ADVANCED SECOND-LANGUAGE READING AND VOCABULARY LEARNING IN THE PARALLEL-LANGUAGE UNIVERSITY

Špela Mežek
Advanced second-language reading and vocabulary learning in the parallel-language university

Špela Mežek
Abstract

Due to the internationalisation of higher education, the use of English at higher education institutions has become widespread. Today an increasing number of students participate in courses with the local language as medium of instruction but with textbooks in English. These have been called parallel-language courses, because they are expected to facilitate learning disciplinary discourse in two languages: the local language and English.

This thesis reports an exploration of Swedish students’ reading and learning from English textbooks in parallel-language courses. The overarching aim was to investigate the relationship between the students’ Swedish and English reading habits and reading proficiency, their academic biliteracy, and incidental learning of subject-specific terminology in English from reading. The study also set out to identify pedagogical solutions to facilitate students’ reading and learning from reading in English.

The investigation comprised four studies which utilised a variety of methods and approaches, both qualitative and quantitative. Participants were Swedish and British students of biology and Swedish students of English.

The results show that many Swedish students are capable of reading and learning from texts in Swedish and English without experiencing serious difficulties, although additional support is required for the learning of English terminology. The findings also indicate that some students’ difficulty when reading in English is not due to poor English language proficiency, but rather a range of other factors such as weak general literacy skills, low motivation, low subject and vocabulary knowledge, note-taking strategies, slow reading speed, and time. For some students, learning is also rendered difficult by their self-perceptions and beliefs about reading and learning.

Based on my findings, I propose a range of practices for EAP and subject teachers to adopt in order to improve reading and learning in parallel-language courses.

Keywords: advanced second-language reading, biliteracy, content courses, English textbooks, higher education, incidental vocabulary learning, parallel-language courses, reading to learn, Sweden.

©Špela Mežek, Stockholm University 2013


Printed in Sweden by Universitetsservice AB, Stockholm 2013
Distributor: Department of English, Stockholm University
To my family.
List of studies


II. High-proficiency L2 study reading: Effects of time and language of production. (Submitted).


Contents

Introduction ........................................................................................................................................... 1
1. Educational linguistics .................................................................................................................. 4
2. The parallel-language university ................................................................................................. 6
   2.1 Origin of the concept of parallel languages ......................................................................... 6
   2.2 Definition(s) of parallel-language use .................................................................................. 8
   2.3 Parallel-language courses ....................................................................................................... 10
   2.4 Parallel-language courses with textbooks in English ......................................................... 12
3. Learning from second-language textbooks in parallel-language courses 15
   3.1 The aims of learning from second-language textbooks ....................................................... 15
   3.2 The problems of learning from second-language textbooks ............................................. 16
4. Theories and models of second-language reading and vocabulary learning .............................. 19
   4.1 Continua of biliteracy ............................................................................................................. 19
   4.2 Reading and reading to learn in a second language ............................................................... 23
   4.3 A compensatory model of second-language reading ........................................................... 25
   4.4 Learning subject-specific terminology from reading in a second language .................... 27
       4.4.1 The definition of subject-specific terminology .......................................................... 28
       4.4.2 Incidental vocabulary learning from second-language reading ................................ 29
       4.4.3 Incidental subject-specific terminology learning from second-language reading in parallel-language courses .......................................................... 30
5. Overview of the studies .................................................................................................................. 31
   5.1 The English Vocabulary Acquisition project .......................................................................... 33
       5.1.1 The EVA project: Stage 1, observational/descriptive studies ........................................ 34
       5.1.2 The EVA project: Stage 2, experimental studies ............................................................ 35
   5.2 Methodology ............................................................................................................................ 37
       5.2.1 Participants ...................................................................................................................... 37
           Studies I and II ..................................................................................................................... 37
           Studies III and IV ............................................................................................................... 39
       5.2.2 Methods ......................................................................................................................... 39
           Study I ................................................................................................................................. 41
           Study II ............................................................................................................................... 43
           Study III ............................................................................................................................. 46
           Study IV ............................................................................................................................. 48
   5.3 Summaries of studies ................................................................................................................. 49
5.3.1 Study I: Multilingual reading proficiency in an emerging parallel-language environment ........................................49
5.3.2 Study II: High-proficiency L2 study reading: Effects of time and language of production .........................................................51
5.3.3 Study III: Learning terminology from reading texts in English: The effects of note-taking strategies ........................................51
5.3.4 Study IV: Learning subject-specific L2 terminology in a parallel-language HE course: The effect of medium and order of exposure ....52
6. Conclusion..........................................................................................53
6.1 Implications for teaching: English for Academic Purposes (EAP) support..................................................................................56
6.2 Implications for teaching: Content teachers........................................57

Summary in Swedish / Sammanfattning ........................................59
1. Bakgrund..............................................................................................59
2. Frågeställningar ..................................................................................61
3. Metoder ...............................................................................................61
4. Resultat ................................................................................................63
  4.1 Studie I ............................................................................................63
  4.2 Studie II ..........................................................................................64
  4.3 Studie III ........................................................................................65
  4.4 Studie IV..........................................................................................65
5. Slutsatser och pedagogiska förslag ......................................................66
  5.1 Pedagogiska förslag: Hjälp med akademisk engelska ......................67
  5.2 Pedagogiska förslag: Ämneslärare ..................................................68

Acknowledgements .................................................................................70

References .............................................................................................71

The studies .............................................................................................83
## Abbreviations

<table>
<thead>
<tr>
<th>ART</th>
<th>Author Recognition Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIL</td>
<td>Content and Language Integrated Learning</td>
</tr>
<tr>
<td>EAP</td>
<td>English for Academic Purposes</td>
</tr>
<tr>
<td>EMI</td>
<td>English-medium instruction</td>
</tr>
<tr>
<td>EVA</td>
<td>English Vocabulary Acquisition project</td>
</tr>
<tr>
<td>L1</td>
<td>first language</td>
</tr>
<tr>
<td>L2</td>
<td>second/foreign language</td>
</tr>
<tr>
<td>SweSAT-R</td>
<td>Swedish Scholastic Aptitude Test–Reading test</td>
</tr>
</tbody>
</table>
Introduction

English is widely used not only as a means of everyday communication between speakers of different nationalities, but also in international organisations, commerce, and in the context of higher education and science. However, this has not always been the case. At the beginning of the twentieth century, three languages had international currency in different domains: in international trade primarily English was used, in international diplomacy French, and in science German (Ammon & McConnell, 2002). With the rise of the US to power after the Second World War, English became dominant in all three domains, and its position has been largely uncontested since then. English is now used in many international domains, including Internet communication, scientific publication, tertiary education, and technology transfer (Graddol, 1997).

Within the domain of higher education, the use of English has become widespread due to higher education becoming “a highly competitive milieu” affected by market economy and instantaneous spread of information via the Internet (Ammon & McConnell, 2002, p. 171). Consequently, institutions of higher education have felt the need to become more international, which has in most cases resulted in an increase in the use of English at institutions which have another language as the primary operation language. The particular reasons behind the use of English in universities have been to establish the profile of an international university, to attract foreign students, scientists and scholars, to give students and staff English language competence which will prepare them for the global market and increase their employability, and to establish academic and scientific relations with other international institutions (Ammon & McConnell, 2002; Coleman, 2006; Wächter & Maiworm, 2008).

With internationalisation in mind, many universities have started providing courses and degree programmes with English as the medium of instruction, attended not only by international and exchange students, but also by domestic students. In the last two decades in Europe, there has thus been an “exponential growth” in English-medium teaching (Coleman, 2006, p. 6), with the consequence that English-medium courses and degree programmes are now “a regular feature of European higher education” (Wächter & Maiworm, 2008, p. 91). These types of courses have been the focus of a considerable amount of research. Phenomena which have been studied include, for example, the use of English as an academic lingua franca (e.g. Björkman,
2010; Hynninen, 2013; Mauranen, 2012) and the use of other languages within these types of courses (e.g. Söderlundh, 2010; Tange, 2011). Studies have also investigated student learning in English-medium courses (e.g. Airey, 2009; Klaassen, 2001; Vinke, 1995).

However, internationalisation of higher education and scientific publishing has also resulted in an increasing use of English textbooks in countries where English is not the national language (Graddol, 2006). While other reasons are often given for using English textbooks, such as students learning the language and disciplinary discourse in English from the textbooks (Pecorari, Shaw, Irvine & Malmström, 2011a), the main reason for using textbooks originally written for native speakers of English is economic. Writing textbooks in local languages and translating English textbooks into local languages is often unprofitable, as some language markets are too small. English textbooks, on the other hand, are produced for big language markets, which means that the publishers can afford to produce textbooks with attractive, colourful illustrations and additional online study resources. Many English textbooks are thus considered to be of high quality (Ljosland, 2011). In addition, they are frequently updated, which is very important in disciplines such as biology where new scientific discoveries are made every day. These characteristics make these textbooks very attractive; however, it is precisely these characteristics that also make translations of these textbooks problematic and, above all, unprofitable for markets the size of Sweden, for example. Translation of English textbooks into local languages is thus rare in many disciplines. Consequently, many students around the world attend courses where the medium of instruction is a local language, but where at least some of the reading is in English.

In the Nordic countries, the discussion of the increasing use of English in science and academia has revolved around the concept of parallel languages (the “concurrent” and “equal” use of two languages), which has arisen within a discourse of concern about protecting and promoting the local languages (see Section 2). This concept has thus been used when discussing the use of English in research and in teaching, for example in lectures, seminars, and in various learning materials such as handouts and textbooks. Because the concept of parallel languages revolves around the use of two languages, courses where students undergoing university education learn subject matter through two languages, the local language and English, are thus sometimes referred to as parallel-language courses. In practice, such courses often involve reading in English, while other learning activities (lectures, seminars, laboratory work, etc.) and assessment are typically in the local language.

Despite calls for local languages to maintain a strong position in the face of the inevitability of English, problems have been identified in this type of learning situation. One of the concerns raised regarding this learning situation has had to do with domain loss. In some scientific and academic domains, English is the language of research and publication, so some have
warned against the local languages losing their status to English in those domains (e.g. Gunnarsson, 2001; Höglin, 2002; Linn, 2010). Some are worried by the fact that, because it is not financially profitable to publish textbooks for smaller language markets, the number of textbooks being written in the local languages has declined (Höglin, 2002). In many disciplines, few, if any, textbooks in languages other than English are available. Because of this, the concern is that, in disciplines where mainly English is used for publication and learning from reading, the development of terminology in the local language will stagnate.

Questions have also been raised in the context of parallel-language courses regarding the impact of English textbooks on students’ content uptake. In many cases, students are already expected to have the English reading abilities to be able to learn from reading in English when they enter university (Gunnarsson & Öhman, 1997; Hellekjær, 2009). However, some students have been said to not completely understand the content in the English textbooks and thus not to gain the knowledge expected of them (Gunnarsson, 2001). A related concern has also been the lost opportunities to develop students’ first language (L1) academic literacy, which is made more difficult if all the reading the students do is in English. Furthermore, it has also been questioned whether using textbooks in English is in fact effective in the aim of promoting incidental vocabulary learning, which is one common reason for their use (Pecorari et al., 2011a). Thus the situation of students having to learn through two languages, by listening, talking, and writing in one language and reading in another, has been identified as a problem which needs further investigation.

These concerns related to the use of English in higher education have been raised not only in Sweden, but in the rest of the Nordic region as well. This investigation, however, is situated within the context of higher education in Sweden. It aims to explore some of the problems which may arise in the specific form of the parallel learning situation in which students attend courses with Swedish as the language of instruction, but where the assigned textbook reading is in English. The particular purpose is to investigate two issues which have the potential to impact learning outcomes from English textbooks: (i) Swedish students’ academic English reading abilities, and (ii) incidental English vocabulary learning, and more specifically, subject-specific terminology learning from reading in English. The investigation was conducted within the field of educational linguistics, the principles of which were used to guide the investigation from start to finish. The four studies which comprise the investigation were conducted within the project English Vocabulary Acquisition (EVA; see Section 5.1). Each study approached the topic of Swedish students’ reading in English and vocabulary learning from reading in English from a different angle, so a variety of methods and approaches, both qualitative and quantitative, were employed. These studies were written up as separate articles.
This introductory chapter is intended to provide a context for the articles which make up the rest of this thesis. It is organised into six sections. Section 1 describes the theoretical framework, drawn from educational linguistics, which underpinned this investigation. Section 2 describes the origins and definition of the concept parallel-language use and of parallel-language courses. Learning, the aims, and the problems arising in parallel-language courses are the subjects of Section 3. Theories and models of second-language (L2) reading and vocabulary learning are presented in Section 4. A general summary of the empirical work reported here, along with the discussion of methods and participants, and commentary on and summaries of the four studies, can be found in Section 5. That section also contains a description of the work done in the EVA project and how the present thesis relates and contributes to the work within the project. Section 6 presents the overarching conclusions of the four studies taken together and their implications for teaching. The introductory chapter is followed by a chapter containing the summary of the thesis in Swedish. The four articles can be found at the end of the thesis.

1. Educational linguistics

Educational linguistics is a rather young branch of applied linguistics (Hult, 2008); its focus is narrower than that of applied linguistics in that it is linguistics applied to the field of education (Davies, 2007; Hult, 2008). Its primary concern is, therefore, the role of language in education. The field emerged in the 1970s as a response to the increasing needs of language education in the last few decades (Spolsky, 2008). A widely discussed issue in educational linguistics has been the impact of the globalised world on the role of language (in) education. Research in this area has thus focused on various topics and issues which have increased in importance as a consequence of globalisation. Issues dealt within the literature include, for example, bi/multilingual education, biliteracy, language acquisition, language assessment, language ecology and education, language education policy, and literacy development (see Hult, 2010; Spolsky & Hult, 2008). Research within the field has therefore focused on various issues related to language learning/teaching and learning/teaching through language.

The field is grounded in educational practice, so the starting point of research within educational linguistics is a problem identified within the educational practice in focus (Hornberger, 2001). Educational linguistics is a problem- and practice-oriented approach; research in this field is guided by educational practice, while at the same time its aim is to inform practice and policy (Hult, 2008). The purpose of research within educational linguistics has, therefore, not only been to provide an insight into the various social processes that affect educational policy and practice, but also to serve as a
basis for effective educational policy and to suggest measures to increase learning of languages as well as learning through languages (Hult, 2008, 2010).

Educational linguistics research is transdisciplinary (Hult, 2008). Research in this field starts by identifying a problem within educational practice, after which theories and methods employed to investigate this particular problem are chosen from a range of disciplines on the basis of context and investigative needs. Research within educational linguistics is thus both narrow and broad: narrow in the sense that the focus is on a particular problem in language (in) education, and broad in the sense that a range of methods, theories, and approaches are employed (Hornberger, 2001; Hornberger & Hult, 2006; Hult, 2010). The usefulness, effectiveness, and suitability of methods employed in this type of research are typically re-evaluated during the course of investigative work (Hult, 2010, p. 26), resulting in this problem-oriented and transdisciplinary approach having the ability “to fit the needs of research and practice in an ever-changing multilingual world” (Hornberger & Hult, 2006, p. 80).

Another important characteristic of research within educational linguistics is that it takes into account the relationships between research, theory, policy, and practice (Leung, 2010). Thus “educational linguistics takes as its starting point the practice of (language) education, addressing educational problems and challenges with a holistic approach which integrates theory and practice, research and policy” (Hornberger, 2001, p. 11). Any research done within educational linguistics has to consider ways in which it could positively impact educational practice, by feeding back either into language/educational policy or directly into educational practice. The relationship between policy, theory, practice, and research is thus an important factor in educational linguistic research. Therefore, educational linguistics is well suited as a framework to investigate issues related to language and education in contexts where there is a gap in the knowledge of how policy affects learning and how learning could be maximised within that context.

The work toward this thesis has been guided by these key characteristics of educational linguistics—its problem-centric nature, its grounding in educational practice, and its policy-practice synergy—since its inception. The problem at the heart of this thesis is the use of English textbooks in courses where the language of instruction is the local language. These types of courses are often called parallel-language courses in the Nordic countries and are invested with the expectations that they will foster parallel-language competence in students, and, more specifically, that students have the ability to learn from reading in English, and that they will learn English subject-specific terminology incidentally. In the present work this problem is investigated in the Swedish context, though it also arises elsewhere. The debate about parallel languages in language policy documents thus serves as a background to this investigation. The principal aim of this investigation is,
after examining the students’ reading and learning terminology from reading in English, to present recommendations as to how to enhance reading and language learning outcomes for students in these settings.

2. The parallel-language university

In the context of higher education in the Nordic countries, courses and degree programmes where both the local language and English are in use are sometimes referred to as parallel-language courses. The concept of parallel languages, and thus the expression parallel-language course, originates in the debate surrounding the issue of English dominance in science and academia and the concern that it is negatively affecting the use and development of national languages. The term parallel-language course is thus primarily a policy term rather than an educational term. This section will discuss the beginnings of the concept of parallel languages and how this concept has been interpreted and used in higher education.

2.1 Origin of the concept of parallel languages

The description of the use of languages as “parallel” was first used in Nordic language policy documents written to protect and promote the national languages. The “parallel use” (Sw. parallell användning) of English and the national language was mainly discussed within the context of higher education as a response to perceived or feared domain loss of the national language to English.

One of the first Nordic language policy documents to discuss the use of a national language and English in parallel was the Swedish Draft action programme for the promotion of the Swedish language (Swedish Language Council, 1998). This draft programme identified several potential problems within higher education: the use of English learning materials (e.g. textbooks, handouts), English as the language of instruction, the increasing use of English in research, the ability of experts to discuss their subject matter in Swedish, and lecturers’ and students’ overestimated proficiency and ability to teach and learn in English. A major point of concern was the development of “separate domains” (Swedish Language Council, 1998, p. 20), with beginner courses taught in Swedish, and advanced courses taught in English. To prevent this, the policy draft encouraged “enhancing students’ ability to use Swedish and English in parallel in their subjects” (Swedish Language Council, 1998, p. 20), although it did not provide an elaboration of how this could be achieved.

The use of English in higher education was also a theme of the draft action programme Mål i mun: Förslag till handlingsprogram för svenska språket / Speech: Draft action programme for the Swedish language, devel-
oped by the parliamentary Committee on the Swedish Language between 2000 and 2002 (2002a). Similarly to the Draft action programme of 1998, Mål i mun identifies points of concern related to the use of English within higher education. However, the authors of this draft go even further and issue a warning about the possibility of domain loss (p. 48) and even diglossia (p. 50), with Swedish as the low variety and English the high variety. Within higher education they also identify the trend that certain fields, for example the natural sciences, are affected more by the use of English than others; in addition, higher levels of education (e.g. MA courses) are affected more than lower ones (pp. 81–82). The Committee’s solution to these problems was to strengthen the status of Swedish within higher education.

However, this should not occur at the expense of English. Both Swedish and English are needed. Any discussion of the relationship between Swedish and English in the Swedish university system should thus involve a both/and, and not an either/or proposition. (Committee on the Swedish Language, 2002a, p. 90, translation ŠM)

The proposed solution involved the use of both Swedish and English. Thus “parallel employment of English and Swedish in research and scholarship” was to be promoted (Committee on the Swedish Language, 2002b, p. 3). However, what was meant by parallel employment was not defined.

The actual term parallel-language use (Sw. parallellspråkighet, Dan. parallelspråklighed) or parallel-lingualism1, as it is sometimes also called, was not used until 2001 (Davidsen-Nielsen, 2008). In that year, the language policy reference group of the Nordic Council of Ministers launched a language policy project the aim of which was to investigate the status of the languages of the Nordic countries and the impact English has had on them. The findings of the project were summarised in ten reports, each with a focus on one of the following languages: Danish, Faroese, Finland-Swedish, Finnish in Sweden, Finnish, Greenlandic, Icelandic, Norwegian, Sami, and Swedish. According to Davidsen-Nielsen (2008), the term parallel-language use was used for the first time in connection with this project at a Nord-målforum (Nordic languages forum) conference in 2001.

Following the conference, the reports from the language policy reference group project and the Swedish draft action programme Mål i mun (Committee on the Swedish Language, 2002a) were the basis for the volume Engelska språket som hot och tillgång i Norden / English language as a threat and an asset in the Nordic countries (Höglin, 2002). This volume identified similar problematic themes in the Nordic higher education context as the two

1 Both parallel-language use and parallel-lingualism are used in the policy documents. They are both English translations of the Swedish word parallellspråkighet and used interchangeably. In this thesis both of these terms will be used, although their use will usually depend on how the term was translated in the document being discussed.
earlier Swedish draft action programmes: domain loss, the increasing use of English learning materials, English as the language of instruction, etc. In this volume, parallel-lingualism was seen as something desirable:

Thus, English is necessary and desirable at Nordic universities and university colleges. You must have a sufficient command of scientific English and be able to use it frequently. However, this must not be allowed to result in the disappearance of the Nordic languages from universities. What is desirable is parallel-lingualism, not monolingualism, whether it is a question of a Nordic language or English. (Höglin, 2002, p. 110; from the author’s summary written in English)

What was seen as important, therefore, was the use of not only English or only the national language, but the use of the national language and another language, be it another language of a Nordic country or English. This volume thus cautioned against the development of (English) monolingualism within certain scientific/academic fields and encouraged strengthening the position of national languages within the context of higher education in the Nordic countries.

2.2 Definition(s) of parallel-language use

The language policy reference group’s reports on the status of the languages of the Nordic countries ultimately resulted in the Declaration on a Nordic language policy (Nordic Council of Ministers, 2006), a document which promoted the languages of the Nordic countries within and cooperation among Nordic countries. This language policy document also endorsed parallel-language use in higher education and was the first attempt to define what was meant by parallel use of languages. The Declaration on a Nordic language policy defines it as:

the concurrent use of several languages within one or more areas. None of the languages abolishes or replaces the other; they are used in parallel. (Nordic Council of Ministers, 2006, p. 93)

Parallel use of languages is clearly differentiated from multilingualism, as it is discussed in a separate section (p. 94). According to this document, parallel use of languages is the use of two or more languages confined to a specific field. The fields identified are academic, scientific, and to some extent professional, and the languages which should be used in parallel are not only the national language and English, but also the other languages of the Nordic countries. The important characteristic of how these languages are used within particular fields/domains is that they do not compete with one another, but instead co-exist. In effect, this policy is an attempt to limit the dominance of English within certain contexts.
Future language policy propositions strengthened the idea that parallel-lingualism is different from multilingualism. Värna språken—förslag till språklag / Safeguarding language—proposal for a language act (Swedish Ministry of Culture, 2008, translation ŠM), for example, states that “people are not parallel-lingual, but bi- or multilingual” (p. 45, translation ŠM). The concept of parallel-lingualism instead refers to the use and availability of languages in specific contexts:

Parallel-lingualism does not necessarily mean that language is used to the same extent, but that information, and with it relevant terminology, exists in both languages. (Swedish Ministry of Culture, 2008, p. 45, translation ŠM)

Parallel-lingualism is seen as the opposite of and as a solution to domain loss and diglossia (Josephson, 2005). Through parallel languages, it is argued that the functions of the Swedish language can be preserved (Swedish as a scientific/academic language) and the development of Swedish terminology encouraged. The discussion about parallel languages and parallel-lingualism in language policy documents is thus about language cultivation through status and corpus planning (Cooper, 1989; Hornberger, 2006).

However, the definition of parallel-language use in these documents is still fairly vague. While the policy documents distinguish parallel-language use from monolingualism and bi/multilingualism, and domain loss and diglossia, what exactly is meant by parallel or concurrent use is less clear. The concept has thus been said to be “an intuitively appealing idea, but a somewhat fuzzy and probably unrealistic target” (Phillipson, 2006, p. 25) and “a notion in flux, one which is defined differently in different documents” (Linn, 2010, p. 299). Many have also pointed out that it is unclear how this policy could be implemented and what its implications would be (e.g. Airey & Linder, 2008; Airey, 2009; Bolton & Kuteeva, 2012; Ferguson, 2007; Kuteeva, 2011; Kuteeva & Airey, 2013; Salö, 2010).

What also makes the concept unclear is that, because it is an attempt at both status (function) and acquisition planning (Cooper, 1989), policy documents state how and where languages should be used and at the same time specify the desired level of ability of language users, or, in other words, their competence. Competence is also discussed in terms of the availability of terminology to transmit subject-specific knowledge in two languages (corpus planning). The three dimensions of language planning (status, corpus, and acquisition planning) are, indeed, inter-related, although the relationships between them are complex and not always clear.

Airey and Linder (2008) point out that in the context of teaching, for example, a greater use of a language in teaching will not always result in the students’ greater language competence: “it is dangerous to assume that there is a one-to-one relationship between teaching and learning in this way” (p. 150). They instead emphasise that a needs analysis of student language skills
would first have to be conducted, after which the course should be designed to teach the identified skills to students. The use of different languages in the classroom would thus not necessarily be parallel, but would be adapted to the learning needs of the students within a particular field.

A greater competence in a given language also does not mean that there will be, or perhaps even should be, a greater use of it. Even though speakers may have good language abilities, the choice of language will depend on the situation: the purpose and the audience of communication. In other words, efficiency and appropriateness will steer language choice (Siiner, 2010). Preisler (2009) gives a similar argument in his critique of the concept of parallel languages. He claims that since language users choose language on the basis of communicative need, the languages in use—in his example Danish and English—will not be used in parallel. Instead, there will be a “functional (complementary) distribution” of the languages (p. 13). English will be used in contexts when not all participants understand Danish, and Danish will be used when the expectation is that they do; in other words, English is used in contexts where Danish cannot be used. Some contexts thus call for the use of the national language, some for English, and in some contexts both can be used (Norén, 2006). Accordingly, since the distribution of languages is affected by the communicative needs of the participants, the relationship between complementary languages is not “inherently or by definition hierarchical”, and it is not parallel either (Preisler, 2009, p. 13).

The concepts of parallel languages and parallel-language use are thus still rather fuzzy and difficult to apply. In particular, it is unclear how these concepts could translate into practice; the status of this concept is “still one of an unoperationalized political slogan” (Kuteeva & Airey, 2013, p. 4). As discussed above, some have challenged the idea that parallel use will result in parallel competence and that parallel use is always desirable or efficient. In addition, the term itself is problematic because the word parallel seems to imply independent or even separate tracks, while in reality there is combination or intersection happening between the uses of the languages. How this concept has been interpreted in the context of higher education is discussed in the next section, which deals with parallel-language courses.

2.3 Parallel-language courses

In the context of higher education in Sweden, the use of parallel languages has been discussed as a practice at three levels: (i) the university/institution; (ii) researchers and teachers; and (iii) students. At the level of the university, the discussion has centred on rules and regulations regarding the use of languages in research and teaching at the universities (e.g. Björkman, 2013; Hult & Källkvist, 2013), as well as the use of languages in administration. For example, many of the existing Swedish university language policy documents stress the importance of information (e.g. course descriptions and
websites) being accessible in both Swedish and English (Göteborg University, 2006; KTH Royal Institute of Technology, 2010; Malmö University, 2010; Stockholm University, 2011; Umeå University, 2008). At the level of staff, the focus has been on publication practices of researchers (e.g. Lillis & Curry, 2010; Petersen & Shaw, 2002), and at the level of teachers, on their abilities to teach in the local language and English, their teaching practices in the two languages, and their attitudes (e.g. Airey, 2011, 2012; Thøgersen & Airey, 2011).

At the level of student experiences and practices, research has been done in various types of settings. Because there is no clear agreement as to what parallel-language use would mean at the level of course, programme, or degree design, the term has been applied to various teaching situations. The three most common are: (i) students attending BA degree programmes in the local language and MA degree programmes in English (e.g. Gustafsson, 2011; Pecorari et al., 2011a); (ii) students attending courses with the majority of the teaching in the local language, and only some parts of the course, for example learning materials or certain lectures, in English (e.g. Blåsjö, 2011; Preisler, 2009; Pecorari et al., 2011a; Pecorari, Shaw, Malmström & Irvine, 2011b; Shaw & McMillion, 2011); and (iii) students being able to choose between an identical programme or course in the local language or English (e.g. Norén, 2006; Preisler, 2009).

The reason that all of these different types of courses are sometimes referred to as parallel-language courses is that two languages are present in all, and all are regarded as promoting (academic) language competence in both languages, although this is done in different ways. Students who attend BA degree programmes in the local language and MA degree programmes in English are expected to gain academic language competence in the two languages successively, while those who attend courses in the local language with some elements in English are expected to gain academic competence in the two languages simultaneously. These two types of courses/programmes are thus considered to promote academic language competence in two languages in individuals. On the other hand, when students can choose the language in which they will study a programme or course, individual students will probably not gain academic language competence in two languages; however, academic language competence will be fostered in the two languages at the level of the population, or for example, development of terminology.

Investigations of experiences and practices of students attending these different types of courses have been conducted in the context of student thesis writing (Berg, Hult & King, 2001; Gunnarsson & Öhman, 1997; Salö, 2010) and students attending courses where English is the language of instruction (Airey, 2009; Björkman, 2010; Bolton & Kuteeva, 2012; Söderlundh, 2010). Students attending courses where the majority of the teaching is in the local language and some learning materials, for example textbooks, are in English
have hitherto been investigated less (see Section 5.1, the EVA project). It is these students who are the subject of this investigation and whose learning situation is described more thoroughly in the next section.

2.4 Parallel-language courses with textbooks in English

In Swedish university language policy documents, one common interpretation of the call for parallel-language use in the context of university teaching has been that students should develop parallel-language competence, i.e. good academic/scientific proficiency in the local language and English (e.g. KTH Royal Institute of Technology, 2010; Stockholm University, 2011). One attempt to develop this has been to start introducing English components in courses and degree programmes at the beginning of the studies. Interestingly enough, even though the concept of parallel-language use was introduced in order to protect and promote Swedish academic/scientific proficiency, universities have responded by introducing English language components, particularly in courses and degree programmes with fewer English components. This is probably in part because there is an awareness that students need support in English in their courses, and because competence in L1 and English will help students to move more freely in the international labour market.

In many cases, the introduction of English components in courses and degree programmes has meant having textbooks and some lectures in English. Many Swedish universities strive to design their undergraduate courses and BA degree programmes in such a way that teaching is mainly done in Swedish, although some lectures and textbooks are in English (Göteborg University, 2006; KTH Royal Institute of Technology, 2010; Malmö University, 2010; Stockholm University, 2011; Umeå University, 2008). In undergraduate studies, students are expected to improve their comprehension of English, listening and reading (Göteborg University, 2006; Umeå University, 2008), and to develop only “passive specialist language competence in English” (KTH Royal Institute of Technology, 2010, Section 3.2.1). In Master’s level courses, there should be an increase in English components, mainly in terms of textbooks (Göteborg University, 2006; Malmö University, 2010); however, English as the language of instruction is also mentioned in university language policy documents (Göteborg University, 2006; KTH Royal Institute of Technology, 2010; Stockholm University, 2011). In Master’s level courses, the English language skills the students should develop are active skills, speaking and writing (Umeå University, 2008), and parallel-language competence, meaning “specialist language competence in both Swedish and English” (KTH Royal Institute of Technology, 2010, Section 3.2.2). Thus universities strive to design courses where students will encounter an increasing amount of English through the progression of their university studies and gradually develop parallel-language competence.
A large part of the student population in Sweden, therefore, attend courses where the language of instruction is Swedish, but where at least some of the learning materials are in English. Examples of such courses with textbooks in English and lectures in Swedish can be found in all disciplines throughout all levels of studies, although in most cases the amount and manner of using English in the course depends on the lecturer’s teaching habits, the availability of teaching materials in either language, and whether the focus of the studies is national or international (Preisler, 2009). In Swedish universities, surveys have shown that a majority (approximately 58%) of textbooks are in English (Pecorari et al., 2011b) and that this number is growing (Salö, 2010). However, there are differences between subjects and the levels of studies. For example, Gunnarsson and Öhman (1997) and Melander (2004) have found that, at Uppsala University, the subjects least likely to assign English-language textbooks are education and law, and those most likely to do so are medicine, technology, and the natural sciences. Murray and Dingwall’s (2001) survey confirms these findings. Accordingly, Swedish textbooks are used more frequently for subjects which have a more national character, are more closely connected to the community, or are more culture-specific, such as teacher education and some subjects within the humanities, while subjects with an international character, for example those within the natural sciences, tend to make greater use of textbooks in English. There is a difference in quantity of English textbooks on different levels of studies as well. In general, the further along in their studies students are, the more learning material in English they will encounter. Even subjects with a close connection to the community, such as law, will make greater use of textbooks in English at the advanced levels. Subjects in which English textbooks are common at the start of the studies, for example biology, will probably use English textbooks exclusively at the advanced levels.

Sweden is not alone in its extensive use of university textbooks in English. Students in other Nordic countries also need to learn from reading in English. An increasing use of English textbooks has been reported in Denmark (Haberland & Risager, 2008), Finland (Haarmann & Holman, 2001), Iceland (Arnbjörnsdóttir & Ingvarsdóttir, 2010), and Norway (Brock-Utne, 2007; Ljosland, 2011). A growing use of English textbooks has also been noted elsewhere in Europe, for example Austria (de Cillia & Schweiger, 2001), Slovenia (Mežek, 2009a, 2009b), and Switzerland (Dürmüller, 2001; Murray & Dingwall, 2001), and other countries around the world, for example Brazil (Paiva & Pagano, 2001), China (Huang, F., 2003; Huang, S., 2006), Hong Kong (Evans, 2009), Indonesia (Nurweni & Read, 1999), Israel (Spolsky & Shohamy, 2001), Puerto Rico (Mazak, 2012), Taiwan (Chia, Johnson, Chia & Olive, 1999; Huang, F., 2006), Thailand (Kaewpet, 2009; Ward, 2001), and Turkey (Sert, 2008). The use of English textbooks follows a similar pattern in these countries as well: (i) textbooks in English are used more in the natural sciences than in the humanities; (ii) more textbooks in
English tend to be used at the advanced level of studies; and (iii) in general, the use of textbooks in English is increasing.

Thus there are many students around the world, and not only in Sweden, who attend courses where the language of instruction is the local language, but the language of the textbook is English. Consequently, these students have to learn subject matter in two languages which are often restricted to particular media, and this connection between medium and language has important implications. For many students at the beginning of their studies, English is used only passively; the students encounter English mostly in their reading. On the other hand, their local languages are usually used in lectures, seminars, laboratory work, etc. However, while both reading and lectures are used to transmit information, different learning activities are best used to teach different types of knowledge (Biggs & Tang, 2011), and this means that students are potentially not exposed to the same type of knowledge in both languages. The students’ use of languages in parallel-language courses is thus not parallel in the sense that their use is equal, but it could be said to be parallel in the sense that they learn the same subject matter in two languages in the same course. Because the languages are usually used in different media (reading text and listening to lectures), one crucial characteristic of these students’ parallel-language use is that it is bimodal. Consequently, exposure to these languages in different media means that students receive different linguistic exposure, i.e. spoken local language (e.g. Swedish) in lectures and written English in the textbooks.

A growing number of students around the world are, therefore, required to learn from reading in English. Many of these students attend courses and degree programmes where the medium of instruction is English, so it is not only textbooks but also other learning activities that are in English. These students attend English-medium instruction (EMI) courses (e.g. Evans & Morrison, 2011; Tatzl, 2011) and Content and Language Integrated Learning (CLIL) courses (e.g. Aguilar & Rodríguez, 2012; Costa & Coleman, 2010), the number of which has been growing over the years (Wächter & Maiworm, 2008). Furthermore, as has been discussed above, a large number of students also learn in what are called parallel-language courses in the Nordic countries, which differ from EMI and CLIL courses in that the general medium of instruction is the local language and that language learning is not an expressed aim; however, the students are required to learn from reading in English. The following section will discuss the characteristics of learning in such courses.
3. Learning from second-language textbooks in parallel-language courses

This section begins with a general description of learning in a parallel-language course and then continues with a discussion of learning from second-language (L2) reading in that setting. Learning in parallel-language courses differs in several critical respects from learning in courses where the medium of instruction is solely the local language (L1) or the second/foreign language (L2) (see Table 1).

Table 1. Languages used in courses with different media of instruction

<table>
<thead>
<tr>
<th>Language used in</th>
<th>Lectures</th>
<th>Textbooks</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1-medium instruction</td>
<td>L1</td>
<td>L1</td>
<td>L1</td>
</tr>
<tr>
<td>Parallel-language course</td>
<td>L1</td>
<td>L2 (&amp; L1)</td>
<td>L1 (/L2)</td>
</tr>
<tr>
<td>L2-medium instruction</td>
<td>L2</td>
<td>L2</td>
<td>L2</td>
</tr>
</tbody>
</table>

In monolingual courses where the medium of instruction is one language, L1 or L2, all input and assessment are typically in that language. In parallel-language courses, however, the language used for different learning and assessment activities is not always the L1 or the L2. In these types of courses in Sweden, for example, the lectures are predominantly in the L1 (Swedish) and the reading in the L2 (English), although some courses use L1 learning material as well. The assessment in these courses is usually in the L1; however, in some courses, the students can complete assignments and write exams in other languages as well, although this may be at the discretion of the instructor.

Students in parallel-language courses thus learn through different media in different languages than students in courses where only one language is in use in all media. The knowledge the students are expected to learn, and the difficulties they encounter during learning, will therefore be specific to their learning situation.

3.1 The aims of learning from second-language textbooks

As has been mentioned in Section 2, at the policy level, the reason for encouraging the parallel use of languages in content courses is to promote a parallel competence in the local language and English. However, when educators and stakeholders are asked about the purposes of English textbooks in content courses, receptive skills in English emerge as an important reason for using them. Medical students in Taiwan are thus expected to gain the ability to read medical journals and research articles (Chia et al., 1999) and engineering students in Thailand should gain the ability to read textbooks and occupational manuals (Kaewpet, 2009). In Sweden, a survey showed
that university teachers believe their students will benefit in their future careers from being able to access research in English (Pecorari et al., 2011a). Gaining receptive skills in English also includes the knowledge of terminology in English (Chia et al., 1999; Pecorari et al., 2011a). Textbooks in English are, therefore, not only meant to be used to transmit information to the students, but also to enable them to gain written receptive skills and learn terminology in English.

Airey and Linder (2008) use the term bilingual scientific literacy when talking about an appropriate goal for parallel-language courses. They define this as scientific literacy in two languages, incorporating all types of language-specific skills that students should typically gain during the course of their studies. In the context of physics courses they reviewed, the term does not imply high L2 proficiency in all language skills, but instead high proficiency in written receptive skills (reading), medium proficiency in aural receptive (listening) and written productive (writing) skills, and low proficiency in oral productive skills (speaking). Of course, different disciplines and types of courses will demand different levels of proficiency for different skill sets; however, as the previous paragraph suggests, most courses in which English textbooks are in use are expected to foster high proficiency reading skills.

3.2 The problems of learning from second-language textbooks

Studies of content courses in which students learn from reading in L2 have revealed that this type of learning can be problematic. Some have shown that when students learn through L2, their content and concept learning suffers (Airey, 2009; Gerber, Engelbrecht, Harding & Rogan, 2005; Met & Lorenz, 1997; Söderlundh, 2005; Yip, Tsang & Cheung, 2003). In addition, it has been reported that students have problems reading and comprehending L2 scientific texts in general (Berman, 2010; Evans & Green, 2007; Pecorari et al., 2011b) and that it takes more effort and a longer time to read and learn from texts in L2 (Hellekjær, 2009; Pecorari et al., 2011b; Tatzl, 2011; Vinke, 1995; Ward, 2001). Because students in general do not make full use of written learning material (e.g. Burchfield & Sappington, 2000; Pecorari, Shaw, Irvine, Malmström & Mežek, 2012b; Sappington, Kinsey & Munsayac, 2002; Ward, 2001), having to put in more time and effort into reading might make study reading seem even more unappealing and encourage non-optimal student learning strategies.

Some have suggested that what is causing difficulties is not necessarily L2 language proficiency, but perhaps general academic proficiency (Berman, 2010), or poor understanding of the concepts in the text (Murray & Dingwall, 2001). What has probably contributed to poorer reading and learning in L2 is students’ vocabulary knowledge, both general and academic (Evans, 2009; Evans & Green, 2007; Evans & Morrison, 2011; Hellekjær,
Without the necessary vocabulary knowledge, students’ comprehension of texts is lower and, consequently, so is their ability to learn. Subject-specific terminology has also been reported as a cause of difficulty when learning from reading in L2 (Bolton & Kuteeva, 2012; Byun et al., 2011; Chia et al., 1999; Evans & Green, 2007; Evans & Morrison, 2011; Hallnäs & Holmberg, 2012; Sert, 2008), which is very problematic, as learning subject-specific terminology is one of the goals of using textbooks in English. As the following student quotation from a survey at a Swedish college illustrates, students sometimes experience difficulties reading textbooks in English because they do not understand the subject-specific terminology:

English course books are tricky sometimes because of the technical terms, there is a threshold you have to pass to get into it. You have to mix Swedish and English. [It’s] complicated in an unnecessary way. A word list would have been good. (Hallnäs & Holmberg, 2012, p. 8, translation ŠM)

The student quoted above believes understanding of the English text would be improved if students were provided with a Swedish-English word list of relevant terminology. Some kind of an explicit connection between Swedish terminology in the lectures and English terminology in the reading could, therefore, improve learning.

In response to some of the perceived difficulties in reading and learning from L2 texts, students have adopted a variety of strategies, some of which are unlikely to affect their reading speed and learning positively. Some students translate texts into the language they use for thinking and the language used for assessment, which are not always necessarily the same language. For example, in English-medium courses in Hong Kong, students have reported translating English into Chinese, and then back into English (Evans & Morrison, 2011). In Sweden, the fact that the language of learning from reading and the language of assessment are different causes problems when taking exams in Swedish, because students find it difficult to switch between the two languages (Bolton & Kuteeva, 2012). Because of this, some Swedish students use translation as a strategy. A bilingual student attending a parallel-language course, for example, has claimed to read in English, think in Spanish, and write in Swedish (Committee on the Swedish Language, 2002b, p. 29). However, since it is low proficiency L2 readers who rely more on their L1 when reading in L2 (Kern, 1994; Malcolm, 2009; Upton, 1997), it is probable that not all students employ this strategy.

Students in countries with different levels of English knowledge have adopted similar strategies of minimising their reading load and depending on the lectures for content. Students read texts only superficially and focus only on certain parts of the texts. Thai engineering students, for instance, focus on examples and not on the running text (Ward, 2001), and Swedish students prioritise introductions, conclusions, and summaries (Pecorari et al., 2012b).
Some students read after lectures, possibly because they feel they need guidance in their reading, and some students, instead of reading the textbooks, seem to depend on the lectures for content and use textbooks as reference books which they use to check information and when they do not understand something (Pecorari et al., 2012b; Ward, 2001). These tactics are, of course, problematic, because it means that students are not exposed to the knowledge in the textbooks and because it may ultimately also mean that, in the cases where the lecturers depend on the students having done their reading before the lecture (as is the case in the increasingly vaunted “flipped classroom”), the students will not be able to participate or follow the lecture. As attitudes to reading and learning from reading differ depending on the culture (Newman, Trenchs-Parera & Pujol, 2003), discipline (Taillefer, 2005b), and national background (Taillefer, 2005a), this student strategy may be more common in some contexts than in others. However, Sweden has been shown to be one context where students prefer lectures to reading, especially if the reading is in English (Pecorari et al., 2011b, 2012b). This strategy of minimising reading load is thus used widely among the Swedish student population.

Another reason which may contribute to students’ choice of learning strategies is the way courses are designed. Good pedagogical practice has been said to be one where different learning activities (e.g. reading and lectures) and assessment are constructively aligned (Biggs & Tang, 2011). Studies of teacher practices have shown, however, that connections between different activities are not always ideal. L1 lecturers, for example, do not make many connections to reading in their lectures (Shaw, Irvine, Malmström & Pecorari, 2010), and the same can probably also be assumed of lecturers who expect students to learn from L2 textbooks. Other lecturers repeat the content from the L2 textbooks in the students’ L1 (e.g. Spolsky & Shohamy, 2001), which results in students not having to read the textbooks in order to gain that knowledge from reading. In some courses, therefore, pedagogical practices may be sending the students the message that the reading is not necessary for learning, which is problematic because students in general have been said to be unable to understand the value of different learning activities and contexts (Lei, Bartlett, Gorney & Herschbach, 2010; White et al., 1995).

In parallel-language courses, there is also a disconnect between the teachers’ aim for students to learn subject-specific terminology in English and their teaching practices. Although teachers want the students to learn terminology in L2, they often do not put language or L2 terminology learning in the official course objectives (Airey, 2012; Pecorari et al., 2011a). L2 terminology learning is often also not supported in lectures; observations of teachers in Sweden have revealed that they very rarely use English terms in their lectures (Malmström, Irvine, Mežek, Pecorari & Shaw, submitted), which may make connecting the reading to the lectures difficult for some
students. Learning from reading in parallel-language courses is therefore affected by lecturer as well as student strategies.

In some courses where the medium of instruction is L1, learning from textbooks in L2 can be quite problematic. As many courses and degree programmes have set textbooks in English (L2) already at the beginning, the students are not only expected to be developing academic language competence in the two languages throughout the duration of the course, but are actually expected to already possess the ability to learn from reading in English when they start their studies. However, there are students who do not possess the ability to deal with the amount of reading they have to do in English. They instead try to manage their reading load using strategies unlikely to have a positive effect on their learning. This situation is made all the more challenging because some of the aims of learning from L2 textbooks are not made explicit to students and the connections to the textbooks are not frequently made. Consequently, many students do not know that they are expected to learn more than just content from textbooks, so the lecturers’ perceived benefits of English textbooks are not realised.

4. Theories and models of second-language reading and vocabulary learning

In this section, the discussion turns to the theoretical underpinning for this investigation. The theories and models used are continua of biliteracy (Section 4.1), the theory of second-language reading (Section 4.2) with a focus on the compensatory model of second-language reading (Section 4.3), and learning of vocabulary, or, more specifically, incidental vocabulary learning from L2 reading (Section 4.4). These concepts are brought together because they each provide an insight into a specific area or level of students’ learning situations.

4.1 Continua of biliteracy

In order to be able to analyse and discuss students’ reading abilities in this particular learning context where students attend Swedish seminars and lectures but read textbooks in English, Nancy Hornberger’s continua of biliteracy are useful (1989, 2003, 2004; see also Hornberger & Skilton-Sylvester, 2000). Continua of biliteracy form a framework used to “situate research, teaching, and language planning in linguistically diverse settings” (Hornberger, 2004, p. 155), and can be used to see the relationship between language policy and practice, and ways in which the development of biliteracy could be increased. The focus on linguistically diverse settings and the rela-
tionship between language policy and practice make the framework particularly suitable for this investigation.

In this model, biliteracy refers to “any and all instances in which communication occurs in two (or more) languages in or around writing” (Hornberger, 1990, p. 213). The framework consists of several continua described as being nested and intersecting; they are usually visually represented as a three-dimensional model of nested cubes (e.g. Hornberger, 2003, 2004). In this way, the model reveals the relationships between the different continua and enables us to plot the particular biliterate situation. The groups of continua in the framework are media (in this model referring to languages in focus), content, development, and contexts (see Figure 1).

<table>
<thead>
<tr>
<th>Contexts of biliteracy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>micro</td>
<td>macro</td>
</tr>
<tr>
<td>oral</td>
<td>literate</td>
</tr>
<tr>
<td>bi(multi)lingual</td>
<td>monolingual</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development of biliteracy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>reception</td>
<td>production</td>
</tr>
<tr>
<td>oral</td>
<td>written</td>
</tr>
<tr>
<td>L1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Content of biliteracy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>minority</td>
<td>majority</td>
</tr>
<tr>
<td>vernacular</td>
<td>literary</td>
</tr>
<tr>
<td>contextualised</td>
<td>decontextualized</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Media of biliteracy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>simultaneous exposure</td>
<td>successive exposure</td>
</tr>
<tr>
<td>dissimilar structures</td>
<td>similar structures</td>
</tr>
<tr>
<td>divergent scripts</td>
<td>convergent scripts</td>
</tr>
</tbody>
</table>

Figure 1. Continua of biliteracy (from Hornberger, 2004, p. 158)

Each of these groups consists of three continua along which biliteracy develops (Hornberger, 1989, 2003, 2004). In the media of biliteracy, for example, the continua identified are exposure, which range from simultaneous to successive (e.g. early or late bilingualism); structures, running from dissimilar to similar; and scripts, which can be more or less divergent or convergent.

The continua in this framework are not static and an individual covers different points at various points of his or her experience. Covering one or more

---

2 In Hornberger’s model, media refers to languages. In this thesis, outside of discussions of Hornberger’s model, I will use media in the more traditional way to refer to the means through which people receive, for example, information (e.g. newspapers, books, television) and instruction (e.g. textbooks, lectures).
points along several continua is, in fact, preferred, because it will increase the chances for biliteracy to develop (Hornberger, 1989). For example, learners can learn things from oral reception which will help them when writing a text. The different ends of the continua also reveal the different power structures. The ends of continua represented on the right of the model have traditionally been considered more powerful and the ones on the left less powerful (Hornberger & Skilton-Sylvester, 2000). Thus, for example, written production has been considered more prestigious than oral reception, and global monolingual interaction (macro context) more prestigious than local multilingual interaction (micro context) (Hornberger, 2004). Drawing from different points on continua will, therefore, not only increase chances of biliteracy development, but also aid in empowering individuals.

This framework is particularly useful in situations where issues of power are essential for the discussion and development of biliteracy. Because of this, it has mostly been applied to situations where children undergo bilingual education (e.g. the US, Canada), and in situations where one language or variety is considered less powerful (see Hornberger, 2003). While many situations analysed through the continua of biliteracy framework involve minority languages receiving little institutional support and thus learning situations which are highly affected by the issues of power, the model can also be applied to parallel-language courses in Sweden despite the issue of power between Swedish and English being less obvious. Swedish, for example, is entrenched in society and, in fact, even in instances where communication and learning is conducted in English only (EMI/CLIL courses), Swedish still has informal power (e.g. Söderlundh, 2010). The framework can still be useful, for example, in revealing the types of communicative competence demanded by global and local pressures and the type of development students participate in in parallel-language courses.

In the courses focused on in this investigation, the media (languages) of biliteracy involved are Swedish and English. Since the aim of these courses is academic or scientific biliteracy (Airey & Linder, 2008), the focus is not on general language proficiency, but on academic Swedish and English. The two languages, Swedish and English, have convergent scripts and similar structures. While Swedish students do not learn Swedish and English simultaneously in their childhood, at the university level many are exposed to the two languages simultaneously, especially when it comes to reading written texts. However, oral texts and production of texts in English tend to be successive to Swedish. As mentioned in Section 2.4, many universities gradually introduce more English as the student progresses. For example, MA courses/degree programmes tend to have more English components than BA courses/degree programmes.

The content of biliteracy in this learning situation tends to be received through literary (academic) genres and styles, and not vernacular genres. The preferred meanings within the academic and scientific tradition also tend to
be decontextualized (Hornberger & Skilton-Sylvest, 2000, p. 110). However, it is difficult to place this context within the minority and majority presentations and perspectives. This makes the model difficult to apply to the post-national globalised environment.

When it comes to the development of biliteracy, Swedish (L1) can cover points between oral reception and production, as well as written reception and production. This, naturally, depends on the course. Some courses within the natural sciences often have textbooks in English only, in which case L1 would not extend to written reception (except for, for example, timetables, some lab instructions, handouts). English (L2), on the other hand, can extend from written reception in many of the beginner courses, and extend to other points such as oral reception and both oral and written production in higher-level courses such as those within the MA degree programmes. The analysis of these development continua depends on the level of the course and whether the analysis covers one course or a part of the course or perhaps follows the student over their entire programme of higher education. Since the focus of this thesis is primarily on students at the beginning of their studies, and thus on courses which usually have only textbooks in English, the development of L2 here extends primarily to written reception only.

Finally, the context of biliteracy is literate and bi(multi)lingual, as multiple languages are involved (in this work, Swedish and English). Whether the context is micro or macro, however, again depends on what the focus is on. Micro context can refer to both local pressures and interaction on the individual or local level, whereas macro can refer to global or societal pressures as well as policy at the level of school, for example (Hornberger, 1989, 2004; Hornberger & Skilton-Sylvest, 2000). The focus of this investigation is on particular instances, and thus the micro context.

As shown above, the continua of biliteracy framework can be used to analyse educational practice. It can also be used to suggest ways to improve the development of biliteracy in particular learning situations. One practice which has been suggested because it fits well within the framework of continua of biliteracy is translanguaging. Translanguaging refers to “how bilingual students communicate and make meaning by drawing on and intermingling linguistic features from different languages” (Hornberger & Link, 2012, p. 240). In other words, individuals use a variety of languages to complete tasks. For example, an individual could read a text in one language, make notes in another, and then discuss the text in yet another language. It thus refers to how bilinguals draw on different language sources to gain knowledge and understanding. Translanguaging entails code-switching, shifting between languages, translation, and other ways of using several languages when in a classroom (García, 2011). This practice fits well within the continua of biliteracy, because it involves drawing from various points of the developmental, content, and context continua, and in this way promote biliteracy.
Translanguaging is both the everyday practice of multilingual individuals (Lewis, Jones & Baker, 2012) and “a pedagogical strategy to foster language and literacy development” (Hornberger & Link, 2012, p. 242). Translanguaging as a pedagogical strategy can enhance learning of languages, contribute to the understanding of content, and, in the cases of bilingual students, also provide a link with language practices at home (Lewis et al., 2012). However, translanguaging as a strategy has so far mostly been discussed in contexts with societal bilingualism, and the focus has thus far been mainly on younger bilingual students and not university students, for example translanguaging involving English and Welsh in Wales (Lewis et al., 2012), English and Spanish in the US (García, 2011; Hornberger & Link, 2012), and English and Sepedi in South Africa (university students; Hornberger & Link, 2012). In these examples, the languages students use in the classroom are languages used at home and/or languages used in the general society. These contexts are different from the situation of Swedish university students who use Swedish, which is the language used in societal institutions and structures and for many the first language, and English, which does not have official recognition and is mainly used by the students in the following ways: for consumption of popular culture and entertainment (music, films, etc.), to find information (including the Internet), as a lingua franca when communicating with people from other countries, and, in some cases, for educational purposes (EMI/CLIL courses, English textbooks, etc.) (e.g. Bolton & Meierkord, 2013; Bonnet, 2002; Oakes, 2001). The relationship Swedish students have with English is thus different than, for example, bilingual Spanish-English students in the US, where Spanish is an important part of their (cultural) identity and English is used in the wider society and for education. In situations such as the use of Spanish in the US, issues of power usually also affect how languages are used in society. Finally, language proficiency and how these languages are learnt in society also differ from Swedish students’ English. Nevertheless, translanguaging as a pedagogical practice could be used in any context where the aim is to develop biliteracy in two languages.

4.2 Reading and reading to learn in a second language

A simple definition of reading is “a way to draw information from a [written] text and to form an interpretation of that information” (Grabe & Stoller, 2002, p. 4). However, the process of reading is not simple; it is both a cognitive and a social process, both “meaning-extracting and meaning-constructing” (Bernhardt, 1991, p. 5). Reading involves many different processing skills, both lower-level (lexical access, syntactic parsing, etc.) and higher-level (textual-model of comprehension, background knowledge use, etc.) (Grabe & Stoller, 2002, pp. 19–30). There are also different types of reading depending on the purpose of the reading. Some of the purposes are,
for example, reading for general comprehension, to critique texts, to integrate information, to learn, to search for information, to write, and to skim-read (Grabe & Stoller, 2002). These different types of reading involve focusing on different parts of the text and using different strategies to absorb information. Because reading is also a social process, different readers will also approach texts differently, depending on their sociocultural backgrounds, their beliefs about reading, and experiences of reading (Bernhardt, 1991).

In this investigation, the focus is on the type of reading that students need to do at university. While university students are required to do many different types of reading, for example reading to learn, to critique texts, to write, etc., this investigation only focuses on reading for general comprehension and reading to learn, as these are encountered by students earliest in their studies. According to Grabe and Stoller’s definition (2002), reading to learn requires the reader to recognise and comprehend the main ideas in the text and enough details to elaborate those main ideas. This new information then has to be connected to the reader’s previous knowledge of the subject-area content and the world. Consequently, reading to learn differs from other types of reading in that it is slower and that background knowledge plays a bigger role (Grabe & Stoller, 2002).

Reading is also different when it is done in the reader’s L1 or their L2, and this is not only because the readers have a different amount of language knowledge and experience in reading in those languages (Grabe & Stoller, 2002). It has long been acknowledged that reading in L2 involves the use of L1 as well as L2. In fact, when reading in L2, both languages are active, whether the user is highly proficient or not (Schwartz & Kroll, 2006). However, several reading theories have been put forward to explain the exact relationship between the L1 and L2. Koda (2005) describes the three hypotheses which have been proposed to describe the relationship: (i) the developmental interdependence hypothesis; (ii) the linguistic threshold hypothesis; and (iii) the simple view of reading hypothesis. The developmental interdependence hypothesis states that L2 reading ability depends on L1 reading ability and that L1 reading ability affects L2 reading ability (e.g. Cummins, 1979). The linguistic threshold hypothesis, on the other hand, stresses the importance of L2 knowledge. Clarke (1980) has thus posited that a certain threshold of L2 knowledge has to be passed in order for L2 reading to become effective. In the simple view of reading, reading in L2 is mainly affected by decoding efficiency in L1 and thus also L2 (e.g. Gough & Tunmer, 1986). Each of these models puts emphasis on different components of reading, yet it is increasingly understood that all of these components play a role. For this reason, the present investigation uses a more recent model which is more flexible and includes all of these components: a compensatory model of second-language reading (Bernhardt, 2005, 2011).
4.3 A compensatory model of second-language reading

In the compensatory model of second-language reading (Bernhardt, 2005, 2011), reading components can be sorted into three arrays: *L1 literacy, L2 language knowledge,* and *unexplained variance* (see Figure 2).

![Figure 2. A compensatory model of second-language reading (adapted from Bernhardt, 2011, p. 38)](image)

L1 literacy includes factors such as L1 vocabulary knowledge and knowledge about text structure. For example, because educational genres across languages tend to follow similar genre conventions, with minor differences (e.g. Martín, 2003; Moreno, 1997; Mustafa, 1995), being familiar with a particular genre in the L1 will facilitate reading comprehension of that genre in the L2. L2 knowledge, on the other hand, includes factors related to the reader’s knowledge of the L2, such as knowledge of vocabulary and grammar, as well as the similarities and differences between the L1 and the L2. Thus, if the L1 and L2 are similar at the level of the alphabetic script they use, and at the level of morphology, syntax, and phonology, reading comprehension in L2 should be facilitated (Schwartz & Kroll, 2006). Cognates in the L2 also facilitate L2 reading (Grabe & Stoller, 2002). The final group of components, grouped under the term unexplained variance, includes all factors not related to the L1 or the L2, such as reading strategies, motivation and interest, engagement with the text, and content and domain knowledge. Thus, being very knowledgeable about chemistry will help readers comprehend texts about chemistry whether they are in their L1 or L2.
Each of these groups can account for a different percentage of the reading comprehension. At the high level of reading comprehension, L1 literacy can contribute up to 20%, L2 language knowledge 30%, and unexplained variance 50%. These components “operate synchronically, interactively, and synergistically” (Bernhardt, 2005, p. 140). This particular model of reading is also compensatory, which means that different components can buttress one another (Bernhardt, 2005, 2011). Good subject knowledge and familiarity with the text topic can improve reading comprehension when other factors are low (Brantmeier, 2003, 2005; Chen & Donin, 1997; Lee, 2009). Subject knowledge has been proven to compensate for poor L2 proficiency: Chen and Donin (1997) have found that readers with low L2 proficiency but high subject knowledge could read just as quickly as readers with high L2 proficiency and low subject knowledge.

The compensatory model of reading also takes into account that there will be individual differences between readers and conditions of reading (Bernhardt, 1991), and that the access to and knowledge of these different components grow over time with the reader’s increased proficiency (Bernhardt, 2011). One of the ways reading proficiency has been proven to increase is with reading itself. In L1 reading, the amount of exposure individuals have to printed media and thus the amount of reading they do positively affects factors such as general knowledge (Stanovich & Cunningham, 1993; Stanovich, West & Harrison, 1995), orthographic processing in L1 (Cunningham & Stanovich, 1990; Stanovich, West & Cunnigham, 1991), reasoning ability (Dougherty & Clayton, 1998; Siddiqui, West & Stanovich, 1998), visual literacy (Stone, Fisher & Eliot, 1999), word recognition and knowledge in L1 (Chateau & Jared, 2000; Stanovich et al., 1995; West, Stanovich & Mitchell, 1993), and thus indirectly also L2 reading. Amount of exposure to L2 written texts also affects L2 factors, such as L2 grammar (Gradman & Hanania, 1991; Rodrigo, 2006), L2 language proficiency (Gradman & Hanania, 1991; Mason & Krashen, 1997), and L2 word knowledge (Kim & Krashen, 1998; McQuillan, 2006; Pitts, White & Krashen, 1989). Exposure and access to different types of texts, or, in other words, an individual’s reading habits, thus indirectly and directly affect L2 proficiency, and, as a result, also L2 reading.

Consequently, in the context of university studies, the ability of a student to learn from a text in L2 will be affected by various factors and strength in some of them permit the student to compensate for areas of weakness. For instance, students will be able to use subject-knowledge to facilitate L2 reading comprehension, even if they are not very experienced and proficient in reading L2 scientific texts. If the L1 and the L2 are linguistically close, skills at many levels can be transferred from the L1 to the L2. For example, many Swedish and English scientific terms are cognates, which will facilitate comprehension of scientific texts. University students’ comprehension of scientific texts is also expected to improve over time, as they are exposed to
an increasing amount of various learning materials. Through this exposure they are expected to gain subject knowledge, relevant terminology, and subject-specific ways of using language, and also become more familiar with the structure of related texts. Students should thus not experience the same level of difficulty throughout their studies; even though reading scientific texts in L2 may be perceived as difficult at first, it should, in fact, become easier over time.

Although this effect of practice on reading success is an important characteristic of learning in a parallel-language course, the present study is not a longitudinal investigation of learning from L2 reading. Instead the focus of the investigation is on students in the beginning of their studies, who may still experience difficulties learning from reading in L2.

4.4 Learning subject-specific terminology from reading in a second language

In this investigation vocabulary is defined as “the set of explicit word sound-meaning (and word grapheme-meaning) pairings” (Paradis, 2009, p. 21). A particular vocabulary item thus has a written and a spoken form which are connected to a particular meaning. Learning a new word means learning new forms and new meanings, connecting the new forms and new meanings, and usually also linking the word to pre-existing knowledge and other already known concepts (Koda, 2005). In knowing a word there is also a receptive and a productive distinction. Receptive vocabulary involves hearing or reading the form of a word and retrieving the meaning, whereas productive vocabulary involves producing the forms (Nation, 2001). According to Nation (2001, pp. 26–30), to know a word when reading (written receptive comprehension) means that the reader not only recognises the form of the word and understands the meaning of it, but also that they understand what the concept includes and does not include, and what other words are associated with this particular word. Learning a new word thus includes more than just making appropriate form and meaning connections.

There is a difference between learning new vocabulary in the L1 and in the L2. L1 learners need to connect the sound form, written form, and meaning, whereas L2 learners make an additional connection: they connect the L2 sound form, written form, and meaning, and then connect these to the L1 word (Koda, 2005). Bernhardt (2011) illustrates this difference by describing the steps which need to occur in order for people to be able to understand a particular word in reading. When L1 users are learning to read, for example, they need to establish a connection between the written form and the already known sound form and meaning. If the word is unknown to them, they also have to learn the new meaning and sound form. When L2 learners read in the L2, on the other hand, they do not necessarily know the L2 sound form. In-
stead, they may know the equivalent L1 sound and written form, and the
meaning of the concept, so they make connections to the meaning already
existing in their L1 (Jiang, 2002, 2004). However, often they also need to
learn the new meaning. Learning new meanings can be more difficult when
the two languages involved are from very different cultures than when the
languages are closely related, because, across big cultural gaps, forms and
meanings of words do not map onto each other closely.

How difficult it is to learn a new word in the L2 depends on the “learning
burden” of the word (Nation, 2001, p. 48). The learning burden is deter-
mined by the L1 of the learner and the language that is being learnt. If the
word being learnt is a cognate or a loan word, then the learning burden will
be smaller, as the form and the meaning of the word in the two languages
will probably be fairly close. However, this may not always be the case.
Some culture-specific concepts, for example, will have culture-specific
meanings, which means that even if the form is similar, what the concept
encompasses will be different. In learning terminology, this type of differ-
ence may mainly be the case when it comes to subjects more closely co-
nected to the local culture, where the concepts are culture-specific and per-
haps even slightly ambiguous (Siguan, 2001). For example, Swedish stu-
dents of law have to learn that the concepts of *lag* and *juridik* both corre-
respond to *law* in English, and that the word *law* thus does not always refers to
*lag*. Examples such as these are more common in the humanities and the
social sciences, and are quite rare in the natural sciences, as the concepts in
those subjects tend to be unambiguous and international (Siguan, 2001).
Nevertheless, some differences can be found, for example, the differences
between the English words *monkey* and *ape* and the Swedish word *apa*
which can refer to both.

### 4.4.1 The definition of subject-specific terminology

In parallel-language courses, students are expected to learn both general and
academic vocabulary and also technical/subject-specific vocabulary or ter-
minology (Pecorari et al., 2011a). While there are many definitions of sub-
ject-specific terminology, usually depending on their degree of “technical-
ness” (Nation, 2001), in this investigation terminology is defined as words
which are subject-specific and “are not likely to be known in general lan-
guage” (Chung & Nation, 2003, p. 105). These words may be used in differ-
ent fields, but they usually have meanings specific to those fields (Nation,
2001). The concept of subject-specific terminology as it is used in this inves-
tigation thus refers to what has been termed Step 4 technical terms by Chung

These words do not differ from general and academic vocabulary only in
that they are quite rare and specific to certain areas (Nation, 2001), but also
in that learning them will probably imply quite a large learning burden.
Learning terminology in L2 often involves learning new concepts. In paral-
lel-language courses, learning L2 terminology is connected with learning L1 terminology, which means that often the students need to learn the term in their L1 and in the L2 at the same time. In addition, learning new terminology is closely connected to learning the subject matter; “knowing a technical word involves knowing the body of knowledge that it is attached to” (Nation, 2001, pp. 203–204). Learning a term in L2 can therefore require more effort than learning general vocabulary.

4.4.2 Incidental vocabulary learning from second-language reading

L2 vocabulary can be learnt in different ways. In the L2 vocabulary-learning literature, a distinction is made between intentional and incidental vocabulary learning (Hulstijn, 2003). Intentional learning refers to strategies of learning vocabulary, such as the use of vocabulary cards and vocabulary instruction in class, whereas incidental vocabulary learning occurs while the learner is pursuing attainments in another domain (Nation, 2001; Schmidt, 1994). For example, while reading a novel or watching a film, a learner could learn new vocabulary. In other words, intentional vocabulary learning is deliberate and its goal is made explicit, whereas incidental learning is not (Hulstijn, 2003). However, while incidental vocabulary learning is not deliberate, it does require attention on the part of the learner (Paradis, 2009, p. 51).

Vocabulary can be learnt incidentally through reading (Hulstijn, 2003; Pitts et al., 1989). There are certain preconditions which need to be met, though. The most important and perhaps paradoxical precondition (Koda, 2005) for incidental vocabulary learning from reading is that the reader needs to be able to read and comprehend the text, which suggests knowing a sufficiently large number of words before the start of the reading. Studies have found strong correlations between the knowledge of vocabulary and reading comprehension (Hu & Nation, 2000; Stanovich, 1986), so good reading comprehension requires good knowledge of vocabulary. There is no exact consensus on how much vocabulary a reader has to know to be able to read successfully, although a minimal vocabulary size of 10,000 base words (Hazenberg & Hulstijn, 1996) and a coverage of 98% of the text seems to be what many studies agree on. In several studies of English L2 reading, it has been found that a coverage of 98% is needed to read for pleasure (Hirsh & Nation, 1992; Hu & Nation, 2000), to read business textbooks (Hsu, 2011) and academic texts in general (Schmitt, Jiang & Grabe, 2011). However, the vocabulary size needed depends on the type of reading being done, for example, whether the reading is to be done independently or with some help (Laufer & Ravenhorst-Kalovski, 2010). The second set of preconditions for incidental vocabulary learning from reading are attention and noticing; “[a]ttention is a necessary condition for noticing and noticing is a necessary condition for learning” (Paradis, 2009, p. 51). The reader therefore needs to be able to read the text and notice words in order to learn them incidentally.
Incidental learning of vocabulary from reading can be enhanced under certain conditions. Studies have shown that words which are more frequent in the text are more likely to be learnt (Brown, Waring & Donkaewbua, 2008; Kweon & Kim, 2008; Rott, 1999; Waring & Nation, 2004). Context has also been shown to affect incidental vocabulary learning (Webb, 2008), as has, for example, motivation (Laufer & Hulstijn, 2001). In addition, vocabulary learning also benefits from connecting reading to tasks in other types of contexts. Meeting and using words in different contexts in all of the four skills (reading, listening, writing, and speaking) can increase learning and retention of the words (Huckin & Coady, 1999; Nation, 2001). Words, the forms and meanings of which have to be retrieved and produced multiple times, are, therefore, more likely to be learnt.

### 4.4.3 Incidental subject-specific terminology learning from second-language reading in parallel-language courses

In parallel-language courses, students are expected to learn both L1 and L2 subject-specific terminology. However, since language use in these courses is usually bimodal (Section 2.4) and little connection is made between the L2 reading and the L1 lectures (Section 3.2), this means that students are often expected to learn L1 terminology from lectures and L2 terminology from reading. This learning situation is illustrated in Figure 3.

![Figure 3. Learning subject-specific terminology in parallel-language courses](http://www.openclipart.org)

The example given in the figure is from physics. Students in a parallel-language course in Sweden are expected to learn the form of the English term, *kinetic energy*, and the meaning of it from reading in L2. They also

---

3 Images are used with the kind permission of openclipart (http://www.openclipart.org).
learn the meaning from their Swedish L1 lectures. However, in the lectures the terms used are usually Swedish, *rörelseenergi*/*kinetisk energi*. In this example, one form is a close cognate form (*kinetisk energi*), while the other is not (*rörelseenergi*), although it is transparent morphologically (direct translation: “motion energy”). This raises the question whether the lecturer’s choice of Swedish term form could affect the students’ learning of the English term form and term meaning.

5. Overview of the studies

The investigation was driven by pedagogical issues arising in the context of higher education in Sweden, where this investigation was situated. The courses in focus were parallel-language courses, where students attend lectures in Swedish, but learn from textbooks in English. The overall aim of the investigation was to investigate Swedish students’ academic reading abilities in English and incidental vocabulary learning of subject-specific terminology in English. The purpose of this investigation was to be able to propose pedagogical interventions which could facilitate the students’ L2 (English) reading, learning from L2 reading, and incidental L2 vocabulary learning of subject-specific terminology. The following areas of inquiry were explored in this investigation:

1. What are students’ reading habits and reading abilities in Swedish and English and how are they related?
2. To what extent do the students possess literacy in both languages adequate for the academic tasks with which they are confronted?
3. To what extent does incidental English vocabulary learning of subject-specific terminology occur in the parallel-language context?
4. What can be done to maximise these students’ English reading, learning from English reading, and incidental English vocabulary learning of subject-specific terminology?

The investigation addressed these questions in four studies, as follows:


Study II High-proficiency L2 study reading: Effects of time and language of production. (Submitted).


The four studies each investigated a variety of factors (see Figure 4) which together provide an insight into the students’ reading and learning from textbooks in L2 English in the parallel-language environment, something which has so far not yet been explored. The subjects in focus in all of the studies were Swedish university students attending beginner courses.

Figure 4. The design of the studies

Study I investigated the students’ Swedish and English reading habits and their general reading abilities in the two languages. Study II investigated their English reading abilities in general and in terms of how much subject-specific terminology and content they comprehend under specific reading conditions (time given to read the text and the language chosen for reporting). Study III investigated how note-taking strategies during reading affect the students’ learning of subject-specific terminology in English. Finally, Study IV investigated the effects of media and the order and amount of media exposure on the students’ learning and perception of learning of subject-specific terminology in English. The four studies thus investigated the students’ general Swedish and English reading abilities, academic English reading abilities, how their practices (leisure reading habits and note-taking strategies) affect their English reading abilities, and how the students’ and teach-
ers’ strategies affect the students’ English terminology learning and self-perception of English terminology learning.

This section begins with a description of the English Vocabulary Acquisition project of which these four studies were a part, and the placement of the studies within that project (Section 5.1). The following section, Section 5.2, contains the discussion of methodology (participants and methods), and Section 5.3 contains short summaries of the four studies: their aims and major findings. The conclusions drawn from these four studies as a whole are discussed in Section 6.

5.1 The English Vocabulary Acquisition project

The four studies in this thesis were a part of the English Vocabulary Acquisition (EVA) project. The EVA project was a three-year project funded by the Swedish Research Council (Ve- tenskapsrådet) in order to investigate language learning from reading and lectures in two contexts: in universities in Scotland and Sweden. The project was a collaboration between five researchers from four institutions and two countries:

Philip Shaw, Stockholm University, Sweden, Principle Investigator
Diane Pecorari, Linnaeus University, Sweden
Hans Malmström, Chalmers University of Technology, Sweden
Aileen Irvine, Edinburgh University, UK
Špela Mežek, Stockholm University, Sweden

The main aim of the EVA project was to investigate the extent to which students learn English vocabulary incidentally while processing content in reading and lectures. The project was interested both in the learning of students in the Swedish parallel-language courses, where the reading is in English and the lectures are in Swedish, as well as in the learning of L2 students in the British monolingual university context, where both the reading and the lectures are in English.

The EVA project was organised into two stages, one observational and descriptive, and the other experimental:

Stage 1: observation and description of students’ and teachers’ attitudes and personal and social practices while reading and attending lectures, the problems arising, the measures taken by lecturers, and student learning of subject-specific terminology;

---

Stage 2: an experimental investigation of how various student practices and teacher measures affect the learning of English terminology in the normal teaching situation.

The project resulted in numerous publications which are not part of this thesis. I contributed to and was co-author on several of them, but have included in this thesis only the publications stemming from work in which I played a leading, directive role. The first two studies in this thesis (Studies I and II) were a part of the observational/descriptive stage, and the last two studies (Studies III and IV) were a part of the experimental stage.

5.1.1 The EVA project: Stage 1, observational/descriptive studies
Stage 1 of the project consisted of student and teacher questionnaire surveys, student interviews, recordings of authentic content lectures from various disciplines, and investigations of students’ reading habits, abilities, and learning of academic and subject-specific vocabulary. Several articles from Stage 1 of the project describing teacher and student attitudes and practices have already been published or submitted for publication.

Investigations of teacher practices focused on teacher behaviour in lectures, course objectives, and attitudes. Shaw et al. (2010) investigated the intertextual episodes in L1 English lectures as potentially enhancing incidental learning from reading and Malmström et al. (submitted) looked at Swedish teachers’ lecture practices, including code-switching behaviour, when introducing terminology. Pecorari et al. (2011a) was a survey of Swedish teacher practices, attitudes, and aims of the use of English textbooks in Swedish courses.

Surveys of student practices focused on the Swedish students’ reading practices and attitudes towards assigned reading in general (Pecorari et al., 2012b) and towards English textbooks in particular (Pecorari et al., 2011b).

Student learning was also observed in Stage 1 of the project. In the UK, observational/descriptive studies focused on L1 and L2 students’ learning of academic and subject-specific vocabulary (in preparation). In Sweden, the studies investigating student learning were those which are part of this thesis. Study I explored the relationship between the Swedish students’ Swedish and English leisure and study reading habits and Swedish and English reading abilities. Study II, on the other hand, explored the Swedish students’

5 Studies I and II were also partially funded by the Receptive proficiency in high-level second language users project, with Philip Shaw as Principal Investigator. This project was a part of the Avancerad andraspråkanvändning / High-level proficiency in second language use research programme, with Kenneth Hyltenstam as Project Leader, funded by the The Bank of Sweden Tercentenary Foundation (Riksbankens Jubileumsfond), Project number/Dnr: M2005-0459. Some of the data analysed in these studies were also collected through this particular project, and I am grateful to Philip Shaw and Alan McMillion for allowing me to use it.
academic reading abilities in English. The focus of this study was on their learning of content and terminology from scientific texts in English.

5.1.2 The EVA project: Stage 2, experimental studies

In Stage 2 of the project, an experiment was designed to test some of the teacher practices observed in the lectures in Stage 1. The experiment also tested some of the student practices reported in the questionnaire surveys. The focus of the experiment was on the effect of teacher and student practices on student learning of English subject-specific terminology in parallel-language courses. For this reason, an experiment was designed to resemble parallel-language courses. The materials consisted of textbook-like text in English and a pre-recorded lecture in Swedish on the same topic. The topic of both the reading and the lecture was classical rhetoric, and both presented and explained terms such as *catechresis*, *polysyndeton*, and *litotes*, which were likely to be unknown to the majority of experimental participants. Participants were asked to learn the English subject-specific terminology from reading the text and listening to the lecture. They were allowed to take notes during the learning activities. They were tested on their knowledge of subject-specific terminology with a series of instruments which included a recognition test of the type introduced by Paribakht and Wesche (Vocabulary Knowledge Scale; 1993) and a multiple-choice knowledge test. The battery of tests included a pre-test, which was necessary to control for the prior knowledge of terms (Hulstijn, 2003), an immediate post-test, and a retention test given one week after the experiment.

Several versions of the experiment were conducted, each manipulating the variables in the English reading text and the Swedish lecture in order to test a few of the teacher and student practices at a time. The practices tested in the experiment are listed in Table 2.

Table 2. *Teacher and student practices tested in the EVA experiment*

<table>
<thead>
<tr>
<th>Practices tested</th>
<th>Teacher</th>
<th>Student</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Different media and amount of exposure:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terms are described in the Swedish lecture only;</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Terms are described in the English reading and in the Swedish lecture;</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Terms are described in the English reading and mentioned shortly in the Swedish lecture;</td>
<td>✓ □</td>
<td>✓ □</td>
</tr>
<tr>
<td>Terms are described in the English reading only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Media order:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading is done before the lecture;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Reading is done after the lecture.</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Term form used in the lecture:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cognate term (e.g. <em>sammanblandning</em>);</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Cognate term (e.g. <em>katakres</em>);</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Code-switching into English (e.g. <em>catechresis</em>).</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
The teacher and student practices relating to different media (reading, lecture) and amount of exposure tested the teacher practices of which subject-specific terms they cover in the lecture and how (describing terms not in the textbook, describing/mentioning/not describing terms from the textbook), and student practices of not engaging with certain media (reading/not reading and/or attending/not attending the lecture). Media order had to do with the student practices of reading before or after the lecture, and the versions of experiment testing effects of term form used in the lecture investigated whether using a non-cognate, cognate, or English term contributes more to students learning the term in English.

The final results of this experiment have not yet been calculated, as the experimental phase of the project has just recently finished. However, preliminary results seem to confirm that subject-specific L2 vocabulary learning is positively affected by the amount of exposure the students receive to the term. Reading appears to contribute more to vocabulary learning than the lecture, as does code-switching into English. These preliminary results of the experiment have not yet been published, but they have been presented at several conferences (e.g. Mežek, Irvine, Malmström, Pecorari & Shaw, 2012a; Mežek, Pecorari, Shaw, Irvine & Malmström, 2012b; Pecorari, Shaw, Irvine, Malmström & Mežek, 2012a; Shaw, Irvine, Malmström, Mežek & Pecorari, 2011).

Studies III and IV were a part of the Stage 2 experimental phase of the project. Study III investigated the effect of student note-taking strategies on the learning of subject-specific terminology from reading in English, and Study IV investigated the effect of media and order and amount of media exposure on students’ learning and perception of learning of subject-specific terminology in English. These two studies thus explored teacher and student practices and perceptions and how they affect student reading and learning from reading in English.

The experiment and the materials used in the experiment (reading text, lecture, and tests) were designed by the entire EVA research group. The experiment was run primarily by the researchers at Stockholm University (Philip Shaw and myself), where the data used in these studies were collected (data were also collected at two other universities, but for reasons related to comparability of the student groups were not included in these studies). I analysed and interpreted the data used in Studies III and IV, wrote the article reporting Study III, and took the role of lead author, making the primary contributions to the article reporting Study IV. Because the data collected for Study III was less dependent on how the entire experiment was designed, and was only a small portion of the data collected in that specific experiment (see Section 5.2.2), the research group decided that Study III would be a single-authored article.
5.2 Methodology

In this section I describe and discuss the participants (Section 5.2.1) and methods (Section 5.2.2) used in the four studies. The discussion about the participants is divided into two separate parts describing the studies which came from the observational/descriptive stage (Studies I and II) and the experimental stage (Studies III and IV) of the EVA project, and the discussion about the methods is divided by study.

5.2.1 Participants

A total of 486 students participated in the four studies (Table 3): 437 students were from Sweden and 49 formed a comparison sample from the UK. The samples of students in the studies are representative (e.g. in terms of sex, age, and language backgrounds) of the students studying the particular subjects at the institutions where they were recruited. Student participation at all institutions was voluntary and all participants received compensation in the form of a gift token. The composition of students in the four studies is in Table 3.

Table 3. Numbers of participants (per study)

<table>
<thead>
<tr>
<th>Students</th>
<th>Country</th>
<th>Total</th>
<th>Study I</th>
<th>Study II</th>
<th>Study III</th>
<th>Study IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Biology</td>
<td>Sweden</td>
<td>126</td>
<td>34</td>
<td>125</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>UK</td>
<td>49</td>
<td>–</td>
<td>49</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>First term English</td>
<td>Sweden</td>
<td>311</td>
<td>–</td>
<td>–</td>
<td>181</td>
<td>130</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>486</td>
<td>34</td>
<td>174</td>
<td>181</td>
<td>130</td>
</tr>
</tbody>
</table>

Studies I and II

Students who participated in the first two studies were first year undergraduate Biology students. Biology students were chosen for these studies because Biology is one of the subjects in Sweden in which the textbooks in use are predominantly those produced for L1 English speakers. Biology students in Sweden thus tend to attend parallel-language courses and are expected to learn from reading in English and listening to lectures in Swedish from the beginning of their studies.

A total of 175 first year undergraduate Biology students participated in the first two studies: 126 were studying in a parallel-language course in Sweden, and 49 were students in a monolingual course in the UK in which all of the teaching and teaching material was in English (Table 3). As the focus of Study I was on Swedish students’ reading habits and abilities, Study I included only Swedish students, whereas Study II included both Swedish students and their British peers in order to be able to compare the two groups. The students were recruited over the course of two years. The Swedish students who participated in the studies were recruited from a biology course given to first-year students on various biology degree programmes at
Stockholm University (e.g. Biogeology, Biology, Microbiology). Some of these Swedish students participated in both Studies I and II. British students were recruited from two universities, Edinburgh University and the University of Reading, and various degree programmes which included the study of biology (e.g. Biochemistry, Biological Sciences, Zoology). They only participated in Study II.

British students in Study II were used as a comparison to Swedish students. Because a comparison between L1 and L2 speakers should be between “individuals-in-society-in-history associated with specific communities of practice about whose language knowledge we are interested in learning more” (Hall, Cheng & Carlson, 2006, p. 233), it was important that the Swedish and British students were all studying a subject within Biology and that they were all within the first year of their degree programme. In addition, the two populations of students both used similar biology textbooks (in some cases the same), so it was expected that they interacted in their courses with similar texts in similar ways and were expected to reach similar goals.

There was language background intragroup variation in the Swedish and British group. However, the pattern of that variation was broadly similar for both groups; the two groups included similar proportions of monolingual and bilingual students. In Study II, in which both Swedish and British students participated, 35% of the British students reported being bilingual (English plus another language) and only two students (4%) of the entire sample said their secondary education was in a language other than English. In the Swedish sample, 30% of the students said they were bilingual (Swedish plus another language), and six students (4%) reported receiving secondary education outside of Sweden. A superficial comparison was made between the groups before the data were analysed for the article, and no meaningful differences were found between the monolingual and bilingual groups within the different country samples. It is possible, however, that differences could be found if more detailed comparisons were made, for example, between bilingual students educated in Sweden and those not educated in Sweden. However, because people in different countries are exposed to different amounts of English (e.g. via television), it is possible these differences would only show if a comparison were made on the basis of where outside of Sweden they received their secondary education. For example, it is possible there would not be a difference between a student educated in Sweden and a student educated in Norway, but that there would be a difference if a student were educated in Spain. However, the differences between monolingual and bilingual students were not the focus of this investigation, so this analysis was not done. Instead, the focus of Study II was on comparing students in the Swedish and the British context as the type of student populations normally found within these contexts, which means diverse groups of students with different language backgrounds and experiences.
Studies III and IV

Participants in Studies III and IV were in their first term of English studies at Stockholm University. They were all recruited from the same course in English linguistics over a three-year period. They were informed that being able to follow a lecture in Swedish and to read in English was a prerequisite for participation in the experiment. Three hundred and eleven (311) students of English participated in these two studies: 181 in Study III and 130 in Study IV (Table 3). As with the biology students described above, data from this sample of students were also not analysed separately on the basis of the students’ language backgrounds; instead, the overall group was held to represent the diverse population of students at universities in Sweden.

One reason for selecting students of English as subjects was that they had chosen to study a subject which would clearly require them to read in English. Because of this, it was assumed that students of English probably do not have negative attitudes towards reading in English and English in general. It was therefore expected that the students’ attitude to English would not negatively affect their reading and learning in English. Another reason for using this population of students is that they are a self-selecting sample containing individuals who are unlikely to have reading comprehension levels below the threshold. By using students of English, it was also possible to exercise greater control over when their participation occurred, in order to be able to ensure that they had been exposed to at least some academic texts in English by the time they participated in the experiment. Thus they were not complete novices at learning from reading in English. In addition, it was also easy to identify material (topic they read about) that was relevant to a large group but largely unknown to them. Finally, there were also many opportunities to recruit a large number of them, which was extremely valuable in the experimental stage of the EVA project (see Section 5.1.2).

5.2.2 Methods

The methods adopted in this project were carefully tailored to the particular problems in question. In this respect, this transdisciplinary and problem-centric investigation was similar to many within educational linguistics (Hult, 2010). As the different studies focused on different aspects of reading and learning in parallel-language environments, a variety of methods were needed, both quantitative and qualitative (Table 4).
Table 4. Methods used in the four studies

<table>
<thead>
<tr>
<th>Investigating factor</th>
<th>Study I</th>
<th>Study II</th>
<th>Study III</th>
<th>Study IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading habits</td>
<td>*test: ART</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>survey: Questionnaire &amp; interview</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Reading abilities</td>
<td>瑞典</td>
<td>*test: SweSAT-R</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>英语</td>
<td>*test: Nelson-Denny</td>
<td>*test: Multiple-choice test</td>
<td>—</td>
</tr>
<tr>
<td>Learning</td>
<td>术语</td>
<td>*test: Written recall task</td>
<td>*test: Knowledge (EVA)</td>
<td>*test: Knowledge (EVA)</td>
</tr>
<tr>
<td></td>
<td>内容</td>
<td>*test: Written recall task</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Note-taking strategies while reading</td>
<td>—</td>
<td>—</td>
<td>data: Student notes</td>
<td>—</td>
</tr>
<tr>
<td>Reading conditions</td>
<td>时间</td>
<td>—</td>
<td>*test: Written recall task</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>语言记录</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>媒介</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>顺序及媒体暴露</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>暴露量</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Student self-perceptions</td>
<td>阅读能力</td>
<td>Survey: Questionnaire &amp; interview</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>阅读条件</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>学习</td>
<td>*test: Recognition (EVA)</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

* Methods and instruments are described in Section 5.2.2, in subsections dealing with each study.
Study I

The aim of Study I was to investigate the Swedish and English reading habits and abilities of Swedish students, and how these are correlated. The decision to investigate this was based primarily on the fact that not much is known about this issue. However, as a large body of reading research suggests that reading habits and abilities are connected (Section 4.3), an investigation of this would aid in understanding the factors affecting Swedish students’ academic English reading abilities.

To investigate this area, a mixed method, triangulation approach was used, so both quantitative and qualitative data were collected (Ivankova & Creswell, 2009). Both reading habits and reading abilities were investigated using quantitative and qualitative measures. Reading habits were explored with the Author Recognition Test (ART), a background questionnaire for reading skills (developed by McMillion & Shaw, 2009a), and semi-structured interviews. Reading ability was investigated with the background questionnaire for reading skills, semi-structured interviews, and two reading comprehension tests, one for Swedish and the other for English. Together all of these tools provided the means to describe the Swedish and English reading habits and abilities of Swedish students attending a parallel-language course. These instruments are described in greater detail below.

The Author Recognition Test (ART) has been used to measure exposure to print in a variety of studies in monolingual and multilingual higher education environments. In the ART, the participant is given a list of names on which only some are names of prominent authors, while others are foils or distractors. The participants’ task is to identify the names of authors which he or she recognises. This test measures the participants’ exposure to print only indirectly: it does not, for example, measure how many authors on the list the participant has read. Instead, the assumption is that those who read more recognise more author names. Because of this indirect quality of the test, it is important to be careful when constructing the author list, as over-representation of certain genres or authors from certain time periods could under- or over-estimate the exposure to print of certain participants.

The ART used in this study consisted of a list of one hundred names, of which only half were real, prominent fiction and non-fiction authors. The ART was used in 2010, so the list of authors was compiled with reference to the 2009 bestsellers lists. Because today people buy books not only in book stores but also from online book stores, the bestsellers lists used were those from two chains of Swedish bookstores, three Swedish online book retailers, and the 2009 national bestseller list. The authors included were those who appeared in at least three of the lists. The final list was a mix of authors writing a variety of genres as well as Swedish and foreign authors. I excluded the names of people who were well known from other domains than writing (e.g. Barack Obama). The foils were fifty names taken from the staff roster...
of a different Swedish university and adapted. They included both Swedish and non-Swedish names, in the same proportion as the author list. Using an Internet search engine, I also checked all of these names to ascertain that they did not belong to well-known authors. The list of authors and non-authors were alphabetically arranged. The students were asked to read the list and mark the names they recognised as authors. A point was awarded for correctly marking an author, and deducted for marking a non-author. The ART used in this study can be found in Appendix A of Study I.

The reading questionnaire was the background questionnaire for reading skills developed by Alan McMillion and Philip Shaw (2009a) and used in previous investigations of student reading. It included questions about the students’ language backgrounds, language knowledge, self-perception, and reading habits. The reading habits investigated with this questionnaire were daily leisure reading, print (fiction, etc.), electronic (news websites, Internet fiction, etc.), and vacation reading, in terms of type and the amount of time spent reading these media. Study reading habits were also investigated in terms of the amount of assigned reading done, time dedicated to it, and the reasons for not doing all of the assigned reading.

The interviews were semi-structured interviews which were recorded and transcribed with the permission of the students. The majority of the interviews were conducted in Swedish; two students chose to do it in English. The interview included questions about the students’ reading habits and perception of their own reading and language skills. Because the interviews were conducted after the other instruments had been administered, I used the students’ reading comprehension tests, questionnaire, and the ART to encourage them to talk about their reading abilities and habits. This also gave the students an opportunity to elaborate, for example, on why they thought certain names on the ART were authors, or what more precisely they mean when they say they read electronic media for one hour every day. I also gave the students the chance to browse through the textbook they were using in their course when talking about their study reading habits. This method of conducting interviews not only facilitated the students answering the questions, but also provided in-depth information into how students read and what they find causes problems. The interview transcripts were analysed using meaning coding, by identifying and coding relevant categories (Kvale & Brinkmann, 2009).

To measure Swedish and English reading comprehension, two tests were used: the Nelson-Denny Reading Test, Form G (Brown, Fischo & Hanna, 1993), and the Reading part of the Swedish Scholastic Aptitude Test (SweSAT-R, 2006). These two were chosen because they are standardised and widely in use. The Nelson-Denny test has been used in many studies of L1 and L2 English reading comprehension (e.g. Shaw & McMillion, 2011; Trites & McGroarty, 2005; Williams, Ari, & Santamaria, 2011), and the SweSAT-R came from a previously used national test, so it can be consid-
ered well constructed. Both the Nelson-Denny and the SweSAT-R test the comprehension of academic texts, which makes them appropriate for use in testing university students. As the tests are multiple-choice, they are also the type of reading comprehension tests that students are familiar with. Both also test the comprehension of relatively longer texts, although the texts in the SweSAT-R are longer than those in the Nelson-Denny. Additional reasons for using the Nelson-Denny were that it also tests vocabulary and reading rate, and that the testing manual provides mean scores of the standardisation sample, which was used to compare the Swedish students’ scores to those of their American peers.

The three reading habits measures (the ART, questionnaire, interviews) complemented each other in that the questionnaire included items about reading time, electronic media habits, and study reading habits, which the ART is not able to measure (Acheson, Wells & MacDonald, 2008; Spear-Swerling, Brucker & Alfano, 2010). On the other hand, the ART could be considered a more reliable source of measurement, because the students were penalised for guessing by losing a point. In the interviews, as noted above, student comments provided explanations of many of the choices they made. The interviews also provided in-depth understanding of how and why students read for pleasure and to study. These measures thus each supplemented what the others revealed.

The reading abilities measures (questionnaire, interviews, tests) also complemented each other. In the questionnaire, the students estimated their own abilities, which they could then comment on in-depth in the interviews. The tests, on the other hand, measured their abilities. The three different ways of measuring reading abilities thus not only provided reading comprehension scores, but also information on students’ self-perception.

Study II

The aim of Study II was to investigate Swedish students’ academic English reading abilities and how their reading of English textbooks compares to British students, who are one of the main targeted audiences of these types of textbooks. An additional aim was also to test how different learning conditions might affect the Swedish students’ learning of content and terminology from English textbooks. In this study, two English reading comprehension assessment techniques were used to test the English reading abilities and learning of content and terminology under different reading conditions: a multiple-choice test developed by Shaw and McMillion (2008, 2011; McMillion & Shaw, 2009b) and an immediate written recall protocol task of a subject-specific text. The tests were used to compare the Swedish and British students’ reading comprehension and learning of content and terminology from reading in English. The different reading conditions tested were the time given to read the text and the language of reporting.
The multiple-choice test involved a series of shorter texts and multiple-choice questions. The texts were about various academic topics. This test was chosen because it has been successfully used in the past with Swedish students (e.g. Shaw & McMillion, 2008, 2011; McMillion & Shaw, 2009b) and because it was of the format students were expected to be familiar with. The test has also been found to be strongly correlated ($r = .75$; Shaw & McMillion, 2011) with the Nelson-Denny Reading Test (Brown et al., 1993). This test was used to triangulate measures of reading comprehension.

The immediate written recall protocol task was used as a test of academic reading comprehension because it resembles the type of academic reading task students need to do (see below) and because it offered the possibility of investigating how much and what kind of content and terminology students remember from reading. The recall protocol task is also regarded as not having some of the problems that other types of reading comprehension tests have (Alderson, 2000; Bernhardt, 1991, 2011).

Many different kinds of reading comprehension assessment techniques have been discussed and criticised in the literature. Almost all of the methods, even those traditionally used, such as multiple-choice questions and cloze tests, have been criticised for not testing reading comprehension only, but for involving other types of processes and knowledge, such as linguistic and grammatical competence and background knowledge (Alderson, 2000). What this means is that the different methods we use to test reading comprehension will give us different results, because they will test other skills in addition to reading comprehension, such as the ability to skim-read, select text, and produce answers, which some L2 readers may find easier than others. One way of mitigating the effects of the preferences and knowledge of individual readers is to use tasks appropriate for the type of reading we would like to assess.

Alderson (2000) has called attention to the fact that the methods we use often do not correspond to the way readers normally interact with texts. He instead asserts that our methods should reflect what the L2 users we are interested in would normally do. In particular, we should consider the following points:

(i) what type of text the reader would normally be expected to read (e.g. length, difficulty, topic);
(ii) what the reason for reading the text would be;
(iii) what the reader would normally do with the text;
(iv) what the reader would be expected to learn from the text.

Consideration of these factors and the choice of a text and methods corresponding to the standard practices of the readers will increase the authenticity, validity, and generalisibility of our results (Alderson, 2000).
The immediate written recall protocol task in this investigation was a reading comprehension test which asked Swedish and British subjects to read a biology text in English for a specific amount of time (10 or 15 minutes) and then, immediately after, to write everything they remembered in the language in which they felt most comfortable writing. Their protocols were then analysed by marking the number of idea units from the text which the student remembered. The readers were, therefore, able to demonstrate their comprehension of the text without the tester having to prompt them, such as with open-ended or multiple-choice questions. Because reading a text and then retelling what has been learnt is quite a common task university students need to be able to perform, the recall protocol task can claim to possess a certain amount of authenticity. As a result, it can be considered superior to other methods of testing reading comprehension.

As mentioned above, the immediate written recall protocol task was chosen because it was considered ecologically valid. Because the aim of the study was to test the reading abilities of university students, a relatively long scientific text taken from a biology textbook was considered authentic, as it is related to the type of reading tasks the participants were required to perform on a daily basis. The Swedish students were also allowed to choose the language of reporting, which mirrors the fact that some students in parallel-language courses may choose the language in which they produce assessment writing. The choice of task, text in the task, and the procedure of the task were, therefore, well matched with what Study II was investigating.

The recall protocols of students were also analysed in such a way that the analysis reflected what the students would be expected to learn from reading in English in their course. When reading to learn, students are expected to recognise and remember the main ideas in the text as well as some of the details which help them explain the main ideas (Grabe & Stoller, 2002). In content courses, reading to learn also requires the students to learn new terminology, in particular the terminology which is the focus of the text. For this reason, the analysis of the student protocols focused on both the content and the terminology the students recalled.

To be able to analyse student protocols, the chapter the students read was analysed first, in order to create a list of items that could be recalled from the text. First, propositions in the chapter were identified by using Meyer’s (1975) idea units method. In this method, idea units are identified and connections between them are noted. One example of a sentence deconstructed in this way can be found in the manuscript of Study II in Section 2.3.1. Second, to be able to identify the main ideas in the chapter, I used the book authors’ chapter summary. Because this type of chapter summary is written as a study guide for students learning from the textbook, the chapter summary indicates which ideas and terms students are intended to learn from the chapter. Consequently, the content ideas found in the chapter summary were considered to be the main ideas (high-level) and all others details (low-level).
Terms were identified by looking at typographically emphasised words in the chapter and in the summary, and by deciding which words were subject-specific terms “not likely to be known in general language” (Step 4 technical terms; Chung & Nation, 2003, p. 105). Terms in the text were also divided into main (key) terms and terms which were less important. I considered key terms those that were identified by the authors themselves in the textbook list of key terms and those that were typographically emphasised in the text or in the summary. In addition, because frequency can also signal when a term is more important than others, I decided to consider one additional term a key term, as it was as frequently used in the text as the other key terms.

Once the chapter was thoroughly analysed, a scoring template was produced; the entire text in the chapter was represented as a list of idea units where connections between idea units were noted. The scoring template was used to score the student protocols; students received a point for every content unit identified correctly and half for when the idea unit was incomplete or when it was incorrectly connected to another idea unit. The recalls were analysed separately for content and terminology. This scoring method was checked for reliability by two raters; the reliability was found to be high for all levels of content and terminology units (.92 or higher).

The analysis of the content and terminology was thus both qualitative and quantitative. It was qualitative in the sense that the content which could be recalled was divided into high-level (main ideas) and low-level content (details), and terminology into high-frequency (key terms) and low-frequency terms (terms not in focus in the text), and quantitative in that the different content and terminology ideas were counted. This type of analysis was able to reveal characteristics of students’ L2 reading that a mere quantitative analysis of content would not be able to.

Both of the tests, the multiple-choice test and the recall protocol task, were used to compare the Swedish and British students’ reading comprehension. The multiple-choice test tested the students’ general reading comprehension, and the immediate written recall protocol task tested the learning of subject-specific terminology and content under particular reading conditions. All students could choose the language they reported in; however, some students were given more time to read. Statistical comparisons were done between different groups of students: Swedish and British students, students reading for 10 or 15 minutes, and students writing the protocols in Swedish or English. Using the multiple-choice test and the recall protocol task, this study investigated Swedish students’ learning of content and terminology from reading in English and the effects of the time given to read and the language the student chose to report in.

**Study III**

The aim of Study III was to explore how students interact with reading, or, more specifically, what they do when they read and how this affects their
learning. I decided to investigate this by focusing on one of the products of reading, student notes, because taking notes is a very common student strategy and as such is of interest to the investigation of student learning from reading.

Study III was a part of the experimental stage of the EVA project, which means that it used data collected through the experiment in which the learning of terms in a parallel-language course was tested. In the EVA project, different versions of the experiment were conducted, with reading and the lecture manipulated to test several variables (see Section 5.1.2). This study covers the parts of the experiment exploring student reading strategies, in particular note-taking strategies. The aim of the study was to explore the note-taking strategies of Swedish students who were learning terminology from reading in English and how their strategies related to their learning of terminology.

The data used in this article were collected from an experiment investigating the effect of term form used in the lecture. In this experiment, the students were asked to learn English subject-specific terminology from a textbook-like text in English and a pre-recorded lecture in Swedish. They were tested on their knowledge of subject-specific terminology with a series of tests measuring recognition and knowledge (in multiple-choice format). Some of the terms the students were supposed to learn were only in the English reading, some were in the English reading and elaborated in detail in the Swedish lecture, and some were in the English reading and only mentioned in the Swedish lecture. All students participating in this particular version of the experiment read the same text, which can be found in Appendix 1 of Study III. However, the lectures took three forms: One used Swedish forms of the terms which were non-cognate with the English terms in the reading; another used Swedish cognate terms; and in the third, the lecturer code-switched and used the English term which occurred in the reading. The structure, the length, and the content of the three lectures were the same.

The data collected from the EVA experiment were student notes and knowledge scores of the immediate post-test. Other data (pre-test, retention test, recognition scores) were not used. Since the terms presented in the reading only were all learnt under the same conditions, the notes of all the students were used. However, only the notes on the terms found in the reading only were analysed. In this way a large number of notes was collected, which made up for the fact that the student notes were rather short. Even though the data were collected during the EVA experiment where teacher strategies were tested, Study III, therefore, explored only students’ note-taking strategies and their connection to student learning of English terminology from reading.

The analysis of the student notes was informed partially by studies of student note-taking strategies conducted within educational psychology in mainly monolingual tertiary environments and by studies of student source
use and writing in both monolingual and multilingual tertiary environments. The student notes were analysed according to what the students noted—the information type the students chose to note (general information on rhetoric, term name, term group characteristics, definition, example, detail), and how they noted it—the level of language transformation of the original text into note form (from lowest to highest: verbatim copying, non-lexical additions, close transformation, rephrasing, translation, original ideas). Detailed explanations and examples of these strategies can be found in Study III, Section 3.3. This type of analysis was chosen because I was interested in the selection and production part of the note-taking process and not, for example, comprehension (Piolat, Olive & Kellogg, 2005). The results of the student notes analysis were used to explore whether different terms were noted using different strategies and whether successful and unsuccessful learners used different strategies.

**Study IV**

The aim of Study IV was to test the outcomes of some of the student and teacher strategies found in surveys of student and teacher attitudes and practices within parallel-language courses, in order to be able to suggest practices that would enhance student learning. The data for Study IV were also a part of the experimental stage of the EVA project (Section 5.1.2). The data collected were from an experiment which focused on the conditions of learning from different media, in a different order, and from a different amount of exposure. This experiment tested the outcomes of the student strategies of reading or not reading the text, attending or not attending the lecture, and reading before or after the lecture. It also tested effects of the teacher practice of describing terms found or not found in the reading during the lecture or merely mentioning them. This experiment investigated not only students’ knowledge gained from different learning events, but also students’ perception of knowledge gained from them.

This experiment was designed differently than the experiment from which the Study III data came. Since this experiment was testing the effect of learning from different media, some terms were described only in the English reading and some described only in the Swedish lecture (but said in English, which is quite a common practice in Swedish lecturing). To test the effect of amount of exposure, there were also terms that were described in the English reading and mentioned in the Swedish lecture. Students received twice as much exposure to these terms in comparison with those that were only in the lecture, or only in the text. The same English reading text and the same Swedish lecture were used for all students. However, since the aim was also to test the effect of order of media, the students were divided into two groups: one group read first and watched the lecture second, and one group watched the lecture first and read second. All students took a pre-test before the learning events, a post-test immediately afterward, and a retention test
one week later. The students were tested for their knowledge of terminology (with a multiple-choice test) and self-perception of their learning of terminology (with a recognition test). After the experiment, the group scores were statistically analysed and compared.

Experiments of this kind do not replicate how students study under natural conditions. Both the reading text and the lecture were rather short, in comparison with real lectures and typical reading assignments. In addition, the participants learnt from the two media in quick succession, which is unlikely to happen under ordinary circumstances where students would probably not read immediately before/after a lecture. Nevertheless, this type of experiment can be used to explore how certain teacher and student strategies can affect student learning of terminology and what student self-perception of learning from different media is. The results of this type of experiment can, therefore, suggest what student and teacher practices could be more effective in this type of learning situation where students have different media in different languages as available learning resources.

5.3 Summaries of studies
This section contains short summaries of the four studies. Because the participants and methods are described in detail in the previous section (5.2), only the aims will be repeated here. The results presented in this section are the main findings, discussed in terms of their general significance. Detailed results and discussion of the results can be found in the studies found at the end of this thesis. The conclusions drawn from all of these studies will be given in Section 6.

5.3.1 Study I: Multilingual reading proficiency in an emerging parallel-language environment

**Aims**
The aim of this study was to explore the language environment of Swedish students attending a parallel-language university. The study investigated the Swedish students’ Swedish and English reading habits and electronic media consumption habits, how these habits are related to their reading proficiency in the two languages, and what proportion of Swedish students have English reading proficiency comparable to their L1 English peers.

**Major findings**

*Leisure reading (general)*

Students do not read much printed material for pleasure, and instead spend more time reading on the Internet. They also tend to read shorter texts:
newspapers and news on the Internet. They read both in Swedish and English, although more in Swedish.

*Leisure reading (English)*

The students’ choice between leisure reading in Swedish and English did not depend on language, but on factors such as the availability of the text, the quality of the material, the preference to read in the language the book was originally written in, and the preference to read certain authors and genres in a specific language. Some Swedish students, therefore, do not see language as a constraint, but instead make choices based on their interests. This result demonstrated that Swedish students’ English reading experiences, abilities, and attitudes to English are different than those of students in environments typically studied (immersion or foreign-language environments).

*The link between reading habits and reading abilities*

Only a moderate relationship between reading habits and reading abilities measures was found. The reason for this could be that, because university studies typically require quite a large amount of study reading, students with good reading abilities have already been pre-selected when they decided to study at university.

*Swedish and English reading abilities*

While a large proportion of Swedish students have L2 English reading proficiency comparable to their L1 peers, an approximately equal proportion of them do not. Since L1 and L2 reading abilities have been found to be linked, the students’ L2 reading ability is probably not only affected by their L2 proficiency, but also their reading abilities in general.

*Reading speed in English*

Reading speed was mentioned as a problem by the students. It was also found to be correlated to English and Swedish reading comprehension, which means that reading speed is a problem for students with weak reading abilities. In addition, reading speed was found to be correlated to vocabulary knowledge, which means that it is also affected by the students’ vocabulary knowledge.

*English vocabulary knowledge*

Vocabulary knowledge was found to be problematic, related to reading speed, and correlated to (i) the quantity of assigned reading the students reported doing, and (ii) giving not understanding the course literature as a reason for not doing more study reading. It can thus be assumed that limited vocabulary knowledge is probably also one of the reasons why many students do not complete all of their assigned course readings.
5.3.2 Study II: High-proficiency L2 study reading: Effects of time and language of production

**Aims**
The aim of this study was to investigate the academic English reading comprehension of Swedish students and to compare it to that of their British peers. The study investigated how the time given to read and the language chosen for the reading response affect the students’ demonstrated reading ability in terms of recall of content and terminology, and quantity and quality.

**Major findings**

*The effect of reading time*
With the exception of the recall of key terminology, Swedish students are capable of reaching near-native comprehension if they are given sufficient time to read. Swedish students remembered as much content, both main ideas and details, as their British peers. Additional reading time also affected the choice of language of response: additional time led to a higher proportion of Swedish students deciding to write in Swedish and not in English, possibly because additional reading time made it possible for them to be able to better assimilate the content.

*The effect of language chosen for the reading response*
More advanced readers chose to write their reading response in English. However, they did as well as their peers who chose to write in Swedish. The advantage the advanced L2 readers had in the multiple-choice test did not appear in the recall task, possibly because of inhibition due to writing in L2. Given that they would be expected to perform better in their L1, this finding strongly suggests that the choice to write in English negatively affected their ability to reproduce knowledge.

*Recall of terminology*
Even if they were given additional time to read and if they chose to report in English, Swedish students’ recall of terms did not reach their British peers’ levels. Terminology is thus an aspect of reading which requires additional attention.

5.3.3 Study III: Learning terminology from reading texts in English: The effects of note-taking strategies

**Aims**
The aim of this study was to explore the note-taking strategies of Swedish students learning English terminology from reading in English and how this
is reflected in their learning of English terminology. The study investigated the note-taking strategies used for different vocabulary items and the note-taking strategies of successful and unsuccessful learners.

**Major findings**

**Note-taking strategies**
Most of these students took notes. Their note-taking strategies were most likely related to the individual characteristics of the student: how engaged they were with the text, how well they understood the text, and how they assessed the task. They were also related to the characteristics of the task and text: how much time was available for reading and how conceptually and linguistically complex the text was.

**Learning terminology**
Students who learnt more terms wrote more notes and noted more definitions and examples. They also used more higher-level strategies to transform the language of their notes. For example, more of them translated the text into Swedish and noted their own ideas and interpretations (connections to their pre-existing knowledge). In other words, the notes of successful students were of higher quantity and quality than the notes of unsuccessful students. This result provides empirical support for the assumption that the quantity and quality of reading notes can affect the success of students learning terminology from reading in English, even when notes are not used as recall aids.

**Reading speed**
The results suggest that slower readers may have sacrificed some quality of their reading notes in favour of quantity. How quickly the students were able to read thus appears to have affected their note-taking strategies.

**5.3.4 Study IV: Learning subject-specific L2 terminology in a parallel-language HE course: The effect of medium and order of exposure**

**Aims**
The aim of this study was to explore the effectiveness of some of the strategies Swedish students and teachers have adopted in the parallel-language context. The study investigated what effect medium (reading in English, lecture in Swedish), order of media exposure (reading before or after the lecture), and amount of exposure have on students’ learning of subject-specific terminology in English and students’ perception of knowledge of subject-specific terminology in English.
Major findings

Effect of media
Different media affected the volume of subject-specific terminology retained. English terminology learnt from reading in English was retained more than terminology learnt from listening to a lecture in Swedish (where terms are in English). These results suggest that in some circumstances learning L2 terms from reading in L2 may be more effective than learning them from a lecture in L1, possibly because reading is more engaging.

Effect of amount of exposure
Students learnt more terms described in detail in the reading and mentioned in the lecture than terms encountered only in the reading. Empirical support was thus found for the position that added exposure to terminology in different media, even when brief, contributes to learning of subject-specific terminology in English.

Effect of order of media exposure
In this experiment, the order of media exposure had no effect on the learning of subject-specific terminology in English. Reading before the lecture and reading after the lecture were equally effective. There was no empirical support for the assumption that students should read before the lecture.

Students’ perception of knowledge
The students believed lectures were more effective than reading; they underestimated knowledge gained from reading in English and overestimated knowledge gained from the lecture in Swedish. There is thus empirical support for the belief that students do not correctly judge their knowledge of terms learnt from different media in different languages.

6. Conclusion
This investigation aimed to explore Swedish students’ reading and learning within the context of Swedish higher education. In particular, the focus was on learning from textbooks in English in parallel-language courses, a learning situation which had hitherto not been explored satisfactorily. The specific aims of this investigation were to investigate the relationship between the students’ reading habits and reading proficiency in Swedish and English, the students’ academic biliteracy, and the students’ incidental vocabulary learning from reading in English, with a specific focus on subject-specific terminology in English. The exploration of these aspects often included an investigation of which natural assumptions, such as what type of teacher/student strategies are effective, have empirical support and which do not. As with
many studies within educational linguistics (Hult, 2008, 2010), an additional purpose of this investigation was to suggest pedagogical solutions which may facilitate these students’ reading in English, learning from texts in English, and incidental English vocabulary learning of subject-specific terminology. To explore these aspects, four studies employing a variety of methods and approaches were conducted. The design of the studies and the interpretation of results were guided by three models and theories: continua of biliteracy, the compensatory model of L2 reading, and incidental vocabulary learning from L2 reading.

Several themes emerged from the findings: students’ different levels of biliteracy, students’ infrequent print and study reading habits, the contrast between students’ positive attitude towards English leisure reading and negative attitude towards English study reading, the issue of time and reading speed, the issue of vocabulary knowledge and learning, and students’ partially inaccurate perceptions of their own abilities and knowledge. These themes are discussed below.

One conclusion that can be drawn from the four studies is that many Swedish students can be said to be biliterate, in the sense that they are capable of reading and learning from texts in Swedish and English without experiencing serious difficulties. These students are also able to employ appropriate reading strategies to facilitate their learning. However, there are also students who experience problems, be it due to their poor L1 literacy skills, English knowledge, or other factors. These students will have problems learning from reading in English and will require support to be able to achieve their maximum potential. Some of the factors which cause problems are reading speed and vocabulary knowledge.

Limited empirical support was found for the claim that extensive reading positively affects reading abilities. This could be due to the fact that the participants in the investigation were a fairly homogeneous sample, so there possibly was not much variability in their reading habits, or in the conditions of the current digital environment. In fact, leisure reading has been shown to be rather infrequent among this student population. Considering that many students also try to avoid study reading (e.g. Pecorari et al., 2012b), and that students in this investigation underestimated knowledge learnt from reading, this finding suggests that perhaps students do not put great value on reading. Since much university learning is done by reading academic texts, this is problematic not only in parallel-language courses, but in all courses.

Interestingly enough, although Swedish students do not do a great amount of leisure reading, some of what they do is in English, both on the Internet and in print. The finding suggests that students do not choose leisure reading on the basis of language, but on other factors such as whether the text is of good quality. The students also expressed the preference to read certain authors and genres in English and the preference to read texts in the original language of the book, whether that was Swedish or English. Many of these
students, therefore, do not find leisure reading in English particularly difficult. This finding is in contrast with the studies suggesting that students find academic reading in English difficult (e.g. Pecorari et al., 2012b), which implies that motivation or perhaps low subject knowledge might be factors affecting the perceived difficulty of the text and not language ability.

One factor which could also affect students’ perceived difficulty of academic reading in English appeared as a very common theme in the investigation: the issue of time and reading speed. Students in interviews expressed the concern that reading academic texts in English takes a long time. Slow reading speed also seemed to negatively affect students’ note-taking strategies. These findings support the reports of surveys and studies where time was reported as being a hindrance to students’ learning from L2 (e.g. Pecorari et al., 2011b; Tatzl, 2011; Vinke, 1995). However, as in other studies (McMillion & Shaw, 2009b; Shaw & McMillion, 2011), the results of this investigation suggest that Swedish students are capable readers and learners in English who only need additional time to be able to reach their L1 English peers’ level of reading comprehension. Many Swedish students would thus not experience many problems learning from textbooks in English, if the amount of reading in English they needed to do was adjusted to account for their slower reading speed or if they received additional support.

Vocabulary knowledge and learning were also found to cause difficulties for the students. Students expressed the belief that their slow reading speed is the result of the gaps in their vocabulary and terminology knowledge, thus confirming other surveys and studies (e.g. Bolton & Kuteeva, 2012; Evans & Morrison, 2011). They also reported that they sometimes experience confusion because different terms are used in the lectures (Swedish terms) than in the reading (English terms). English subject-specific terminology was also shown to be difficult to learn for Swedish students, especially the terminology which was the focus of the text. These findings are particularly troubling in this learning situation because the students are expected to learn subject-specific terminology in English incidentally from their reading. However, incidental terminology learning is unlikely to occur, since so many of the prerequisites for its occurrence are not met in this context. A significant number of students actively avoid or minimise their textbook reading (Pecorari et al., 2012b), which means that they receive little or no exposure to English terms through that channel. Terminology learning in English is also rarely supported in lectures (Malmström et al., submitted), which again minimises the frequency of exposure necessary for incidental vocabulary learning (Brown et al., 2008; Waring & Nation, 2004). Thus, considering that this investigation found evidence which suggests that terminology learning is one area of learning where Swedish students need support, the fact that students are not frequently exposed to terms in various contexts is very problematic, indeed.
The final prevailing theme of this investigation was the students’ inaccurate perceptions of their own knowledge and abilities. The investigation showed that students who chose to write their reading recalls in English, instead of in Swedish, on average had better English reading comprehension; however, their recall of content and terminology was not better. Thus, while they were confident in their productive English skills, they are likely in fact to have been constrained by the language they chose to write in. The investigation also showed that some of the strategies the students are known to have adopted in parallel-language courses (e.g. depending on the lecture for content) are, in fact, not very effective. Students are also not able to judge their own knowledge, and frequently underestimate knowledge gained from reading in English, possibly because of perceived difficulties and their negative attitudes towards learning from texts in English (e.g. Pecorari et al., 2012b). Swedish students studying in parallel-language courses are thus steered by self-perceptions and beliefs which do not facilitate their learning.

To conclude, reading in English and learning from reading in English are not unproblematic in courses where students are expected to learn from two media in different languages. Many students possess reading and learning abilities which enable them to succeed; however, many of them would also benefit from additional support given by academic reading and writing professionals and from content teachers themselves. As one of the purposes of this investigation was to suggest pedagogical interventions which might facilitate reading and learning in parallel-language courses, the next two sections are lists of practices that might ease and facilitate student learning. The two sections describe possible pedagogical practices for two groups of teachers: English for Academic Purposes (EAP) teachers (Section 6.1), and content teachers (Section 6.2).

6.1 Implications for teaching: English for Academic Purposes (EAP) support

1) Students’ levels of language and reading ability in Swedish and English need to be identified, and support should be given accordingly:
   a) Good readers in English and Swedish: They generally have good reading and learning abilities in English. However, some may be negative towards reading in English. These students would benefit from motivation and confidence-raising.
   b) Weak readers in English because of weak L1 literacy skills: These students are weak readers in English because their limited literacy skills do not allow much transfer into English. These students would benefit from instruction in various reading strategies.
c) *Weak readers in English because of their poor English knowledge:* These students would benefit from language instruction.

d) *Slow readers:* These students should be taught reading strategies to increase their speed of reading and learning in English.

2) Students should be made aware that there may be a trade-off between reading quality and time spent reading.

3) Students would benefit from being taught note-taking strategies:
   a) Students should be encouraged to take the time necessary to read through all of the text and to take extensive notes on all of the content they need to learn, preferably using their own words and their L1.
   b) Students should be instructed to note high-level ideas and to connect the new knowledge in the text to their pre-existing knowledge.
   c) Students should be taught to adjust to reading and learning conditions and to their own personal learning style. They may sometimes benefit from not taking notes and instead focusing on reading the text more thoroughly.

4) Students who choose to write assessment tasks in English, where that choice is available, should be made aware that their choice of language may affect their success. Some students would benefit from writing in their L1 instead. Those who need to/choose to write in English would benefit from writing instruction.

5) Students would benefit from learning various strategies to improve their learning of subject-specific terminology in English.

6.2 Implications for teaching: Content teachers

1) Content teachers should address their students’ language abilities and how they may be able to help them. If such sources are available, some students may benefit from being referred to academic reading and writing support centres.

2) Students would benefit from explicit explanations of aims of different learning activities (e.g. reading, lectures, seminars, laboratory work):
   a) Teachers need to explicitly explain the different types of knowledge that are learnt in different contexts and encourage their students to participate in all of them.
   b) Teachers need to explain the different purposes of different learning activities. If their lecture depends on students having done the reading beforehand, they need to inform students of this and encourage them to read before the lecture.
c) Teachers need to make more connections between different learning activities. In particular, more explicit connections need to be made to the reading in their lectures.

d) Because students are negative towards reading and underestimate knowledge gained from reading, teachers should stress the relevance and the benefits of learning from reading. Students should in fact be actively encouraged to read.

3) Teachers should address the reasons for using textbooks in English in their courses, discuss this with their students, and provide help where needed.

4) Teachers should not expect students to learn subject-specific terminology in English from their reading only. Learning terminology in English should be supported in other contexts, such as lectures and seminars. A mere mention of a term in English in the lecture contributes to better learning of the term. Using the cognate form might also contribute to better learning of English terms.

5) Teachers should advise their students on note-taking strategies. In particular, students should be taught how to find the relevant information in their reading and be encouraged to take the time necessary to read through all of the text and to take extensive notes on all of the content they need to learn.

6) Teachers who set assessment tasks in English should address the reasons for doing this. If the aim of the task is to assess the students’ subject-knowledge and not productive English academic skills, some students may in fact perform better if they completed the tasks in their L1.
Avancerad andraspråksläsning och vokabulärinlärning på det parallellspråkiga universitetet

1. Bakgrund

Användningen av engelska är utbredd inom högre utbildning. Ett växande antal studenter i länder såsom Sverige går utbildningar där undervisningsspråket är engelska, eller där svenska är det huvudsakliga undervisningsspråket men där vissa inslag, t ex kurslitteraturen, är på engelska. I detta avseende är situationen i Sverige jämförbar med den i många länder runtom i världen där studenterna lär sig genom att läsa på engelska.

Inom ramen för högre utbildning i de nordiska länderna har diskussionen kring denna situation handlat om begreppet ”parallella språk”, dvs. ”samtidig användning av flera språk inom ett eller flera områden” (Nordic Council of Ministers, 2006, s. 83). Detta begrepp introducerades som ett led i försöken att skydda och främja användningen av nationella språk. Begreppet är dock ganska vagt definierat och har använts i olika betydelser. Bland annat har det använts för att beskriva kurser där både svenska och engelska används parallellt i undervisningen.

Kurser där undervisningen vanligtvis är på svenska och litteraturen på engelska har kallats parallellspråkiga kurser (eng. parallel-language courses), inte bara för att två språk används parallellt, utan även för att de anses främja (akademiska/vetenskapliga) språkkunskaper i båda språken. Användningen av engelska kursböcker har ansetts fördelaktig i och med att studenterna därmed förväntas förbättra sina receptiva färddighet och kunskaper i terminologi på engelska. Inlärning från kursböcker på ett främmande språk (L2) är dock inte oproblematiskt. Bland annat har undersökningar visat att studenter har svårt att förstå L2-texter (Berman, 2010; Pecorari et al., 2011b) och att det kräver mer tid och kraft att lära sig av den här typen av texter (Hellekjær, 2009; Pecorari et al., 2011b; Tatzl, 2011). Studenterna har bemött dessa svårigheter att hantera sin läsmängd genom att använda strategier som sannolikt inte har någon positiv inverkan på deras inlärning (Pecorari et al., 2012b). Några av de problem som kan uppstå i en
sådan inlärningssituation utgör focus för den undersökning som redovisas här.


I den kompensatoriska modellen för andraspråksläsning (Bernhardt, 2005, 2011) betraktas läsning som en komplex förmåga som inte enbart påverkas av färdigheter i andraspråket. Enligt denna modell påverkas L2-läsning även av läs- och skrivkunnigheten i förstaspråket (L1), samt av andra faktorer såsom lästrategier, ämneskunskaper, intresse och motivation. En viktig egenskap hos L2-läsning enligt denna modell är även att dessa aspekter av läsning kan kompensera för varandra och att dessa olika aspekters tillgänglighet kan öka med tiden. Läsförmåga har således visat sig förbättras genom läsning i sig.

Oavsiktlig vokabulärinlärning är inlärning som en biprodukt av läsning medan studenten eftersträvar kunskaper inom en annan domän (Hulstijn, 2003; Nation, 2001; Schmidt, 1994). Till exempel, genom att läsa en kursbok på engelska för att lära sig innehållet lär sig studenten samtidigt ämnesspecifika termer på engelska. För att detta ska kunna ske krävs dock att vissa förutsättningar är uppfyllda: (i) studenten måste kunna läsa texten, vilket delvis är beroende av tillräckliga kunskaper om de ord som förekommer i

\(^6\) Tvåspråkig läs- och skrivkunnighet

2. Frågeställningar

Undersökningen föranledes av pedagogiska frågeställningar som framkommit inom den högre utbildningen i Sverige, vilket också var ramen för denna undersökning. Kurserna i fokus var parallellspråkiga kurser där studenterna går på föreläsningar som hålls på svenska men lär sig från kursböcker skrivna på engelska. Det övergripande syftet med undersökningen var att undersöka svenska studenters förmåga att läsa vetenskapliga/akademiska texter på engelska och deras omedvetna inlärning av ämnes- specifik terminologi på engelska. Målet med undersökningen var att kunna föreslå pedagogiska lösningar för att främja studenternas läsning på L2 (engelska), inlärning från L2-läsning och oavsiktlig L2-vokabularinlärning av ämnesspecifik terminologi. Följande frågeställningar var i fokus för denna undersökning:

(1) Hur ser studenternas svenska och engelska läsvanor och läsförmåga ut, och vad finns det för samband däremellan?
(2) I vilken utsträckning har studenterna de färddigheter i båda språken som krävs för de akademiska/vetenskapliga uppgifter de ställs inför?
(3) I vilken utsträckning sker oavsiktlig vokabularinlärning av ämnes- specifik terminologi på engelska i den parallellspråkiga kontexten?
(4) Vad skulle kunna göras för att maximera dessa studenters läsning på engelska, inlärning från läsning på engelska, samt deras oavsiktliga vokabularinlärning på engelska?

3. Metoder

Denna undersökning genomfördes som en del av projektet English Vocabulary Acquisition (EVA), finansierat av Vetenskapsrådet. Projektet var ett samarbete mellan fem forskare från fyra lärosäten i två länder:

---

Projektet utmynnade i ett flertal publikationer som inte ingår i denna avhandling. Denna avhandling består av de fyra studier där jag spelade en ledande och direktiv roll. Två av dessa studier har redan publicerats, och de andra två har skickats till tidskrift för granskning. Tre av studierna (I, II och III) är ensamförfattade, och Studie IV har Mežek som huvudförfattare och övriga EVA-deltagare som medförfattare (Pecorari, Shaw, Irvine & Malmström). I studierna användes ett antal olika kvalitativa och kvantitativa metoder som valts utifrån de faktorer som undersöktes i respektive studie. Deltagarna var svenska och brittiska biologistudenter (Studie I och II) samt svenska engelskstudenter (Studie III och IV).

I Studie I undersöktas svenska studenters läsvanor och läsförmåga när det gäller nöjes- och studieläsning, samt hur dessa hör samman. Läsvanor på svenska och engelska undersöktes med hjälp av ett frågeformulär, en intervju och ett test där studenterna fick läsa en namnlista och kryssa för de namn som tillhörde författare (Författarigenkänningstest, eng. Author Recognition Test). Läsförmåga testades genom ett läsförståelseprov på svenska och engelska, och studenternas uppfattning om sin egen läsförmåga undersöktes genom frågeformuläret och intervjun. De svenska studenternas engelska läsförståelseresultat jämfördes med de engelskspråkiga studenternas med hjälp av det standardiseringsurval som angivits i testmanualen.

Studie II undersökte svenska och brittiska studenters läsförmåga vad gäller både allmän och akademisk engelska. Allmän läsförmåga testades genom ett läsförståelseprov med flervalsfrågor, och akademisk läsförmåga testades genom en uppgift där studenterna ombads att läsa en vetenskaplig text under en bestämd tid och sedan skriva ned allt de kunde minnas direkt efteråt på valfritt språk (svenska eller engelska). Studien syftade till att svara på hur lästiden och det valda svarsspråket påverkar svenska studenters uppusvisade läsförmåga med avseende på att förstå och minnas innehåll och terminologi, och med avseende på såväl kvantitet som kvalitet.

Studie III undersökte anteckningstekniker hos svenska studenter som lär sig engelsk terminologi genom att läsa på engelska, samt vilken inverkan dessa tekniker har på studenternas inlämnning av engelsk terminologi. De tekniker som undersöktes var vilken typ av information studenterna antecknade (t ex definitioner, exempel) och hur de överförde språket i texten till sina egna anteckningar (t ex ordfagrann kopia, översättning). Studien undersökte huruvida olika termers antecknades med hjälp av olika tekniker och huruvida studenter med bra respektive dåliga resultat använde sig av olika tekniker. Anteckningarna samlades in från ett EVA-experiment där studenterna om-
bads att läsa en text på engelska och lära sig de termer som förekom i texten. Studenternas kunskaper prövades genom ett flervalstest.

Studie IV undersökte effektiviteten av några av de tekniker som svenska studenter och lärare använt sig av inom parallellspråkiga kurser. Studien undersökte vilken effekt mediet (engelsk litteratur, svensk föreläsning), ordningen för inläsningen från respektive medium (om studenterna läste före eller efter föreläsningen) och antalet exponeringstillfällen har såväl på studenternas inläsning av ämnesspecifik terminologi på engelska, som studenternas uppfattning om sina egna kunskaper i ämnesspecifik terminologi på engelska. Uppgifterna samlades in från ett experiment där inläsningssituationen liknade den i parallellspråkiga kurser: studenterna fick lära sig engelsk terminologi från en text på engelska och en föreläsning på svenska (men där termerna var på engelska). Texten och föreläsningen var speciellt utformade för att testa följande variabler:

- Effekten av mediet och antalet exponeringstillfällen: vissa termer förekom endast i texten, andra endast i föreläsningen, och några beskrevs i texten men nämndes bara kort under föreläsningen.
- Ordningen för inläsningen från respektive medium: några studenter läste före föreläsningen och andra läste efter föreläsningen.

Studenternas verkliga och upplevda kunskaper och uppfattning testades genom en kunskapsdel med flervalsfrågor samt frågor där de ombads gradera sin egen igenkänning av orden. Studenterna gjorde testet före, direkt efter, samt en vecka efter inläsningstillfällena.

4. Resultat

4.1 Studie I


*Studenterna har varierande engelsk läsförmåga.*

Samtidig som en stor andel svenska studenter har en engelsk läsförmåga som är jämförbar med de engelskspråkiga studenternas så finns det en ungefär lika stor andel som inte har det. I och med att det har visat sig finnas kopplingar mellan läsförmåga på L1 och L2 kan en delförklaring till detta resultat vara bristande läsförmåga i allmänhet. Endast ett begränsat samband hittades mellan läsvanor och läsförmåga.
Låg läshastighet och bristande ordförråd orsakar lässvårigheter för vissa studenter.


*Studenterna läser inte mycket för nöjes skull; dock läser de både på svenska och på engelska.*


4.2 Studie II

High-proficiency L2 study reading: Effects of time and language of production / Avancerad L2-studieläsning: effekter av lästid och skrivspråk. (Skickats till tidskrift för granskning).

*Svenska studenter klarar av att uppnå en läsförståelse nära modersmålsnivå om de får mer tid på sig att läsa.*

När de fick mer tid på sig att läsa mindes de svenska studenterna lika mycket innehåll, såväl huvuddrag som detaljer, som de brittiska studenterna, förutom när det gällde terminologin. Att få mer tid på sig att läsa påverkade även huruvida studenterna valde att skriva sina svar på svenska eller engelska: mer tid ledde till att en högre andel svenska studenter beslöt sig för att skriva på svenska istället för på engelska.

*Språket påverkar svenska studenters förmåga att återge kunskap.*

Mer avancerade läsare valde att skriva sina svar på engelska. De presterade dock inte märkvärdigt mycket bättre än de som valde att skriva på svenska. I och med att de borde kunna förväntas prestera bättre på sitt L1 tyder detta resultat på att valet att skriva på engelska hade negativ inverkan på deras förmåga att återge kunskap.
Terminologi är en aspekt av lärande som kräver extra uppmärksamhet. Även om de fick mer tid på sig att läsa och de valde att skriva sina svar på engelska kunde inte de svenska studenterna minnas lika många termer som de brittiska studenterna. Terminologi är således en aspekt av lärande genom läsning som kräver mer uppmärksamhet.

4.3 Studie III


Studenternas anteckningstekniker beror på studentens, uppgiftens och textens karaktär.

De flesta av studenterna gjorde anteckningar. Deras anteckningstekniker berodde på studenternas individuella karaktär: hur engagerade de var i texten, hur väl de förstod texten och hur de bedömde uppgiften. De berodde också på uppgiften och textens karaktär: hur lång tid man hade på sig att läsa och hur begreppsmässigt och språkligt komplicerad texten var.

*Anteckningsstrategier kan påverka hur framgångsrikt studenterna lär sig terminologi genom att läsa på engelska.*

Framgångsrika studenters anteckningar hade större omfång och högre kvalitet än mindre framgångsrika studenters. Framgångsrika studenter gjorde fler anteckningar och använde oftare sådana tekniker som översättning, omformulering och anteckning av idéer som inte återfanns i litteraturen. Detta resultat ger empiriskt stöd för det utbredda antagandet att kvantiteten och kvaliteten på läsanteckningar kan påverka hur framgångsrikt studenterna lär sig terminologi genom att läsa på engelska, även om anteckningarna inte används som hjälpmedel för att minnas.

*Läshastigheten påverkar studenternas anteckningsteknik.*

Resultaten tyder på att långsamma läsare kan ha offrat en del av kvaliteten på sina anteckningar för kvantitetens skull. Hur snabbt studenterna kunde läsa texten tycks således ha påverkat deras anteckningsteknik.

4.4 Studie IV

Learning subject-specific L2 terminology in a parallel-language HE course: The effect of medium and order of exposure / Inlärning av ämnesspecifik L2-terminologi i en parallellspråkig universitetskurs: effekter av medium

*Det kan vara mer effektivt att lära sig engelsk terminologi genom att läsa på engelska än genom en föreläsning på svenska.*

Inlärningsmediet påverkade hur mycket engelsk ämnesspecifik terminologi studenterna kom ihåg. Studenterna kom ihåg fler engelska termer som de lärt sig genom att läsa på engelska än termer som de lärt sig genom att lyssna på en föreläsning på svenska (där termerna var på engelska). Dessa resultat tyder på att det i vissa fall kan vara mer effektivt att lära sig engelsk terminologi genom att läsa på engelska (L2) än från en föreläsning på svenska (L1) —möjligtvis för att läsning är mer engagerande.

Ytterligare exponering för terminologi i olika medier bidrar till inlärningen av ämnesspecifik terminologi på engelska.

Resultaten visar att fler studenter lärde sig de termer som beskrivs i detalj i litteraturen och sedan nämndes under föreläsningen än de termer som endast förekom i litteraturen.

**Att läsa före eller efter en föreläsning är lika effektivt.**

I detta experiment hade inte ordningen för inlärning från respektive medium någon effekt på inlärningen av ämnesspecifik terminologi på engelska. Det fanns inget empiriskt stöd för antagandet att studenterna bör läsa innan föreläsningen.

**Studenterna underskattar hur mycket de lär sig genom att läsa på engelska.**

Studenterna upplevde att de lärde sig mer från föreläsningar än genom läsning; de underskattade hur mycket de lärde sig genom att läsa på engelska och överskattade hur mycket de lärde sig från föreläsningen på svenska. Det finns således empiriskt stöd för att studenter missbedömer hur mycket terminologi de lär sig genom olika media på olika språk.

5. **Slutsatser och pedagogiska förslag**

Resultaten från denna undersökning visar att läsning på engelska och inlärning genom att läsa på engelska kan vara problematiskt i kurser där studenterna förväntas lära sig från olika medier på två olika språk. Medan det visade sig att det bara finns ett begränsat samband mellan läsvanor och läsförmåga så visade resultaten att det finns en koppling mellan studenternas läsförmåga på svenska och engelska. Detta innebär att studenternas L1-läsförmåga påverkar deras läsning på engelska. Samtidigt som många svenska studenter som går parallellspråkiga kurser är duktiga läsare på engelska finns det även de som inte är det. Det som gör att dessa studenter upp-
lever svårigheter är dock inte alltid deras bristande kunskaper i engelska, utan ofta handlar det om en rad andra faktorer, som exempelvis bristande läsfärdighet i allmänhet, brist på motivation, bristande ämneskunskaper och ordförråd, låg läshastighet, anteckningstekniker och tid. En del studenters inlärning styrs även av deras självuppfattning och idéer om inlärning som inte underlätta deras inlärning. Dessutom, även om det sker omedveten inlärning av engelsk terminologi när studenterna läser texter på engelska så behövs det ytterligare inlärningsstöd inom andra undervisningsmoment, t.ex föreläsningar. Medan många studenter alltså besitter den läs- och inlärningsförmåga som behövs för att göra bra ifrån sig skulle många av dem även gynnas av att få ytterligare hjälp. I de två följande sektionerna presenteras förslag på pedagogisk praxis som skulle kunna underlätta läsning och inlärning.

5.1 Pedagogiska förslag: Hjälp med akademisk engelska

1) Nivån på studenternas språkfärdigheter och läsförmåga på svenska och engelska behöver identifieras, och hjälp bör ges därefter.
   b) *Svaga läsare på engelska på grund av bristande L1-läsfärdighet:* Dessa studenter är svaga läsare på engelska i och med att deras begränsade läsfärdighet inte tillåter mycket överföring till engelska. Dessa studenter skulle gynnas av att få lära sig olika lässtrategier.
   c) *Svaga läsare på engelska på grund av deras bristande kunskaper i engelska:* Dessa studenter skulle gynnas av språkundervisning.
   d) *Långsamma läsare:* Dessa studenter bör få lära sig lässtrategier för att öka sin läshastighet och inlärning på engelska.

2) Studenterna bör göras medvetna om att det kan finnas en avvägning mellan läskvalitet och tid ägnad åt läsning.

3) Studenterna skulle gynnas av att få lära sig anteckningstekniker:
   a) Studenterna bör uppmuntras att ta den tid på sig som krävs för att läsa igenom hela texten och att göra utförliga anteckningar om hela det innehåll de behöver lära sig, helst med egna ord i sitt förstaspråk.
   b) Studenterna bör få lära sig att anteckna nyckelidéer och att koppla samman den nya kunskapen i texten med deras befintliga kunskap.
   c) Studenterna bör få lära sig att anpassa sig efter läs- och inlärningssvillkoren och sitt eget personliga inlärningssätt. De kan
ibland gynnas av att inte göra anteckningar och istället fokusera på att läsa texten mer noggrant.

4) De studenter som väljer att skriva bedömningsuppgifter på engelska, när denna valmöjlighet finns, bör göras medvetna om att deras språkval kan komma att påverka resultatet. En del studenter skulle gynnas av att skriva på sitt förståspråk istället. De som måste/väljer att skriva på engelska skulle gynnas av undervisning i akademiskt och vetenskapligt skrivande.

5) Studenterna skulle gynnas av att få lära sig olika strategier för att förbättra sin inlärning av ämnesspecifik terminologi på engelska.

5.2 Pedagogiska förslag: Ämneslärare

1) Ämneslärare bör tänka på sina studenter språkkunskaper och hur de skulle kunna hjälpa till. En del studenter skulle gynnas av att hänvisas till hjälpcentra för läsande och skrivande om sådana finns till hands.

2) Studenterna skulle gynnas av tydliga förklaringar av syftet med olika undervisningsmoment (t.ex läsning, föreläsningar, seminarier och laborationer):
   a) Lärarna bör tydligt förklara vilka olika sorters kunskap som lärs ut i olika sammanhang, och uppmuntra studenterna att delta i samtliga.
   b) Lärarna bör förklara de olika syftena med olika undervisningsmoment. Om deras föreläsning är beroende av att studenterna har läst litteraturen i förväg behöver de informera studenterna om detta och uppmuntra dem att läsa innan föreläsningen.
   c) Lärarna bör göra flera kopplingar mellan olika undervisningsmoment. Speciellt bör det göras tydligare kopplingar till litteraturen under föreläsningarna.
   d) I och med att studenterna är negativt inställda till läsning och underskattar hur mycket de lär sig genom att läsa bör lärarna understryka vikten av och nytta med att lära sig av litteraturen. Studenterna bör i själva verket aktivt uppmuntras till att läsa.

3) Lärarna bör fundera över varför engelska kursböcker används i deras kurser, diskutera detta med sina studenter och erbjuda hjälp vid behov.

4) Lärarna bör inte förvänna sig att studenterna ska lära sig ämnesspecifik terminologi på engelska enbart genom att läsa. Inläarning av terminologi på engelska bör stödjas i andra sammanhang, t.ex föreläsningar och seminarier. Blotta omnämnandet av en term på engelska under en föreläsning bidrar till bättre inläarning av termen. Användningen av kognater kan också bidra till bättre inläarning av engelska termer.

---

8 Kognater är besläktade ord i olika språk som liknar varandra. Ett kognat för kinetic energy (eng.) är kinetisk energi. Rörelseenergi, som också betyder kinetic energy, är inte ett kognat.
5) Lärarna bör ge sina studenter råd angående anteckningstekniker. Speciellt bör studenterna få lära sig att hitta relevant information i sitt läsande och uppmuntras att ta den tid på sig som behövs för att läsa igenom hela texten.

6) Lärare som utformar bedömningsuppgifter på engelska bör ta upp varför de gör detta. Om syftet med uppgiften är att bedöma studenternas ämneskunskaper, till skillnad från deras produktiva akademiska engelskkunskaper, skulle en del studenter prestera bättre om de slutförde uppgiften på sitt förstaspråk.
Acknowledgements

A great number of people have in various ways helped and supported me through my years as a PhD student. First, I would like to give my sincere gratitude to my supervisors, Philip Shaw and Diane Pecorari, for all their guidance, support, and feedback, and the other members of the EVA project group, Aileen Irvine and Hans Malmström, for giving me the chance to work on the project. I would also like to offer my thanks to Nils-Lennart Johansson for proofreading my thesis, and to Maria Kuteeva and Francis Hult for their valuable suggestions and feedback on my articles and thesis. Jessica Berggren and Lisa McGrath have also given me a lot of valuable feedback, for which I am immensely thankful.

My special thanks also go out to a long list of other people who have welcomed me to the Department and, throughout the years, provided help when I needed it: Alan McMillion, Anja Nyström, Beyza Björkman, Bo Ekelund, Britt Erman, Christina Alm-Arvius, Claudia Egerer, David Minugh, Elisabet Dellming, Gunnel Melchers, Hermon Berhane, Ingrid Westin, Kingsley Bolton, Lotta Palmstierna Einarsson, Malin Sigvardson, Miguel García-Yeste, Raffaella Negretti, Sara Lilja Visén, my fellow PhD students, and other members of Stockholm University’s Department of English, past and present.

This investigation was funded by the Swedish Research Council (Vetenskapsrådet) and The Bank of Sweden Tercentenary Foundation (Riksbankens Jubileumsfond), for which I am very grateful.

Last, but definitely not least, I would also like to thank my husband Patrik for his love, patience, and encouragement.
References


English as a language of science: Effects on other languages and language communities (pp.85–112). Berlin: Mouton de Gruyter.


The studies