject to considerable variation among the teachers studied. With two teachers this was actually divided into two separate stages. The last stage of *lesson preparation* also varied slightly from teacher to teacher. It consisted of a small collec-

tion of substages only some of which were present in each individual protocol. The design stages of the individual teachers are summarized in table 1.

TABLE 1   CLIL materials design process stages

Teacher	Jo	Alexis	Sasha

Design process stage	1. Reading design brief
	2. Topic planning
	3. Worksheet production
	⎮ 4. Teacher's notes
	⎮ production
	⎮
		1. Reading design brief
		2. Topic planning
		3. Factsheet adaptation
		    cycle
		4. Homework sheet pro-
		    duction
			1. Reading design brief
			2. Topic planning
			3. Activity planning
			    sequence

	5. Lesson preparation	(5. Lesson preparation)	4. Lesson preparation

In the following, I will further describe the design stages, including both the similarities and the variation between the three teachers. The description is divided under three subheadings: *Commencing stages* describes the start of the CLIL materials design process represented by the first two stages (*reading design brief* and *topic planning*). *Core stages* represents the planning and production inherent in the varied stages of *materials preparation*. *Closing stage* corresponds to the *lesson preparation* stage.

4.1.1 Commencing stages

The two commencing stages are the same with all teachers (see table 1). The first one, *reading design brief*, is explained by the fact that each teacher was asked to read the design brief aloud. However, I decided to include it as a stage partially because of the previous example by Johnson (2003) and partially because it sometimes contained not only reading but also comments on the design task.

The second stage, named *topic planning*, was usually short but common to all the three teachers. This stage consisted of connecting the topic with the teacher's classroom in terms of whether or not the teacher had already taught the topic to his/her current pupils. Alexis, for example, stated that the topic was "coming up after the holidays with the... fifth graders". In addition, Alexis and Sasha also further defined or limited the topic given in the design brief. What

happens immediately after these two commencing stages and before the closing stage of *lesson planning* forms the core of the design procedure: the entire physical production of the materials as well as most of the planning.

4.1.2 Core stages

The design core, or the composite stage of *materials production*, following the commencing stages can be divided into two separate stages with Alexis (*factsheet adaptation cycle* and *homework sheet production*) and Jo (*worksheet production* and *teacher's notes production*) whereas in Sasha's protocol it forms one big sequential stage (*activity planning sequence*). Two different approaches could be observed: Sasha's approach to materials preparation was *activity-oriented* whereas Alexis and Jo approached the task in a *materials-oriented* way. In addition, two general design tendencies could be observed: parallel planning tendency and immediate production tendency. I will begin by explaining these general tendencies and then move on to describing each teacher's core stages; first Sasha, then Alexis and finally Jo.

The two general design tendencies of parallel planning and immediate production are present in all of the three protocols, although to varying degrees. Firstly, there are no separate planning and production stages in the analyzed protocols beyond the short *topic planning* stage already mentioned. Instead, the planning of the content, language, physical characteristics and future use of the materials alternates in sequences shorter than stages and often even happens simultaneously or in parallel with their physical production (writing, drawing etc.). This tendency of the planning procedures to not only constantly alternate with production but to actually occur at the same time with it I shall call parallel planning tendency (cf. Johnson 2003, 113). Yet teachers seem to differ in how much their planning is parallel with and separate from production. Sasha seems to do quite a bit of separate planning while almost all of Jo's planning is parallel with production.

The second general tendency to be remarked is closely connected to the first one: after the topic definition the teachers are disposed to start the actual materials production as soon as possible and without any mapping of options or other separate planning. Again, in Jo's design process this immediate production tendency is the most marked: this teacher even skips the topic definition done by Alexis and Sasha. Immediately after noting that the pupils will actually be studying the topic next week, Jo starts to draw while stating: "I will draw a human being here for the children where we will start doing doing – writing the body parts in English."

In a similar fashion, Alexis instantly starts searching for source material on the Internet. Sasha's approach to the whole design process is slightly different from the other two teachers and consequently the immediate production tendency is not as evident. The focus of Sasha's planning is on activities rather than materials and the teacher is in the middle of planning the second lesson activity before any materials production occurs. Then, however, Sasha dismisses separate planning of learning content in favor of immediate production by saying, "I'll open up [the word processor] and I'll write them straight away". In conclusion it could be said that both parallel planning and immediate production tendencies seem to form continua with a differing emphases depending on the designer.

Sasha's single core stage is called the *activity planning sequence.* This teacher's starting point tends to be an activity, and materials design in its wider sense – including search and selection as well as production – is embedded in activity planning. Sasha plans activities one by one and if an activity needs materials, the teacher either searches and selects them (from websites or a repertoire of previously made materials) or prepares the materials from scratch. A review of the activities developed so far follows every few activities and the review may trigger a further development of a previously designed activity. For example, Sasha starts the whole stage by first developing activity 1 and then activity 2. After activity 2, a review of activities 1 and 2 follows, succeeded by a further

development of activity 2 before moving on to activity 3. Sasha's whole approach to CLIL materials design could be termed activity-oriented. In addition, despite the essentially linear progression of chronological lesson or activity planning, there is some cyclicality in the design process in terms of the development-review-redevelopment loops (cf. Johnson 2003, 111; Jolly & Bolitho 2011, 113).

Alexis and Jo, on the other hand, both produce a two-part set of materials including at least one handout for the pupils. They approach the CLIL materials design task from a more materials-oriented perspective than Sasha. Alexis' first core stage is *factsheet adaptation cycle* in which the teacher produces a factsheet for the pupils based on source material found in the Internet. During this stage Alexis searches for source material online, peruses the source material (reads, often evaluates and eventually decides whether or not to use it), then adapts the source material to fit the learners and context (includes mostly *adapting material*, see chapter 4.2.1), and at times reviews what has been done or what still needs to be done (includes mostly *control behavior*, see chapter 4.2.3). These substages of *search, perusal, adaptation* and *review* follow a certain design sequence as seen in figure 1 where *factsheet adaptation cycle* is presented in terms of its substages, *search* as the starting point and broken lines representing alternative routes.
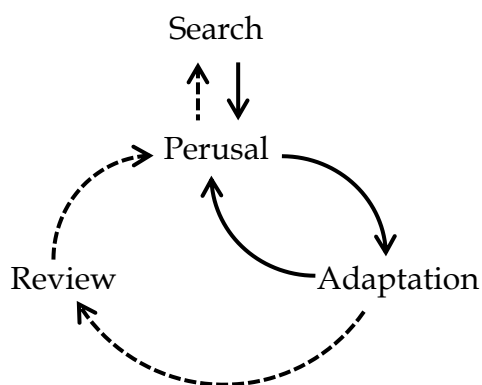

FIGURE 1   Alexis' factsheet adaptation cycle

Perusal (ending in a decision to use a source material) practically always triggers *adaptation*, which in turn sometimes triggers *review*. Again after adaptation and a possible review, another perusal occurs. There are more *reviews* towards the end of the stage than at the beginning. *Search* occurs only twice during this stage – at the beginning and in the middle – and on both occasions is followed by four sets of perusal-adaptation or perusal-adaptation-review. After finishing the factsheet, Alexis decides to prepare a homework sheet for the pupils – a stage named *homework sheet production.*

Just as Alexis, Jo also prepares a two-part material, except that teacher's notes form the second part of these materials. Jo's *worksheet production* and the *teacher's notes production* embedded in the former partially overlap with the closing stage of lesson planning, as represented by the broken line between the stages in table 1. The fact that the production of teacher's notes occurs within the worksheet production stage is represented by the indentation. Jo first draws a worksheet for the pupils, then draws a corresponding picture to act as teacher's notes and then writes teacher's notes into the picture. Despite having already moved on to teacher's notes, Jo decides to return to the worksheet and redraw it at this point. The teacher then moves on to lesson preparation but again returns to the worksheet and decides its title.

4.1.3 Closing stage

The brief closing stage for all teachers, named *lesson preparation,* is a collection of elements or substages revolving around the use of the materials made and getting ready for the lesson: *to do before lesson*, *lesson planning* and *lesson plan/homework sheet analysis*. At least one element is common to all teachers but some only to a couple of them. All three teachers mention things that need to be done before the lesson where the materials will be used. Jo, for example, comments on the need to copy the worksheet made. Alexis' lesson preparation stage, which barely amounts to a full stage and thus is in brackets in table 1, could only be said to contain this substage. On the other hand, just prior to this Alexis

analyzes what the learners will do with the homework and what elements are included in the homework sheet.

Alexis' homework sheet analysis is actually parallel to Sasha's analysis of the lesson plan devised during the materials design task – clearly a part of the *lesson preparation* stage. During this lesson plan analysis Sasha, by way of finishing off, goes through the different types of activities planned during the design: "Alright, so we got writing, k- talking, we got some... computer work and some... something. And got some music to come in." Sasha and Jo also share the substage of lesson planning belonging to the last stage.

4.2 CLIL materials design behavior

The analysis of the teachers' small-scale actions revealed a host of different types of design behaviors which fall into three major themes: *design-related behavior, information-related behavior* and *design process -related behavior.* Each of these in turn encompasses 1–3 more specific design behavior types, as summarized in table 2.

TABLE 2   CLIL materials design behavior

Design-related behavior	Information-related behavior	Design process -related behavior
Originating material	Gathering information	Process control
Adapting material	Seeking information	
Decision-making	Generating information	

4.2.1 Design-related behavior

Design-related behaviors exhibited by the CLIL teachers consist of *originating material,* the most concrete of these action types, and the more abstract *adapting material* and *decision-making.* Besides writing and drawing, *originating* also includes the copying of source material and thus creating a starting point for *adapting* the material to suit the learners. It should be noted that since planning

and production are often parallel (see chapter 4.1.2), originating material is also sometimes hidden behind decisions about content or how the materials will be used, among others. For example, Sasha's statement of "I would like them to know eyelashes" contains a decision of the content to be learned but the teacher is also writing materials at the same time.

As explained in the previous section, adaptation was extensively – and in fact almost exclusively – used by Alexis. Here *adapting* is understood to include formatting (e.g. bulleting items, changing text font, illustration size or layout) and correcting faulty or insufficient parts of the material as well as actions more traditionally associated with adaptation. Of these, text deletion and lexical simplification found in the protocols compare to the traditional adaptation type of simplification (McDonough, Shaw & Masuhara 2012, 75; Moore & Lorenzo 2007). In addition to these, once Alexis displays behavior equivalent to Moore and Lorenzo's (2007) elaboration: the teacher unfolds an anaphoric reference and so makes the sentence more explicit. Many of the formatting procedures (e.g. bullet points, making the text bigger and bold) were actually done in order to facilitate comprehension and can easily be seen as scaffolds to learning (cf. Coyle, Hood & Marsh 2010, 96–98; Guerrini 2009). *Decision-making* includes all actions that have to do with suggesting, rejecting and determining material content or characteristics, classroom activities and the use of previously made or source materials. Also postponing a decision is counted as part of decision-making.

4.2.2 Information-related behavior

If *design-related behavior* is to be focused on the materials and activities being planned, *information-related behavior* is to take one step back; to collect and create data to help the design. *Gathering information* represents the simple, mechanical procedure of reading. Actively *seeking information* by recalling things from one's own mind, searching the Internet or books, identifying issues or questions and attempting to verify uncertain facts is already a more complex procedure. When

generating information, the materials designer is even more active in combining information into descriptions, analyses and evaluations and in assuming or simulating (i.e. creating hypothetical scenarios of) something not actually existent or verifiable.

Not all heeded information is significant. Sometimes a designer might just comment on another piece of information with no apparent design-related purpose. However, designer-generated information, especially assumption and evaluation, is also by far the most common type of explanation given by a designer for another action. Occasionally a decision and the reasons given to support it are so intertwined that only the reasons are explicit in the protocol. For example, while looking for a song containing as much new vocabulary as possible, Sasha rejects one song simply by saying "Okay, there was only one new word."

4.2.3   Design process -related behavior

The third theme of materials design behavior, called *design process -related behavior*, means taking one more step back and acting on the level of the design process. The actions pertaining to it could be termed meta-planning or *process control*, the principal ones of these being surveying what has been or should be done in the design and initiating (stating what will be done next) and concluding (indicating the completion of a preceding design action or stage) individual actions.

All the three teachers studied move between these three levels; not one protocol is missing even the more abstract action of surveying. It is possible, however, that there are quantitative and/or qualitative differences between CLIL teachers in their *process control* and perhaps also in their *information-related behavior*, especially between more and less experienced teachers. This is one area that future research should look into, especially since experts have been found to use more extensive control than novices – although often "control" is

defined more broadly than here (e.g. Johnson 2003, 104–108; Schoenfeld 1985, 20, 307–314).

Finally, it is worth noting that, based on the design procedures, "designing" materials for CLIL teaching is seen by at least two of the teachers studied as encompassing more than its narrow conception of "preparing materials from scratch". Materials design can mean searching for and adapting authentic materials, using online games or videos and reusing materials previously made by oneself – as well as preparing completely new materials when needed.

5 DISCUSSION

The materials design process of the CLIL teachers studied can be summarized in four consecutive stages: 1) reading design brief, 2) topic planning, 3) materials preparation and 4) lesson preparation. The course of the materials preparation stage varied considerably between individual teachers, and their approach could be described as either activity-oriented or materials-oriented. Materials preparation included both planning and production, and two general tendencies regarding these were found: immediate production tendency and parallel planning tendency. However, individual teachers exhibited these to a varying degree. In addition, two of the teachers studied evinced a wider conception of materials design in their own design procedure: they did not just prepare CLIL materials from scratch but also searched, used and adapted materials from external sources. The materials design behaviors of CLIL teachers, based on their small-scale design actions, were categorized into three major themes: *design-related behavior, information-related behavior* and *design process - related behavior.* The information-related behavior produces data to help the design, and design process -related behavior controls the whole design process.

When these results are compared with earlier research, both differences and similarities can be detected. The framework of materials design suggested by Jolly and Bolitho (2011) and summarized earlier (see chapter 2.2.2) shares with the results of this research the view of teachers' materials design as a non-linear process with "a variety of optional pathways and feedback loops" (Jolly & Bolitho 2011, 113). Similarly Johnson's (2003) research on task designers revealed that the design process tends to be cyclical instead of linear and that some designers work in a cyclical way more than others (Johnson 2003, 111–114). Like some designers in Johnson's research, the three CLIL teachers studied

designed mostly "through the process of writing worksheets and teachers' notes" (Johnson 2003, 109).

Many times the process of materials design is presented in clean-cut stages when in fact the writers themselves describe the process as somewhat messy (Hadfield 2013). Although the results of this study also reveal a common pattern of the CLIL materials design procedure, it is just as important to perceive and appreciate the individual variation behind this pattern, note that plans can be revisited and revised and that planning can take place parallel or simultaneously with production. Variation in materials development behavior may of course result in materials of varying quality and effectiveness but studying this was well beyond the scope of this research. In the future, it would be interesting to discover whether for instance activity-oriented and materials-oriented designers produce materials of different kinds and perhaps even qualities. Johnson (2003) found many differences between expert and non-expert task designers but concluded that good task designers may have differing design styles; they may be either language or task oriented.

Earlier CLIL-specific prescriptive and descriptive accounts of materials design both support and slightly differ from the results of this study. It is remarkable that Meyer's (2010) suggestion for CLIL materials design starts with topic selection, parallel to the commencing stage common to all the CLIL teachers in this study. On the other hand, Coonan's (2007, 637) stages of CLIL materials production analyzed from interviews skip topic selection and move directly to searching for materials. The next stages in both Meyer's prescriptive "CLIL-Pyramid" and in Coonan's descriptive framework contain selecting materials or media and then creating tasks around these (Coonan 2007, 637; Meyer 2010, 23–24). Limiting materials search and selection to isolated stages contrasts to the results of this study where search happens throughout the design, not just at the beginning. In addition, Coonan's framework actually describes materials search and adaptation and neither framework includes preparing completely new materials with no source material to build upon.

The present study adds to these and other frameworks an initial description of the actual processes employed by CLIL teachers when designing materials for their CLIL teaching – either from scratch or based on source materials and adaptation – with the help of a data collection method well suited for "investigating the mental processes underlying complex task performance" and potentially providing "rich data on such cognitive processes." (Hevey 2010.) The results of this study, for example the individual variation concerning the different design approaches, could even be used in the training of CLIL teachers in materials design. The teachers could be instructed on the different options they have regarding design. The overall stages and behaviors of the design process can also be learned from and they could even affect the construction of training courses. For example, CLIL teacher trainers could make sure that design-related, information-related and design process -related behaviors are all covered in CLIL materials development training. The use of these results must of course advance with caution – their first use must be to inform. More research is still needed to confirm and expand our knowledge on the processes of CLIL materials design.

In future studies it would be useful to include more cases in the analysis in order to find out more about possible similarities and differences in CLIL teachers' design approaches. It must be kept in mind, however, that the same teachers may use different types of planning approaches at different times. Moreover, it is possible that different subjects and topics induce the production of different types of materials, and different design orientations might even be more functional in designing material for certain school subjects. It is also for future research to establish similarities and differences between CLIL materials design, EFL materials design and materials design in other subjects. One possible research scenario would be to ask different teachers – at least one teaching EFL, one CLIL and one a non-language school subject such as history or biology – to design materials for a similar topic. Comparisons between the resulting materials and perhaps also think-aloud protocols of the design process would be both

extremely interesting and useful. This kind of research would allow us a clearer view of the special requirements of planning materials for CLIL.

Another important area of further research is expertise in CLIL materials design. Comparisons of the design processes of novices and experts through think-aloud protocols would hopefully reveal expertise in CLIL materials design that eventually we might be able to teach in the pre-service and in-service training courses of CLIL teachers. This agenda is not without issues. Apart from the complex question of whether or not expertise can be taught (see, e.g. Johnson 2003, 143–145; Schoenfeld 1985) finding and recognizing experts in any field and especially in CLIL materials design is slightly problematic. There is no standard definition of or ways of measuring expertise in research. A widespread strategy of choosing "experts" for studies is to include people with 10 years of full-time experience in their field (Richey & Klein 2007, 101–102). This strategy, based in Simon and Chase's (1973) research on expert chess players, is nevertheless problematic since experience might not always lead to expertise and there might exist expert practitioners with less than 10 years of experience (Richey & Klein 2007, 101–102). When studying CLIL teachers as materials designers, such problems are magnified: how does one find even one individual who has been both a CLIL teacher and a full-time CLIL materials designer for ten years, or even the five years used by Johnson (2003)? Perhaps comparisons between trained and experienced CLIL teachers and, for instance, unexperienced novices or student CLIL teachers would be more feasible. In addition, being an experienced or a good teacher does not necessarily mean being an experienced or a good materials designer (Johnson 2003, 1). There is at least one more alternative for finding experts: assuming that expertise means expressing "superior performance in a reproducible manner", the researcher's task would be to first identify tasks that exhibit these behaviors in a given field and then find people who can perform these tasks in this expert way (Ericsson 2004).

Nevertheless, CLIL materials is an important topic that deserves more research attention in the future. We still need to "pay more attention to what

teachers do by researching how they adapt marketed textbooks and what principles they follow when engaged in producing their own CLIL materials to suit their unique realities" (Banegas 2010). Providing both descriptions of and suggestions for workable CLIL materials design procedures as well as characteristics of quality CLIL materials means – in part at least – introducing knowledge and guidelines for teacher training in CLIL materials design. When this is combined with facilitating the establishment and running of materials banks and the sharing of CLIL materials between teachers, we are one step closer to solving the CLIL materials issue and helping CLIL teachers in their efforts to provide their students with all the benefits of quality CLIL teaching.

REFERENCES

Admiraal, W., Westhoff, G., & de Bot, K. (2006). Evaluation of bilingual secondary education in the Netherlands: Students' language proficiency in English 1. *Educational Research and Evaluation*, *12*(1), 75–93.

Alonso, E., Grisaleña, J. & Campo, A. (2008). Plurilingual Education in Secondary Schools: Analysis of Results. *International CLIL Research Journal,* 1(1), 36–49.

Baetens Beardsmore, H. (1997). *Manipulating the Variables in Bilingual education.* Report on the Conference on European Networks in Bilingual Education. The European Platform for Dutch Education: The Hague.

Banegas, D. L. (2010). Three Frameworks for Developing CLIL Materials. *Folio, 14*(2).

Banegas, D. L. (2012a). CLIL teacher development: Challenges and experiences. *Latin American Journal of Content & Language Integrated Learning, 5*(1), 46–56.

Banegas, D. L. (2012b). Integrating content and language in English language teaching in secondary education: Models, benefits and challenges. *Studies in Second Language Learning and Teaching, 2*(1), 111–136.

Banegas, D. L. (2013). An investigation into CLIL-related sections of EFL coursebooks: issues of CLIL inclusion in the publishing market. *International Journal of Bilingual Education and Bilingualism*, 1–15.

Bruton, A. (2011). Is CLIL so beneficial, or just selective? Re-evaluating some of the research. *System*, *39*(4), 523–532.

Bruton, A. (2013). CLIL: Some of the reasons why… and why not. *System*, *41*(3), 587–597.

Canniveng, C., & Martinez, M. (2003). Materials development and teacher training. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 479–489.

Coyle, Do. (2007). Content and Language Integrated Learning: Towards a Connected Research Agenda for CLIL Pedagogies. *International Journal of Bilingual Education and Bilingualism, 10*(5), 543–562.

Coyle, D., Hood, P., & Marsh, D. (2010). *Content and language integrated learning*. Cambridge: Cambridge University Press.

Cenoz, J., Genesee, F., & Gorter, D. (2013). Critical Analysis of CLIL: taking stock and looking forward. *Applied Linguistics.* Oxford University Press, 1–21.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education*. 7th edition. London: Routledge.

Coonan, C. M. (2007). Insider views of the CLIL class through teacher self-observation-introspection. *International Journal of Bilingual Education and Bilingualism, 10*(5), 625–646.

Crutcher, R. J. (1994). Telling what we know: The use of verbal report methodologies in psychological research. *Psychological Science, 5*(5), 241–244.

Dalton-Puffer, C. (2007). Discourse in content and language integrated learning (CLIL) classrooms. *Language Learning & Language Teaching, 20*. Amsterdam: John Benjamins Publishing Company.

Dalton-Puffer, C. (2008). Outcomes and processes in Content and Language Integrated Learning (CLIL): current research from Europe. In W. Delanoy and L. Volkmann, (eds.) *Future Perspectives for English Language Teaching*. Heidelberg: Carl Winter.

Dalton-Puffer, C., Nikula, T., & Smit, U. (2010a). Charting policies, premises and research on content and language integrated learning. In C. Dalton-Puffer, T. Nikula & U. Smit (eds.). *Language use and language learning in CLIL classrooms, 7*. Amsterdam: John Benjamins Publishing Company, 1–19.

Dalton-Puffer, C., Nikula, T., & Smit, U. (2010b). Language Use and Language Learning in CLIL: Current Findings and Contentious Issues. In C. Dalton-Puffer, T. Nikula & U. Smit (eds.) *Language use and language learning in*

CLIL classrooms, *7*. Amsterdam: John Benjamins Publishing Company, 279–291.

Dalton-Puffer, C., & Smit, U. (2007). Introduction. In C. Dalton-Puffer & U. Smit (eds.) *Empirical perspectives on CLIL classroom discourse. Frankfurt*: Peter Lang, 7–24.

Davison, C., & Williams, A. (2001). Integrating language and content: Unresolved issues. In B. Mohan, C. Leung & C. Davison (eds.) *English as a second language in the mainstream.* Applied linguistics and language study, 51–70.

de Graaff, R., Koopman, G.J., & Westhoff, G. (2007). An Observation Tool for Effective L2 Pedagogy in Content and Language Integrated Learning (CLIL). *International Journal of Bilingual Education and Bilingualism, 10*(5), 603–622.

Ericsson, K. A. (2003). Valid and non-reactive verbalization of thoughts during performance of tasks: Towards a solution to the central problems of introspection as a source of scientific data. *Journal of Consciousness Studies*, *10*(9–10), 1–18.

Ericsson, K. A. (2004). Deliberate practice and the acquisition and maintenance of expert performance in medicine and related domains. *Academic Medicine*, *79*(10), S70–S81.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: verbal reports as data. Revised edition.* Cambridge (MA): MIT press.

Fernández Fontecha, A. (2009). Spanish CLIL: Research and official actions. *Content and language integrated learning: Evidence from research in Europe*, 3–21.

Fernández Fontecha, A. (2010). The CLILQuest: A Type of Language WebQuest for Content and Language Integrated Learning (CLIL). *CORELL: Computer Resources for Language Learning 3*, 45–64.

Fernández Fontecha, A. (2012). CLIL in the Foreign Language Classroom: Proposal of a Framework for ICT Materials Design in Language-Oriented

Versions of Content and Language Integrated Learning. *Alicante Journal of English Studies 25*, 317–334.

Filardo Llamas, L., Jiménes, E. G. C., & Canduela, L. R. (2011). On the Validity of Systemic Functinal [sic] Approaches as a Tool for Selecting Materials in CLIL Contexts. A Case Study. *Porta Linguarum 16*, 65–74.

Floimayr, T. (2010). CLIL in biology – an evaluation of existing teaching materials for Austrian schools. In U. Smit, B. Schiftner & C. Dalton-Puffer (eds.) Current research on CLIL 3, *VIEWS: Vienna English Working Papers 19*(3), 21–28.

Franklin, C., & Ballan, M. (2001). Reliability and validity in qualitative research. In B. A. Thyer (ed.) *The handbook of social work research methods*. Thousand Oaks: SAGE, 273–292.

Genesee, F. (2003). What do we know about bilingual education for majority language students? In Bhatia, T.K. & Ritchie, W. (eds.) *Handbook of Bilingualism and Multiculturalism.* London: Blackwell.

Georgiou, S. I. (2012). Reviewing the puzzle of CLIL. *ELT journal*, *66*(4), 495–504.

Gierlinger, E. M. (2007). Modular CLIL in lower secondary education: some insights from a research project in Austria. In C. Dalton-Puffer & U. Smit (eds.) *Empirical perspectives on CLIL classroom discourse.* Frankfurt: Peter Lang, 79–118.

Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching, 40*(02), 97–118

Grin, F. (2005). *Added Value of CLIL.* Paper presented at the Conference The Changing European Classroom – The Potential of Plurilingual Education, Luxembourg, 9–11 March 2005.

Guerrini, M. (2009). CLIL materials as scaffolds to learning. In D. Marsh, P. Mehisto, D. Wolff, R. Aliaga, T. Asikainen, M. Frigols-Martin, S. Hughes & G. Langé (eds.) *CLIL practice: Perspectives from the field*. University of Jyväskylä, 74–84.

Hadfield, J. (2013). Chaosmos: Spontaneity and Order in the Materials Design Process. In N. Harwood (ed.) *English Language Teaching Textbooks: Content, Consumption, Production,* 320–359.

Harwood, N. (2010). Issues in materials development and design. In N. Harwood (ed.) *English Language Teaching Materials: Theory and Practice.* Cambridge: Cambridge University Press, 3–30.

Harwood, N. (2013). Content, Consumption, and Production: Three Levels of Textbook Research. In N. Harwood (ed.) *English Language Teaching Textbooks: Content, Consumption, Production*, 1–42.

Hevey, D. (2010). Think-aloud methods. In N. J. Salkind (ed.) *Encyclopedia of research design.* Sage, 1505–1507.

Hillyard, S. (2011). First steps in CLIL: Training the teachers. *Latin American Journal of Content & Language Integrated Learning, 4*(2), 1–12.

Islam, C., & Mares, C. (2003). Adapting Classroom Materials. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 86–100.

Johnson, K. (2000). What task designers do. *Language teaching research, 4*(3), 301–321.

Johnson, K. (2003). *Designing language teaching tasks.* Basingstoke: Palgrave Macmillan.

Jolly, D., & Bolitho, R. (2011). A framework for materials development. In B. Tomlinson (ed.) *Materials development in language teaching*. 2nd edition. Cambridge: Cambridge University Press, 107–134.

Jäppinen, A.-K. (2005). Thinking and Content Learning of Mathematics and Science as Cognitional Development in Content and Language Integrated Learning (CLIL): Teaching Through a Foreign Language in Finland. *Language and Education, 19*(2), 147–168.

Korte, W. B., & Hüsing, T. (2006). Benchmarking access and use of ICT in European schools 2006. Bonn: Empirica Gesellschaft für Kommunikations- und Technologieforschung.

Lasagabaster, D. (2008). Foreign Language competence in content and language integrated courses. *The Open Applied Lingustics Journal 1*, 31–42.

Lasagabaster, D., & Sierra, J. M. (2010). Immersion and CLIL in English: more differences than similarities. *ELT Journal Volume 64*(4). Oxford University Press, 367–375.

Lehti, L., Järvinen, H.-M., & Suomela-Salmi, E. (2006). Kartoitus vieraskielisen opetuksen tarjonnasta peruskouluissa ja lukiossa. In P. Pietilä, P. Lintunen & H.-M. Järvinen (eds.) *Kielenoppija tänään – Language Learners of Today. AFinLAn vuosikirja 2006. Suomen soveltavan kielitieteen yhdistyksen julkaisuja no. 64.* Jyväskylä, 293–313.

Le Maistre, C. (1998). What is an expert instructional designer? Evidence of expert performance during formative evaluation. *Educational Technology Research and Development, 46*(3), 21–36.

Lorenzo, F. (2007). An analytical framework of language integration in L2 content-based courses: The European dimension. *Language and Education, 21*(6), 502–514.

Lorenzo, F., & Moore, P. (2010). On the natural emergence of language structures in CLIL: Towards a theory of European educational bilingualism. In C. Dalton-Puffer, T. Nikula & U. Smit (eds.) *Language Use and Language Learning in CLIL Classrooms.* Amsterdam: John Benjamins Publishing Company, 23–38.

Lucietto, S. (2008). A Model for Quality CLIL Provision. *International CLIL research journal, 1*(1), 83–92.

Luukka, M.-R., Pöyhönen, S., Huhta, A., Taalas, P., Tarnanen, M., & Keränen, A. (2008). *Maailma muuttuu – mitä tekee koulu? Äidinkielen ja vieraiden kielten tekstikäytänteet koulussa ja vapaa-ajalla.* Jyväskylän yliopisto: Soveltavan kielentutkimuksen keskus.

Maley, A. (2003). Creative approaches to writing materials. In B. Tomlinson (ed.) *Developing materials for language teaching*. London: Continuum, 183–198.

Marenzi, I., Kupetz, R., Nejdl, W., & Zerr, S. (2010). Supporting Active Learning in CLIL through Collaborative Search. In X. Luo et al. (eds.) *ICWL 2010, LNCS 6483*, 200–209.

Mares, C. (2003). Writing a coursebook. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 130–140.

Marsh, D. (ed.) (2002). *CLIL/EMILE – The European Dimension: Actions, Trends and Foresight Potential.* Public Services Contract DG EAC: European Commission.

Marsh, D., & Hartiala, A.-K. (2001). Dimensions of content and language integrated learning. In D. Marsh, A. Maljers & A.-K. Hartiala (eds.) *Profiling European CLIL Classrooms. Languages Open Doors.* Jyväskylä: European Platform for Dutch Education, The Netherlands & University of Jyväskylä, 15–53.

Marsh, D., Järvinen, H.-M., & Haataja, K. (2007). Finland: Perspectives from Finland. In A. Maljers, D. Marsh & D. Wolff (eds.) *Windows on CLIL: Content and language integrated learning in the European spotlight.* The Hague: European Platform for Dutch Education, 63–83.

McDonough, J., Shaw, C., & Masuhara, H. (2012). *Materials and Methods in ELT : a teacher's guide*. 3rd edition. Chichester: Wiley-Blackwell.

McGrath, I. (2002). *Materials Evaluation and Design for Language Teaching.* Edinburgh: Edinburgh University Press.

McGrath, I. (2013). *Teaching Materials and the Roles of EFL/ESL Teachers: Practice and Theory.* London: Bloomsbury Academic.

McNamara, C. (2009). General guidelines for conducting interviews. Retrieved September 11, 2013, from http://managementhelp.org/evaluatn/intrview.htm.

Mehisto, P. (2008). CLIL Counterweights: Recognising and decreasing disjuncture in CLIL. *International CLIL Research Journal, 1*(1), 93–119.

Mehisto, P. (2010). Criteria for Producing CLIL Learning Materials. Available at http://www.ccn-clil.eu/clil_criteria_web/index.php

Mehisto, P. (2012). Criteria for Producing CLIL Learning Material. *Encuentro 21*, 15–33

Mehisto, P., Marsh, D., & Frigols, M. J. (2008). *Uncovering CLIL: Content and Language Integrated Learning in Bilingual and Multilingual education.* Macmillan books for teachers. Oxford: Macmillan Education.

Met, M. (1998). Curriculum decision-making in content-based language teaching. In J. Cenoz & F. Genesee (eds.) *Beyond Bilingualism: Multilingualism and Multilingual Education.* Clevedon: Multilingual Matters, 35–63.

Mewald, C. (2007). A comparison of oral FL performance. In C. Dalton-Puffer & U. Smit (eds.). *Empirical perspectives on CLIL classroom discourse.* Frankfurt: Peter Lang, 139–178.

Meyer, O. (2010). Towards quality CLIL: successful planning and teaching strategies. *Puls 33*, 11–29.

Mishan, F. (2005). *Designing authenticity into language learning materials.* Bristol: Intellect Books.

Moore, P., & Lorenzo, F. (2007). Adapting authentic materials for CLIL classrooms: An empirical study. In U. Smit, & C. Dalton-Puffer (eds.) Current research on CLIL 2, *VIEWS: Vienna English Working Papers 16*(3), 28–35.

Morton, T. (2013). Critically Evaluating Materials for CLIL: Practitioners' Practices and Perspectives. *Critical Perspectives on Language Teaching Materials*, 111–136.

Navés, T. (2009). Effective content and language integrated learning (CLIL) programmes. *Content and language integrated learning: Evidence from research in Europe*, 22–40.

Nikula, T. (2007). The IRF pattern and space for interaction: comparing CLIL and EFL classrooms. In C. Dalton-Puffer & U. Smit (eds.) *Empirical perspectives on CLIL classroom discourse.* Frankfurt: Peter Lang, 179–204.

Novotná, J., & Moraová, H. (2005). Cultural and linguistic problems in the use of authentic textbooks when teaching mathematics in a foreign language. *ZDM*, *37*(2), 109–115.

Opetushallitus. (2004). *Perusopetuksen opetussuunnitelman perusteet 2004.* Helsinki: Opetushallitus.

Popovici, R., & Bolitho, R. (2003). Personal and professional development through writing: The Romanian textbook project. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 505–517.

Prowse, P. (2011). How writers write: testimony from authors. In B. Tomlinson (ed.) *Materials development in language teaching.* 2nd edition. Cambridge: Cambridge University Press, 151–173.

Richey, R. C., & Klein, J. D. (2007). *Design and development research: Methods, strategies and issues.* Mahwah: Lawrence Erlbaum Associates, Inc.

Saldaña, J. (2013). *The coding manual for qualitative researchers.* 2nd edition. London: Sage.

Samuda, V. (2005). Expertise in Pedagogic Task Design. In K. Johnson (ed.) *Expertise in Second Language Learning and Teaching.* Palgrave Macmillan, 150–164.

Saraceni, C. (2003). Adapting Courses: A Critical View. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 72–85.

Schoenfeld, A. H. (1985). *Mathematical problem solving*. Orlando: Academic Press, Inc.

Seitamaa-Hakkarainen, P. (1999). Ääneenajattelumenetelmä. Available at http://www.metodix.com/fi/sisallys/01_menetelmat/02_metodiartikkel it/seitamaa_protokolla_analyysi/?tree:D=168739&tree:selres=&hrpDelim Char=%3B&parentCount=1

Simon, H. A., & Chase, W. G. (1973). Skill in chess. *American scientist*, *61*(4), 394–403.

Smagorinsky, P. (1989). The reliability and validity of protocol analysis. *Written communication*, *6*(4), 463–479.

Strauss, A., & Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Newsbury Park: SAGE Publications.

Sudhoff, J. (2010). CLIL and Intercultural Communicative Competence: Foundations and Approaches towards a Fusion. *International CLIL research journal, 1*(3), 30–37.

Sylvén, L. K. (2007). Are *The Simpsons* Welcome in the CLIL Classroom? In U. Smit, & C. Dalton-Puffer (eds.) Current research on CLIL 2, *VIEWS: Vienna English Working Papers 16*(3), 53–59.

Sylvén, L. K. (2013). CLIL in Sweden – why does it not work? A metaperspective on CLIL across contexts in Europe. *International Journal of Bilingual Education and Bilingualism, 16*(3), 301–320.

Tedick, D. J., & Cammarata, L. (2012). Content and language integration in K–12 contexts: Student outcomes, teacher practices, and stakeholder perspectives. *Foreign Language Annals*, *45*(S1), S28–S53.

Ting, Y. L. T. (2010). CLIL appeals to how the brain likes its information: examples from CLIL-(Neuro) Science. *International CLIL Research Journal 1,* 1–18.

Tomlinson, B. (2001). Materials development. In R. Carter & D. Nunan (eds.) *The Cambridge Guide to Teaching English to Speakers of Other Languages.* Cambridge: Cambridge University Press, 66–71.

Tomlinson, B. (2003a). Developing Principled Frameworks for Materials Development. In B. Tomlinson (ed.) *Developing materials for language teaching. London: Continuum,* 107–129.

Tomlinson, B. (2003b). Introduction: Are Materials Developing? In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 1–11.

Tomlinson, B. (2003c). Materials development courses. In B. Tomlinson (ed.) *Developing materials for language teaching*. London: Continuum, 445–461.

Tomlinson, B. (2003d). Materials evaluation. In B. Tomlinson (ed.) *Developing materials for language teaching.* London: Continuum, 15–36.

Tomlinson, B. (2009). Principles and procedures of materials development for language learning. *Metodologias e Materiais para o ensino do Português como Língua Não Materna*, 45–54.

Tomlinson , B. (2011). Glossary of basic terms for materials development in language teaching. In B. Tomlinson (ed.) *Materials development in language teaching.* 2nd edition. Cambridge: Cambridge University Press, ix–xviii.

Tomlinson, B. (2012). Materials development for language learning and teaching. *Language Teaching, 45*(2), 143–179.

Turner, D. W. (2010). Qualitative interview design: A practical guide for novice investigators. *The Qualitative Report, 15*(3), 754–760.

van Braak, J., Tondeur, J., & Valcke, M. (2004). Explaining different types of computer use among primary school teachers. *European Journal of Psychology of Education*, *19*(4), 407–422.

Yano, Y., Long, M. H., & Ross, S. (1994). The effects of simplified and elaborated texts on foreign language reading comprehension. *Language Learning*, 44(2), 189–219.

Ziegelwagner, M. (2007). Chancen und Probleme des CLIL-Geschichtsunterrichts. In C. Dalton-Puffer & U. Smit (eds.). *Empirical perspectives on CLIL classroom discourse.* Frankfurt: Peter Lang, 291–326.

APPENDICES

APPENDIX 1: THE DESIGN BRIEF

Imagine that tomorrow you will be teaching your class biology in English (through CLIL teaching). The topic of tomorrow's lesson is the human body, but you cannot find suitable materials for the lesson. You decide to design the needed CLIL materials yourself. Your task now is to design and prepare these materials. You have pencils, paper, a computer and an internet connection at your disposal. If you make use of the computer, you may use the Web browsers, word processors and slide show programs found on the desktop. You can save files on the desktop.

Try to make the materials as complete as possible so that you could use them tomorrow. If for some reason you cannot finish the materials, end the task by writing down what is still missing. When you are designing the materials, work exactly as you normally would in a similar situation in your work. You may further define the topic of the lesson if you wish.