The role of intersemiotic translation in multimodal communication in educational textbooks.

Danilda Els

2001002050

Submitted in fulfilment of the requirements in respect of the Master's Degree in Language Practice in the Department of Linguistics and Language Practice in the Faculty of the Humanities at the University of the Free State.

November 2021

Supervisor: Prof J Marais

Acknowledgements

First and foremost, I am incredibly grateful to my supervisor, Prof. Kobus Marias. His continuous support, advice and feedback made me a better researcher.

I want to thank my friend and colleague, Linda Sparks, for proofreading my work and for her valuable comments and insight.

To my parents, Danie and Hilda, thank you for always encouraging me to explore new directions in life. This would not have been possible if not for you.

Lastly, I want to thank my lovely partner, Alison. Thank you for choosing me and thank you for witnessing my life.

Declaration

I, Danilda Els, declare that the Master's Degree research dissertation that I herewith submit for the Master's Degree qualification Magister Artium (Language Practice) in the Faculty of the Humanities (Department of Linguistics and Language Practice) at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher education**.**

…… **29 November 2021**

Signature Date

Abstract

Our social world is a multitude of semiotic resources which we use in combination with language to make and convey meaning. The ever-increasing integration of language with other semiotic resources is turning our social world into a multimodal-communicative environment. Multimodality is using and combining various semiotic resources, for example, images and linguistic expression, for communication. It looks at all meaning-making resources available and how different resources are used in multiple contexts. Moreover, it includes the study of how theseresources are organised in these contexts to form coherent meaning. These organised sets of resources are called modes. Through the selection and arrangement of modes, people create meaning, which they can then communicate. The *modes* in multimodality are the various semiotic resources used in combination with language, which creates a message. Since these resources can be translated into a written text and vice versa, an argument can be made that a multimodal text resembles an intersemiotic translation.

Intersemiotic translation is the interpretation of language and/or linguistics signs through other non-verbal semiotic resources. It can be further hypothesised as resemiotisation, which focuses on how meaning conceptualisation occurs when there is a shift between different semiotic resources. Resemiotisation is thus concerned with "tracking" how meaning translates from one semiotic sign to another through intersemiotic translation when meaning-making takes place through a multimodal text. One field in which multimodal communication plays an ever-increasing role is education.

Education as an academic field has transformed tremendously over the years. Changes are not just pedagogical but also, even more importantly, seen in the composition of learning material. Learning and teaching from predominantly text-based textbooks are gradually falling out of favour, and a greater emphasis is placed on adapting educational material to become more multimodal. One of the theories emphasising the importance of multimodal texts is the theory of multiliteracies. The pedagogical approach behind this theory is that a wide range of communicative, cultural and linguistic tools should be incorporated into teaching methodology. This framework thus creates the space for studying the relationship between the different modes in a multimodal text, as well as the composition.

This research aimed to conduct a descriptive content analysis of an academic literacy textbook that communicates predominantly via multimodal texts. The primary research question this study wanted to answer was what relationship, if any, exists between the written text and the other semiotic resources used for communication? Thus, the communication process that was looked at here was specifically multimodal communication. This was done through descriptive analysis. The text that was analysed was from a multimodal literacy textbook used in the field of Natural Sciences at the University of the Free State, South Africa. Additionally, the research also looked at how semiotic resources compare across different subject fields. For the comparison, another multimodal academic literacy textbook was used; this one was from the field of Humanities, also used in classes at the University of the Free State. The aim of the comparison was to see whether similar semiotic resources were used in the meaning-making process or if perhaps certain semiotic resources were used in particular subject fields only.

The study investigated the role intersemiotic translation played in creating multimodal communication by studying one chapter of a textbook to answer the research question. The analysis and subsequent comparison focused on finding answers for the following questions: What semiotic resources are used when creating multimodal texts, and lastly, whether there is a relation between text type and resource? In other words, does a particular text type favour a particular semiotic resource.

The research design was qualitative. Explorative and descriptive content analysis was done to illustrate the relationship of semiotic resources used in the analysed text. This showed how these resources were compared across different fields and how they created the message together with written text.

The data that was analysed in this study was one chapter from a first-year literacy course textbookused at the University of the Free State. The analysis and subsequent comparison established whether specific semiotic resources were consistently used across subject fields, whether one is preferred over another, and how intersemiotic translation transformed communication.

This research proved helpful in understanding the interaction between semiotic resources and language and how multimodal texts communicate meaning.

Keywords:

Multimodality, Intersemiotic Translation, Resemiotisation, Multiliteracies

Table of Contents

Acknowledgements i

Declaration ii

Abstract iii

Table of Contents vi

List of figures ix

List of tables xii

List of Addendums xiii

CHAPTER 1: INTRODUCTION 1

1.1 Background and Rationale 1

1.2 Research problem and objectives 2

1.3 Research design and research methodology 3

1.4 Ethical considerations 4

1.5 Value of the research 4

1.6 Chapter division and outline 4

CHAPTER 2: SEMIOTICS, MULTIMODALITY AND TRANSLATION 5

2.1 Introduction 5

2.1.1 Brief clarification of term according to framework 5

2.2 Overview of Multimodal Semiotics 6

2.2.1 Social Semiotics 6

2.2.2 What is a Sign? 8

2.2.3 Perceian Semiotics 12

2.2.4 Multimodality in Semiotics 17

2.3 Resemiotisation 19

2.3.1 Intersemiotic Translation 19

2.3.2 Meaning-making through Resemiotisation 22
2.3.3 The relevance of Peirce's triadic sign process with relation to resemiotisation and translation 25
2.3.4 Semiotic Resource 26
2.4 Conclusion 27
CHAPTER 3: MULTILITERACIES 28
3.1 Introduction 28
3.2 Overview on Multiliteracies 28
3.2.1 Multiliteracies Pedagogy 31
3.2.2 Multiliteracies in a South African context 32
3.2.3 English as a Second Language and English for Specific Academic Purpose 34
3.2.4 Incorporating Multiliteracies Pedagogy in ESL 34
3.3 The link between Multiliteracies, Multimodality and Intersemiotic translation and Resemiotisation 36
3.4 Conclusion 37
Chapter 4: RESEARCH METHODOLOGY 38
4.1 Introduction 38
4.2 Research design 38
4.2.1 Qualitative research design 38
4.2.2 Research question 39
4.3 Data selection 40
4.4 Method of Analysis 44
4.5 Software used for analysis 47
4.6 Conclusion 47
CHAPTER 5: DATA ANALYSIS and COMPARISON 49
5.1 Introduction 49
5.2 Text 1: English for Environmental Science in Higher Education Unit 5 – Energy Resources. 49
5.3 Discussion of Analysis 126

5.4 Comparison of semiotic resources across different subject fields 129
5.5 Conclusion 138
Chapter 6: CONCLUSION and RECOMMENDATIONS 140
6.1 Introduction 140
6.2 Overview of the study 140
6.3 Research question 141
6.4 Research design and methodology 141
6.5 Data description 141
6.6 Research findings 142
6.7 Significance of the study 143
6.8 Limitations 143
6.9 Further studies 143
REFERENCES 146
ADDENDUM A: Text 1: *English for Environmental Science in Higher Education* pages 38 – 45, *Transcripts of audio* pages 116 – 119 158
ADDENDUM B: Text 2: *English File Intermediate Student's Book* pages 4 - 11, 132 – 133, 152 *Transcripts of audio page* 122 171

List of figures

Figure 1: Picture of the green cross sign at a pharmacy in Paris (Shuttershock, 2014).....9
Figure 2: Peirce's triadic sign process 12
Figure 3: Triadic sign process for pharmacy 13
Figure 4: Peirce's triadic sign process (illustrated as a cyclical process) 14
Figure 5: Application of Peirce's sign process 14
Figure 6: Infinite sign process.....15
Figure 7: Meaning-making possibilities through intersemiotic translation vs intra- and interlingual translation 21
Figure 8: Resemiotisation 22
Figure 9: Initial sign process for pharmacy with the green cross 23
Figure 10: Subsequent sign process for pharmacy with the medicine bottle.....24
Figure 11: Collective meaning-making process 25
Figure 12: Collective meaning-making process for the concept pharmacy.....26
Figure 13: Vocabulary Section 51
Figure 14: Sub-section 1 54
Figure 15: Sign functions present in data sub-section 1 57
Figure 16: Sub-section 2 58
Figure 17: Sign functions present in data sub-section 2 59
Figure 18: Sub-section 2 60
Figure 19: Sign functions present in data sub-section 3 61
Figure 20: Sub-section 3 62
Figure 21: Sign functions present in data sub-section 4 63
Figure 22: Constructing meaning in a single sign – Energy Type.....68
Figure 23: Constructing meaning in a single sign – Energy Usage.....69
Figure 24: Collective meaning-making from a combination of signs – Energy Types 70
Figure 25: Collective meaning-making from a combination of signs – Energy Usage.....70
Figure 26: Constructing "whole" meaning from vocabulary exercises 71
Figure 27: Collective construction of meaning-making – Energy Types and Energy Usage..72
Figure 28: Listening Section.....74
Figure 29: Sub-section 4 78
Figure 30: Sign functions present in data sub-section 5 79
Figure 31: Sub-section 5 80

Figure 32: Illustration 1: Sign functions present in data sub-section 6.....81
Figure 33: Sub-section 6.....82
Figure 34: Sign functions present in data sub-section 7.....83
Figure 35: Sub-section 7.....84
Figure 36: Sign functions present in data sub-section 8.....85
Figure 37: Sub-section 8.....86
Figure 38: Sign functions present in data sub-section 9.....87
Figure 39: Constructing meaning in a single sign – Information on energy resources (with Audio recording part 1).....91
Figure 40: Constructing meaning in a single sign – Information on energy resources (with Audio recording part 3).....93
Figure 41: Collective meaning-making from a combination of signs – Information on energy resources.....94
Figure 42: Constructing "whole" meaning from all exercises.....95
Figure 43: Collective construction of meaning-making from Vocabulary and Listening.....96
Figure 44: Extended Skills.....97
Figure 45: Sub-section 10.....101
Figure 46: Sign functions present in data sub-section 10.....103
Figure 47: Sub-section 9.....103
Figure 48: Sign functions present in data sub-section 11.....105
Figure 49: Sub-section 10.....105
Figure 50: Sign functions present in data sub-section 12.....107
Figure 51: Sub-section 11.....107
Figure 52: Illustration 2: Sign functions present in sub-section 13.....109
Figure 53: Constructing meaning in a single sign – Information on production energy resources.....113
Figure 54: Constructing meaning in a single sign – Information on production energy resources.....114
Figure 55: Collective meaning-making from a combination of signs – Information on energy resources.....115
Figure 56: Constructing "whole" meaning from all exercises.....116
Figure 57: Collective construction of meaning-making from Vocabulary, Listening and Extended Skills.....117
Figure 58: Vocabulary Bank and Skills Bank.....118

Figure 59: Sub-section 12 120
Figure 60: Sign functions present in sub-section 14 121
Figure 61: Sub-section 13 121
Figure 62: Sign functions present in sub-section 15 122
Figure 63: Sub-section 16 123
Figure 64: Sign functions present in sub-section 16 124
Figure 65: Collective construction of meaning-making from the whole Unit 5 126
Figure 66: Signs/sign functions present in the data sample 127
Figure 67: Semiotic resources used for meaning-making in the AT 130
Figure 68: Semiotic resources used for meaning-making in the CT 131
Figure 69 Side-to-side comparison of AT and CT 132
Figure 70: Signs present in the AT 132
Figure 71: Signs present in the CT 133
Figure 72: Indexical language in comparison text 134
Figure 73: Visual resources in CT with no link to the content 135
Figure 74: Sorted content in AT vs CT 135
Figure 75: Comparison Text with IPA as a semiotic resource 136
Figure 76: Graphs only found in the Analysed Text 136
Figure 77: Analysed text sign process vs comparison text sign process 137
Figure 78: Similar collective meaning-making process 137

List of tables

Table 1: Term used according to theoretical framework 5
Table 2: Term (concept of mouse) used according to theoretical framework 6
Table 3: South African languages spoken by students at the University of the Free State 42
Table 4: Data Sample: Vocabulary section 50
Table 5: Data Sample Listening section 50
Table 6: Data Sample: Extended Skills section 50
Table 7: Data Sample: Vocabulary Bank and Skills Bank section 51

List of Addendums

ADDENDUM A: Text 1: English for Environmental Science in Higher Education pages 38 – 45, Transcripts of audio pages 116 – 119……..158

ADDENDUM B: Text 2: English File Intermediate Student's Book pages 4 - 11, 132 – 133, 152 Transcripts of audio page 122 171

CHAPTER 1: INTRODUCTION

1.1 Background and Rationale

Through language, a person constructs meaning from and in the social world. However, language is not the only way humans communicate; it is just one piece of the "communication puzzle". According to O'Halloran et al. (2016) language, carries an equal meaning-making potential to the other pieces of the semiotic puzzle. To identify these other pieces, we must ask what other semiotic resources enable human communication. Van Leeuwen (2005) defines semiotic resources as all resources that carry the potential to create meaning; they are *" the actions and artefacts we use to communicate, whether they are produced physiologically – with our vocal apparatus; with the muscles, we use to create facial expressions and gestures, etc. – or by means of technologies – with pen, ink and paper; with computer hardware and software; with fabrics, scissors and sewing machines, etc.*" (van Leeuwen, 2005:3). Our social world is thus a multitude of semiotic resources from gestures to images and from sound to the physical objects in our environment, which we use in combination with language to make and convey meaning. Language is thus not the only resource available to humans for communication, and the ever-increasing integration of language with other semiotic resources is turning our social world into a multimodal-communicative environment.

Multimodality can be defined as the using and combining of various semiotic resources, for example, images and linguistic expression, for communication. Multimodality is structured on the following interconnected theoretical principles (Bezemer, 2012): Communication often occurs via more than one mode, and together these modes contribute to meaning-making. Multimodality looks at all meaning-making resources available and how different resources are used in various contexts. Moreover, it also studies how these resources are organised in different contexts to form coherent meaning. These organised sets of resources are called modes (Bock, 2016). Through the selection and arrangement of these modes, people create meaning, which they can then communicate. The *modes* in Multimodality are the various semiotic resources used in combination with language, which create a message (Cope & Kalantzis, 2009). Since these resources can be translated into a written text and vice versa, the argument can be made that a multimodal text can include intersemiotic translation.

O' Halloran et al. (2016) define intersemiotic translation as the interpretation of language and/or linguistics signs through other non-verbal semiotic resources. They then further conceptualise intersemiotic translation through a concept called resemiotisation, which focuses on how meaning is conceptualised when there is a shift between different semiotic resources. Resemiotisation is thus concerned with "tracking" how meaning translates from one semiotic sign to another through intersemiotic translation when meaning-making occurs through a multimodal text. One field in which multimodality plays an ever-increasing role is Education.

Education as an academic field has transformed tremendously over the years. Changes are not just pedagogical but also, even more importantly, seen in the composition of learning material. Learning and teaching from predominantly text-based textbooks are gradually falling out of favour. More and more studies show that the process of teaching and learning is becoming multimodal. There is thus a greater emphasis to adapt educational material to meet this particular need. One of the theories emphasising the importance of multimodal texts is the theory of multiliteracies. The pedagogical approach behind this theory is that a wide range of communicative, cultural and linguistic tools should be incorporated into teaching methodology (Cope and Kalantzis, 2009). The multiliteracies framework thus creates the space for studying the relationship between the different modes in a multimodal text, as well as the composition.

1.2 Research problem and objectives

This research aimed to conduct a descriptive content analysis of an academic literacy textbook that communicates predominantly via multimodal texts. The textbook that was analysed was Richard Lee's (2009) *English for Environmental Science in Higher Education Studies*. The textbook is used in an academic literacy course by students of the Natural and Agricultural Science Faculty of the University of the Free State. A multimodal text typically consists of various semiotic resources; it is usually written language and a myriad of other resources such as image, colour, audio etc. Multimodal theory argues that communication happens simultaneously through all the modes present in a multimodal environment (Reid et al., 2016). This means that theoretically, the resources used in multimodal communication connects to one another. The research problem that this study grappled with was to determine whether there is a connection or relationship between the various semiotic resources used in multimodal texts. The primary research question this study thus sought to answer was what is the relationship if

there is one, that exists between the written text in a textbook and the other semiotic resources present in multimodal communication? Although the primary objective of this research was to investigate various semiotic resources and the role each plays in a meaning-making process, the research also briefly looked at how these various semiotic resources compared across different subject fields. This was done to see whether specific semiotic resources are used for meaning-making in specific subject fields.

To answer the research question, the thesis studied the role intersemiotic translation played in creating multimodal communication. The analysis focused on finding answers for the following questions: What semiotic resources were used when creating multimodal texts, and what is the relation, if any, between text type and semiotic resource? The former was answered by analysing a data sample, and the latter by comparingthe texts of two different textbooks.

1.3 Research design and research methodology

The research design was qualitative. Explorative and descriptive content analysis was done to illustrate and analyse the relationship of semiotic resources used in the analysed text. This was done through five questions that were applied throughout the data:

1. *What are the semiotic resources used for meaning-making?*
2. *In which material modalities do these semiotic resources partake?*
3. *With what logic do the signs icon, index, or symbol function?*
4. *What affordances do the semiotic resources and sign types offer?*
5. *How are the semiotic resources linked into a meaning-making whole?*

The answers to the analysis questions illustrated the relationship between the various semiotic resources in the meaning-making process and showed how these resources are linked to form communication. The questions made it possible to first identify the individual semiotic resources of the text; secondly, to see how these individual semiotic resources all carry meaning; thirdly, to see how the individual resources connect to each other in order to collectively form meaning; and lastly to show how meaning is resemiotised from one semiotic resource to the next.

The data that was analysed in this study was one chapter from a first-year literacy course textbook used in the Natural Science field at the University of the Free State. By comparing the data sample to a textbook from a different subject field, in this case, Humanities. The study could also establish whether specific semiotic resources are consistently used across subject fields, whether one is preferred over another, and how intersemiotic translation transforms communication.

1.4 Ethical considerations

This was a desktop study. The researcher did not foresee any ethical dilemma since the research was only conducted by analysing written text. No human participation was needed to compile or study the data in this research. However, the study got clearance from the ethics committee of the University of the Free State.

1.5 Value of the research

This research will prove helpful in understanding the interaction between semiotic resources and language and how multimodal texts communicate meaning. This research can also give some insight into the processes of multimodal communication and can be applied (in this case especially) to the field of Education, where a better understanding of multimodal communication processes can help improve learning outcomes. Therefore, this research will assist in giving insight into the creation of multimodal texts.

1.6 Chapter division and outline

The theoretical concepts semiotics, multimodality, intersemiotic translation and resemiotisation will be discussed in chapter 2. Chapter 3 will discuss the concepts of multiliteracies and English as a Second Language (ESL). After this, chapter 4 will outline the research question and research methodology. Chapter 5 consists of the data analysis and the data comparison, and chapter 6 takes as its focus the conclusion and recommendations.

CHAPTER 2: SEMIOTICS, MULTIMODALITY AND TRANSLATION

2.1 Introduction

This chapter will describe the following theoretical frameworks: semiotics, multimodality, intersemiotic translation and resemiotisation. It will also discuss Charles Peirce's notion of sign and sign process and conclude with explaining the concept of a semiotic resource. This chapter aims to illustrate the link between the aforementioned theoretical frameworks and suggests that a multimodal text can be analysed through the lens of translation, specifically intersemiotic translation created by the process of resemiotisation.

2.1.1 Brief clarification of term according to framework

Since all four theoretical approaches will be discussed in this chapter, the terms listed in Table 1 below will be used (depending on the theoretical framework discussed). However, for data analysis and discussion thereof, only the term *semiotic resource* will be used.

Table 1: Term used according to theoretical framework

Theoretical Framework	**Term used**
Semiotics	*Sign*
Intersemiotic translation	*Nonverbal sign*
Resemiotisation	*Semiotic resource*
Multimodality	*Mode*

In the broader study of social semiotics, the concept of *sign* is viewed as the starting point for communication and meaning-making. Petrilli and Ponzio (2005) go so far as to call the sign the "leading actor" in semiosis. A more detailed discussion of this term will be given later in this research; thus, just a brief definition for now. Signs are elements in which meaning is embodied through some sort of material form. Signs can take the form of language and/or non-language material. For example, imagine a drawing of a mouse. This drawing is a sign that represents a specific mammal. In this case, a small rodent with relatively large ears, a longish tail, a pointy nose, and whiskers. In semiotic study, this drawing of a mouse would be an

example of a *sign*. The drawing is a *sign* because it carries meaning, in this case, meaning about the animal called a mouse.

In the field of intersemiotic translation, the term *sign* is also used, with a distinction made between *verbal signs* and *nonverbal signs*. The aforementioned example (drawing of a mouse) would be considered a *nonverbal sign* because the drawing has no language characteristics. When intersemiotic translation is further conceptualised as resemiotisation, this framework uses the term *semiotic resource,* which is a collective for *verbal* and *nonverbal signs.* Since *semiotic resources* are all the resources (*verbal and nonverbal*) used in the translation process, the previous example of the image of a mouse would then be relevant for this framework as well. When looking at multimodality, the resources used to make meaning are called *modes*. In terms of multimodality, the drawing of the mouse (example above) would be considered the *mode* through which meaning is made. It is important to note that for each framework mentioned above, the drawing of the mouse stays the same. However, each framework uses its own terminology to describe this drawing (refer to Table 1 for clarification).

Table 2: Term (concept of mouse) used according to theoretical framework

Theoretical Framework	**Examples**	**Term used**
Semiotics	Drawing of a mouse	*Sign*
Intersemiotic translation	Drawing of a mouse	*Nonverbal sign*
Resemiotisation	Drawing of a mouse	*Semiotic resource*
Multimodality	Drawing of a mouse	*Mode*

2.2 Overview of Multimodal Semiotics

2.2.1 Social Semiotics

Nehaniv (2000) states that meaning is socially constructed. Human socialisation thus takes place through the meaning we create in our social world. We make and take meaning from all the resources at our disposal, create messages, and then communicate these messages to other humans. This is the human communication process, and according to Donnellon et al. (1986), this process links the meaning we create and the action we take in turn. Humans communicate mostly through language. Language is the most familiar communication system; however, it is

important to know that language is not the only tool used for human communication; as Kress reminds us, *"communication is semiotic work"* (Kress, 2010:32).

By nature, humans are semiotic creatures; thus, by implication, it can be stated that humans communicate verbally and non-verbally (Mehawesh, 2014) and that human communication consists of far more than language. It is as much non-verbal as it is verbal. Bezemer and Kress (2016) argue that the concept of *sign* is the departure point of semiotic studies. Thus, this argument emphasises that human communication should not and cannot be restricted to language only. Non-lingual signs are as much part of communication as lingual signs. And with the study of semiotics, particularly social semiotics, we aim to answer questions about the role signs plays in our communication process. According to Friedman (2019), Semiotic analysis is invested in studying how meaning is produced via social conventions. It analyses the types of signs we have, their function, and their effect on communication (Bal, 1994). It further shows the relationship between the non-verbal aspects and verbal aspects of human communication and how, as a combined unit, this forms a complete message. In other words, semiotics shows the different ways we use signs to create meaning from and in our social environment. Or, as Curtin (2009) puts it, semiotics is studying representation through signs and how this generates meaning. With the development of semiotic theories like those of De Saussure (1959) and Peirce (1994), another branch of semiotics emerged: social semiotics, which Delu (2010) argues is a natural, complementary development of general semiotics. All semiotic action is viewed as social action in social semiotics, which is the distinctive characteristic of social semiotics (Aiello, 2006). One of the focus points of social semiotics is to investigate the systems and resources humans develop to make meaning of, in, and with the world around them (Bezemer & Cowen, 2021). It studies the mechanisms through which resources are "*made to mean*" (Bezemer & Cowen, 2021:107). In other words, social semiotics look at how humans shape and create meaning.

In social semiotics, meaning is concerned with social meanings; in other words, the social implications that are expressed when semiotic resources are used in a social setting with the aim to achieve a social purpose (McMurtie, 2020). Since the essential aspect of this framework is thus to study the semiotic resources used for meaning-making and communication, studying communication from this perspective seeks not only to identify and record the semiotic

resources available but also to look at how these resources are chosen in a meaning-making process. The selected resources in a particular meaning-making process should not be seen as fixed according to Mavers and Machin (s.a), but rather as having the potential to make meaning in the specific context it is used and in combination with other resources. The argument can thus be made that a resource's meaning can change, and this depends on who is using the resource, how it is used, why it is used, where it is used, and when it is used. In other words, social semiotics, therefore, looks at the potential and the limitations of the semiotic resources that humans use for meaning-making. Since the potential and limitations of these resources enable various possibilities for meaning-making, it is possible, through social semiotics, to describe common principles for making meaning at a more abstract level (Bezemer & Cowen, 2021). The example Bezemer and Cowen use as an explanation looks at differences and shared characteristics between building something with Lego blocks, using a video conferencing platform, drawing on an iPad and writing on a piece of paper. However, before looking at and discussing the concept of semiotic resource, an explanation of *sign* should first be given.

2.2.2 What is a Sign?

Signs have many functions; they can serve as exemplars of specific kinds of phenomena, act as predictive guides or as plans for taking action and allow humans to recognise patterns in things (Sebeok, 2001). To understand the role signs play in meaning-making and communication, the concept must first be clarified. According to Bezemer and Kress (2016), signs are units of meaning. A sign is thus a particular form explicitly created to represent a specific referent of referential domain (Sebeok & Danesi, 2000). From a social semiotic point of view, signs share common characteristics: Firstly, anything can be a sign (Chandler 1999). Something becomes a sign when an interpreter establishes a relationship between the sign and what it represents. For example, *object A* becomes a sign once it is used as a point of reference for *object B*. An example of a sign would be the green cross, synonymous with pharmacies in Europe. In the early 20th century, the green cross was introduced as a pharmaceutical symbol in continental Europe (see Figure 1 below). It is now widely used in Europe to indicate where a pharmacy can be found (PharmaKon, 2012). The green cross became a sign once the relationship between the cross and the pharmacy was made clear: you will find a pharmacy where you see this cross (see Figure 1 below). In other words, a sign becomes a sign once the interpreter of the sign does the cognitive work to understand how "things" link.

Figure 1: Picture of the green cross sign at a pharmacy in Paris (Shuttershock, 2014)

The second characteristic of a sign is that of affordance. The relationship between the form of a sign and the subsequent meaning it communicates is a motivating relationship. This means that the form and features of a sign must be apt as means of expression (Bezemer & Kress 2016). Therefore, even though anything can be a sign, affordances and constraints should still be considered when a semiotic resource is chosen to be used as a sign. In multimodal social semiotics, the notion of affordance examines the limitation and potential of a particular mode or medium in meaning representation and communication (Jiang, 2017). In other words, affordance is the potential of a given "thing" to function as a sign; thus, the aptness it has to perform a particular semiotic task. Constraints, on the other hand, is a sign's limitations. So, when you look at the potential of a semiotic resource to become part of the meaning-making process, what you are doing is looking at the resource's affordance and constraints. As a matter of fact, Kress (2010) defines *affordance* as the meaning-making potential of a given mode (semiotic resource).

Jewitt (2012) states that semiotic resources have specific meaning-making potential based on past uses and a set of affordances based on possible "new" future uses. Thus, a specific semiotic resource will theoretically be more suitable in a particular context if said resources have the potential to create meaning in that context. However, as mentioned earlier, when looking at affordances, one should not just be aware of the potential of a given semiotic resource; it is also important to remember that each semiotic resource has constraints. Certain semiotic resources will be constricted in their meaning-making potential within certain contexts. For example, somebody has to find a specific man in a busy shopping centre. They have two semiotic resources, a photograph of the man and a written description of what that particular man looks like. The written description may be constrained if there is not enough detail. Say it is a very general description of a man, it would mean that more than one man in the shopping

centre will fit the description, which will hinder finding the particular man. Thus, as a semiotic resource being used to make meaning, the written description has some constraints. So, instead of the description, the photograph is used to find the man. The photograph will be more specifically detailed since it bears similarities to the actual man in question. There is argumentatively, thus, a bigger chance that the photograph will give more precise detail, which may be more helpful in finding the man. Therefore, one can argue that the potential to create meaning from the photograph as a semiotic resource may be better in this context. However, suppose it was an old photograph. In that case, it may not give a very accurate representation of how the man looks at that particular time and thus, the photograph as a semiotic resource may also be a hindrance rather than a help. Now, the photograph and the description of the man are both used to try and find him. Using these semiotic resources in combination to create meaning may give more information. Therefore, understanding that each semiotic resource has specific potential as a constraint allows for a better understanding of what said resource is capable of. By combining resources, one can meet the complex demand of the message needed to be communicated (Bezemer & Kress, 2016).

The third characteristic is the fact that no sign has a universal meaning (Nehaviv, 2000). Bal (1994) states that a sign's meaning originates from context, that is, the relationship between the sign and the environment it is used in. Each time a sign is used in a meaning-making process, it is only relevant to that particular communication process. Bezemer and Kress (2016) further elaborate on this by saying that signs are also "shaped" by the particular environment in which they are used. In the case of the green cross sign: it is only in countries where the green cross indicates a pharmacy's presence where the green cross represents a pharmacy. A person from a country that uses a different sign for pharmacy may not necessarily understand the connection between the green cross sign and the pharmacy.

From the above, we can conclude that semiotics studies signs. It is a study rooted in interpreting the relationship between material entities and the events these represent. Nevertheless, it is also more than that. Stecconi (2006) argues that the concept of sign is not a straightforward concept. The process of creating and using signs is about the process of making meaning. As Bal (1994:4) states, signs do not exist; they occur. A sign occurs once "something" represents "something else", and the relationship between these two things is perceived or interpreted. Therefore, the conclusion can be made that instead of looking at a sign as a "thing", a sign

should instead be considered a function – functional in the sense that its purpose is to communicate meaning. This notion of functionality in the sign process is something that is more evident in Peirce's work on semiotics and signs.

Charles Sanders Peirce and Ferdinand de Saussure were arguably the most prominent scholars to conceptualise the term sign. De Saussure's theory on signs is based on duality and implies a direct relationship between the sign and its interpretation. A sign, according to De Saussure (1959), has two primary components- the signifier (sound or image) and the signified (concept). For deSaussure, these two components were the fundamental basis of all linguistic signs. The central component of his understanding of signs is an arbitrary relationship between the signified (concept) and its signifier (sound or image). Another critical component of de Saussure's sign theory is the relationship between signifier and signified; once it is established, it is fixed. According to de Saussure, once a linguistic sign is attached to a concept, it is irrefutable and cannot be changed. This, however, means that in de Saussure's sign system, signs become inflexible and highly regimented (Chapman et al., 2004), which is one of the main criticisms against De Saussure's work.

What can be detected in Peirce's theory as opposed to De Saussure's is what Chapman et al. (2004) call a new kind of subjectivity, together with the emergence of an observer or interpretant. Peirce's triadic approach to the sign and sign process contradicts De Saussure's duality (1994). Chapman et al.(2004) state that Pierce's interpretant, as well as his structuring of the discourse on signs, has particular relevance in the emergence of what they termed a *"post-modern semiotics"* (Chapman et al. 2004: 387). Peirce values interpretation over structure and diversity over simplicity. In other words, the vital difference between Peirce and de Saussure is the added dimension that Peirce calls the interpretant. That means that there is no longer a direct relationship between the sign and what it represents, or as it is called in de Saussurean terminology, the signified and signifier, it is now conditioned by the third component, Peirce's interpretant. This third component makes Peirce's sign theory more applicable as an analysis tool for the research done in this study, and hence the reason why Peirce's view on semiotics and his triad sign process will be discussed.

2.2.3 Perceian Semiotics

One of the most influential scholars in the field of semiotics is Charles Sanders Peirce. Peirce states that no human thought or knowledge (thus, by implication, the process of meaning-making and subsequent communication) can exist without semiotics (Marais, 2019). Peirce's theory of signs is about relationships, events and actions. His theory describes elements of a system constantly in flux. Using signs to make meaning entails understanding the relationship between all the different "parts" that constitute a sign (Marais 2019). In Perceian semiotics, language is only one part of semiosis; the other part consists of non-linguistic semiosis. According to Peirce (CP 2.229), making meaning through a sign is a triadic process. This process connects three specific elements to each other: Representamen, Object and Interpretant. A complete sign then, according to Peirce, consists of all three elements (see Figure 2 below). To know what a sign means, the relationship between these three elements, in combination, should be clearly understood.

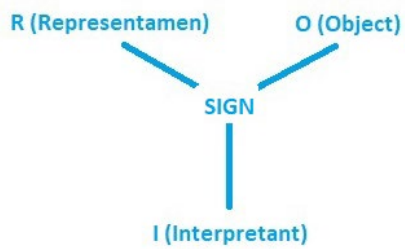


Figure 2: Peirce's triadic sign process

To illustrate, think of the previous example of the green cross/pharmacy as an explanation: A person walks down the street and notices a green cross on the side of a building. The cross is the **representamen** of the sign process**.** Peirce defines representamen as: *"To stand for, that is, to be in such a relation to another that for certain purposes it is treated by some mind as if it were that other.* (CP 2.273:376) He elaborates on this by (CP 2.273) distinguishing between *"that which represents"* and the *"act of representing".* The representamen is the "that" or the "something" of the triadic process because it stands in the place of the "something else" (CP 2.274). In the green cross/pharmacy example, the green cross will thus be the representamen since it stands for the pharmacy.

Secondly, in Peirce's sign process is the **object,** which according to Peirce is represented by the representamen, in other words: *"A Sign, or Representamen, is a First which stands in such a genuine triadic relation to a Second, called its Object." (*CP 2.274:376). In the green cross/pharmacy example, the object would be the actual building in which the pharmacy is located since the building is represented by the green cross. A person sees the green cross on the side of a building and knows that there is a pharmacy. The meaning was made by understanding the relationship between the cross and what it represents, a pharmacy.

Understanding that there is a relationship between representamen and object is what Peirce refer to as the **interpretant**. Peirce (CP 1.564) sees the interpretant as "*the mental effect or thought "* This means that the *interpretant* is the mediation of the relationship between the *representamen* and the *object.* It is the thought process that leads to the conclusion that the green cross indicates where a pharmacy can be found. It is the thought process of further understanding that the complete sign is constructing the *relationship* between these three elements and knowing that all three elements create the sign - however, not just the sign, but also what the sign means (see Figure 3 below).

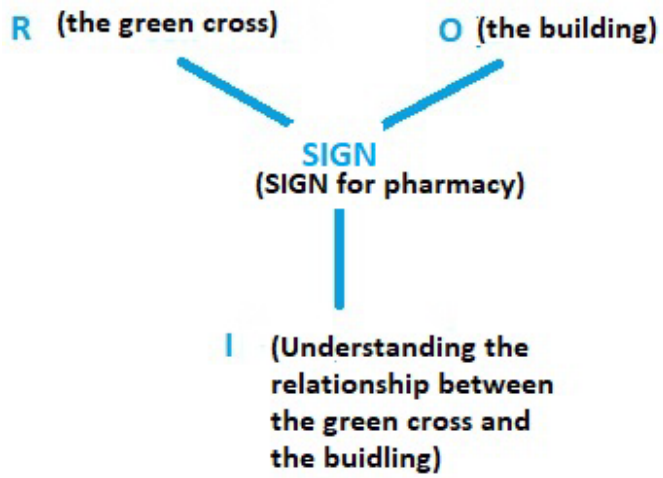


Figure 3: Triadic sign process for pharmacy

Peirce talks about this sign process as infinite (CP 1.339). One sign process can lead to another, and so on. This shows that there is a continuous process of meaning-making occurring. Many attempts to illustrate this sign process use a triadic/triangle shape to illustrate the process.

However, since the meaning-making process is continuous, it seems fitting to illustrate it using a cyclical process. Figure 4 is an illustration of the triadic relationship between the three elements in Peirce's sign process.

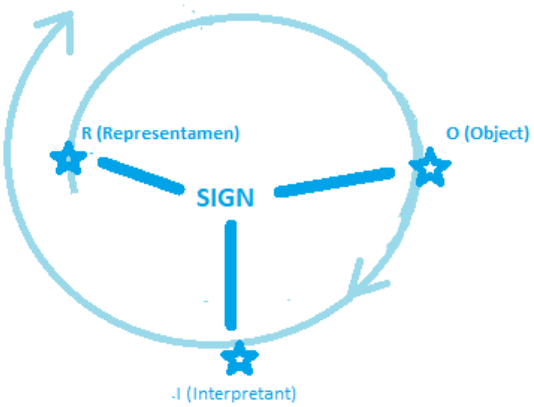


Figure 4: Peirce's triadic sign process (illustrated as a cyclical process)

If this cyclical process is applied to the green cross example from earlier, the sign-making processcan be illustrated as follows (see Figure 5 below). The representamen in this sign process willbe the green cross because the cross stands in place of the building. In other words, it represents the building, which makes the building the object of the sign process. Understanding the relationship between the green cross and the building and then also realising that the meaningis made not by looking at the green cross and the building just as separate semiotic resources, but as a combined "unit" of meaning is the interpretant of the sign process.

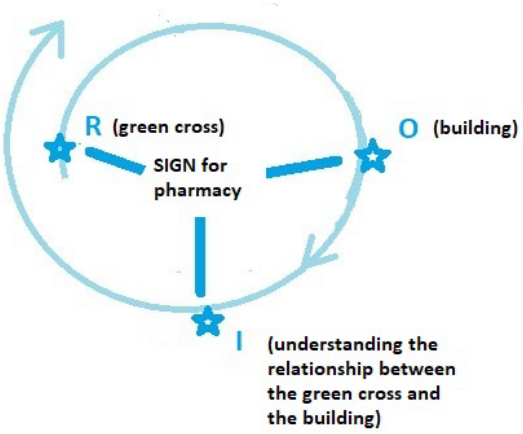


Figure 5: Application of Peirce's sign process

Illustrating the sign process as cyclical reiterates Rasouli's (2008:24) argument about the process as being an "infinite process". Peirce reiterates this when he contends that one does not really have signs but rather sign processes, in which interpretants become representamens, ad infinitum. This means that the sign process is never really "completed" and that there is no beginning and rather a continuation of meaning-making (CP 1.339). Once a sign process involves all three elements, which produce meaning, that particular knowledge or meaning (created by the sign process) gives the opportunity for another sign process to take place. Or, as Peirce puts it: "*the interpretant is nothing but another representation……and as representation, it has its interpretant again. Lo, another infinite series."* (CP 1.339:130). Marais (2019) refers to incipient and subsequent signs, which is relevant for Peirce's in-flux argument. With terminology like incipient sign and subsequent sign, Marais (2019) suggests that the sign-making process is continuous. There is no real beginning to sign-making, nor is there a sign or sign process that says – this is the end. It is maybe better to say now, at this point in time, in this particular social environment, this sign is used to communicate meaning. This meaning is the starting point of a new meaning-making process, with new signs spiralling on in a continuous loop, as seen in Figure 6.

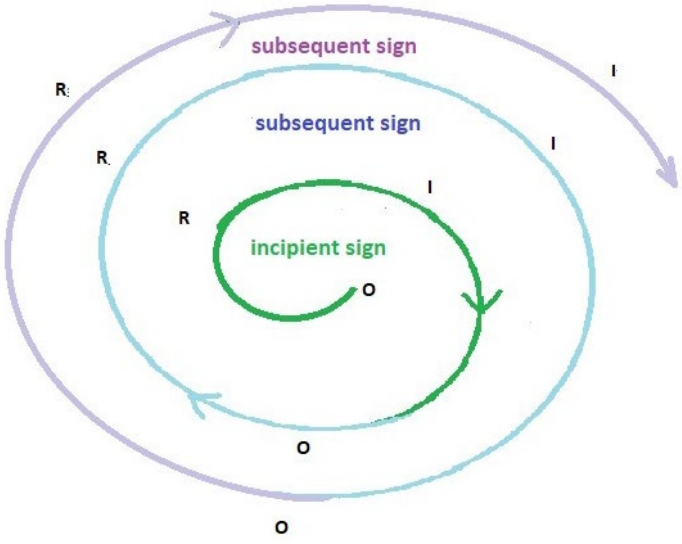


Figure 6: Infinite sign process

2.2.3.1 Peirce's Classification of Signs

A crucial part of semiotic research is classifying signs. According to Ding (2016), Peirce laid a solid foundation for this when proposing his second trichotomy of signs. Based on the

relationship between the *representamen* and *object*, Peirce has three broad categories for signs (CP 1.369): icon, index, and symbol. Categorising a sign as icon, index or symbol comes from its mode of reference (Elgin, 2011).

The first category is icons. This type of sign bears a partial similarity to the object it represents. Peirce states the icon has no physical connection to the object it represents; it just resembles it (CP 2.299). In other words, what stands central to iconic signification is that both the sign and the signified object share qualities, and it is these shared qualities that enable the sign to signify or then function as an icon (Atkin, 2010). An example of an iconic sign would be a photograph of something or somebody.

The second category is the index. The indexical sign is physically connected with the object it represents. An index thus has a direct connection to what it signifies (Harbeck, 2011). Peirce states that "*a genuine Index and its Object must be existent individuals*" (CP 2.283), which means that the indexical sign validates the object's authentication. An example of an index would be seeing smoke in the air and knowing that there is a fire. Smoke can only be present if there is a fire. The smoke directly connects to the fire; without the fire, there can be no smoke.

Symbol is the third category of sign. Symbolic signs represent their object through the association of ideas (CP 1.369). In the case of symbols, some underlying agreement, habit, law or convention exist, which means that invoking some symbol invokes its associated object (Atkin, 2010). For example, a red traffic light indicates that a vehicle or person in motion needs to stop. Vehicles and people stop at a red traffic light because of the agreement (which is enforced by imposing traffic regulations and/or habits) to use red traffic lights as an indication to stop (Atkin. 2010).

Peirce made various alterations to his account of signs (Short, 2004), but according to Atkin (2010), icon, index, and symbol tend to find a place throughout. However, also important to note is the nuance of Peirce's sign categories. Firstly, it is not clear that there are many examples of signs that can be classified only as one specific type, in other words, signs that are only symbolic, or only indexical or only iconic, which means that there is an overlap when it

comes to the characteristics used to categorise a semiotic resource. Take, for example, a photograph of a specific person. The photo is iconic because it signifies its object (the person) in terms of the qualities it shares with the object, like skin colour, facial features etc. However, if the person in the photograph makes a particular facial gesture, like smiling, the photograph can become a symbol of happiness. This is because the smile on the person's face is an underlying agreement of happiness. Peirce was aware of the various overlaps, and as a way of addressing the overlap, he proposed to call icons and indices with symbolic elements hypo-icon and subindices (Atkin, 2010). However, if more than one of the three elements is present, one will be more prominent. Atkin (2010) believes that the trichotomy of sign divides signs according to whether they are predominantly a particular category; in other words, as an example, whether a sign is predominantly an icon or not. This is especially relevant in this research, but a more detailed explanation will be given in Chapter 4.

In conclusion, understanding the function and classification of signs is only the semiotic puzzle's first piece. The relationship of signs to each other and language is the next piece. Looking at how meaning is made from signs in combination with language broadens the understanding of semiosis and illustrates the part multimodality plays in the process.

2.2.4 Multimodality in Semiotics

Multimodal communication has been part of writing studies and research for quite some time now (Chimasko and Shin 2017). It began with basic spatial and visual components that formed part of traditional paper-based texts. However, Lotherington and Jenson (2011) argues that multimodal texts nowadays also contain more audio and video components and that this is also carving a place in multimodal communication. Kress and Van Leeuwen (2001) reiterate this when they state that the dominance of monomodality in communication is beginning to "reverse", and in its place, multimodal communication is becoming more prominent. Theoretically, multimodality is an interdisciplinary approach that focuses on the various modes used in communication, representation and expression. It emphasises that communication does not primarily take place through language but through the semiotic bond between language and sign.

Kress explains multimodality as the specific composition of different modes all working together to convey the message (Jeff Bezemer, 2012). Multimodality is built upon the following interconnected theoretical principles (Bezemer, 2012). Firstly, the semiotic resourcesused in multimodal communication are called modes. From a multimodal point of view, each mode does different communicative work (Pérez-González, 2020) and is moulded by its own semiotic affordance and constraints. The second principle states that communication often occurs through more than one mode, and together these modes contribute to meaning-making. Like an illustrated textbook, multimodal communication is thus the result of the interplay between the relevant co-operating modes. From a research point of view, all meaning-making resources available are studied. Moreover, it also examines how different resources are organised in different contexts to form meaning. Lastly, through the selection and arrangement of modes, people create meaning, which they then communicate.

Studying multimodality is inevitable since it is an inherent form of human communication (Torresi, 2008). However, the interest in multimodality as a field of research has risen over the last decade. Kress (2010) believes that the main reason for this newfound interest in multimodality is the change in communication. Modern technology is becoming the predominant platform where most day-to-day communication takes place. Kress also refers to the shift from "*book to page and screen"* and "*a shift from the dominant mode of writing to the mode of image*" (Kress, 2010:6). O'Sullivan confirms Kress' argument about the shift of meaning. She argues that in a multimodal text, words interact with the rest of the modes of the text (O'Sullivan, 2013). Thus, by analysing the interaction, one can see the shift of meaning from one mode to the next, which causes a multitude of semiotic resources to make and communicate meaning in combination with each other. Hull and Nelson (2005) argue that multimodality brings forward a new way of communicating and creates a different kind of meaning-making. This is because making meaning relies on the collective contribution of the various modes used. The integration of the multiple modes like sound, movement, image and music creates the digital artefacts through which the expressiveness of multimodality in a semiotic environment can be studied (Hull and Nelson, 2005).

Additionally, Bezemer (2012) states that multimodal studies try to understand how semiotic resources are utilised to produce discourse across varying contexts. Looking at sign and

semiosis from a multimodal perspective makes a significant contribution to the semiotic field. O'Halloran (2011) reiterates this by stating that multimodality's analysis of the design of semiotic resources and the inter-related semantic systems they form a) helps to interpret the human experience of the world, b) enables the creation of logical meanings, c) and organises said meaning into coherent multimodal communication.

Kress (2010) states that this multimodal evolution in the landscape of communication raised various questions. What is the role of modes/signs as communication vehicles? What effect does this have on language? And lastly, what would this show us about the ability of language to perform or not perform certain tasks? After all, as Jewitt (2009) argues, it is good to remember that language is one mode of many in a multimodal context. It should thus stand to reason that language can play a subordinate role in communication and translation.

According to Pérez-González (2020), translation studies has not yet managed to articulate the relation between multimodality and semiotics clearly. Stecconi (2009) maintains that, casually speaking, semiotics embodies research that is more than verbal language; it includes multimedia and multimodal material as well. Besides the myriad of terms translation scholars use to characterise their theoretical inquiries of meaning-making resources and practises, they seem to agree that multimodality falls within the broader scope of semiotics (Pérez-González, 2020). This gives leeway for studies where multimodality can be looked at in relation to intersemiotic translation and resemiotisation.

2.3 Resemiotisation

2.3.1 Intersemiotic Translation

There have been many formal definitions for translation over the years, each reflecting a specific underlying theoretical model (Shuttleworth and Cowie, 1997). A large number of these definitions' focus is on the linguistic aspect of the translation process. It can be seen in a definition such as Osman's (2017), where he states that translation is the meaning of a given linguistic discourse rendered from one language to another; or in Catford's (1965) argument when he asserts that translation theory is concerned with a relation between languages. There are many similar theories to the ones mentioned above; however, the problem with definitions and arguments like these is that translation is a language-based activity or at least an activity

where language plays the primary role, which is not true. The meaning-making that transpires through the translation process does not have to be language-based. In fact, for Petrilli (2003), translation is an interpretive process. From her point of view, translation theory should be embedded in sign theory, as she argues with her statement: "*sign activity or semiosis is a translative process"* (Petrilli, 2003:17). With this phrase, she suggests that the translation process is more than a language activity and that it has a semiotic component. It is, as Freeman (2009) says, a process that should help us to study and understand how knowledge is exchanged. This gives leeway to thinking about translation as a process that allows the translators to look at all the possible resources they have to use in a meaning-making process. In other words, to not just think of translation as a language activity but also as a semiotic activity.

Intersemiotic translation is a translation between different codes. One is linguistic code, which is language, and the other a non-linguistic code, described as non-verbal semiotic resources like images (Aktulum, 2017). Intersemiotic translation is a growing field because of the mind shift that is happening in termsof what translation is. Historical and spatial constraints created the idea that translation is primarily a language-driven activity, particularly written language (Marais, 2019). However, this view of translation is gradually changing—translation as a field of study and as a profession is moving away from the language-only approach. Tymoczko (2009) believes that this change is partly due to globalisation. The globalised world enables translators the opportunity to dabble in new technologies, new tools and new resources. Technology is thus responsible for the evolution of translation studies and, subsequently, translation (Munday, 2012). Torresi (2008)states that it is the duty of a translator to have full semiotic awareness. He further argues that translators should become text and meaning-makers and not just focus on the language. This argument gives way for the focus to develop new translation approaches, approaches favouring non-language semiotic resources. This point of view is emphasised by Dicerto's (2017) argument that translation is becoming too complex to study as a language-only activity. She further states that source texts are growing more and more multi-semiotic. In other words, texts are made up of more facets than just language. It is a merger of language and non-language resources, and this merger creates meaning. Thus, by implication, when translating, one should also keep in mind that translation also happens in the non-verbal parts of these said texts. This argument is reiterated when Cross (2017) discusses

intersemiotic translation and states that thesignificance of this type of translation lies in the transposition of meaning from one semiotic resource to another.

Roman Jakobson, arguably one of the most prominent scholars of intersemiotic translation, defines intersemiotic translation as follows: "*a verbal sign can be translated into another non-verbal system of symbols* (Jakobson, 1959:139)". Jakobson's definition shows that meaning is derived from the relationship between reality and sign. And with this, Jakobson enabled translation to step away from the language-only approach and gave translation scholars and practitioners the space to look at other translation resources. Kourdis and Yoka (2012) theorise about a by-pass of language when approaching intersemiotic translation, as such, enabling translation to become more creative. Aguiar et al. (2015) agree that intersemiotic translation transforms the space in which translation can occur. With intersemiotic translation, the parameters of the evaluation of translation increase (Torop, 2003) and, in doing so, helps to create new unique semiosis patterns between different semiotic resources. These types of semiotic patterns are unique to intersemiotic translation. These new patterns enable an almost unlimited number of ways in which meaning-making can take place, which provides types of data previously unseen in translation studies. The figure (Figure 7) below shows a comparison of how intersemiotic translation can generate more meaning-making possibilities than a translation that is language-based only, i.e., intra – and interlingual.

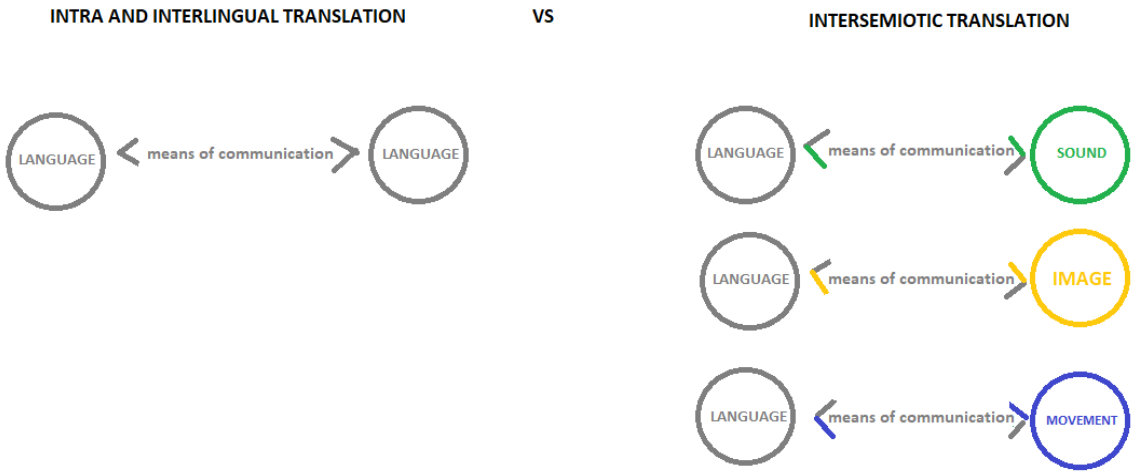


Figure 7: Meaning-making possibilities through intersemiotic translation vs intra- and interlingual translation

As previously stated, in the current technology-driven social world, with its widespread use of multimedia, visual representations are more easily combined with language (Desjardins, 2008) and thus create more intersemiotic translation space. Queiroz and Atã (2019) view intersemiotic translation as a generative model, a semiotic tool that generates layered semiotic processes used for communication. For example, (see Figure 8 below): Sign 1 (semiotic resource 1) is created; a recipient observes and interprets it. The recipient acts according to the meaning created from sign 1 and creates sign 2 (semiotic resource 2). The next recipient of this sign (semiotic resource 2) acts according to the meaning communicated by sign 2 (semiotic resource 2) and creates sign 3 (semiotic resource 3) for further communication. A new semiotic resource is created each time meaningful interpretation happens.

Figure 8: Resemiotisation

Studying intersemiotic translation means that each semiotic resource in the translation process must be considered and understood in terms of its role in the translation. One way to study this layered semiotic process, in which this multitude of semiotic resources are continuously created and used for meaning-making, is called resemiotisation.

2.3.2 Meaning-making through Resemiotisation

From Roman Jacobson's definition of intersemiotic translation, O' Halloran et al. (2016) conceptualise intersemiotic translation as resemiotisation: a process concerned with the translation of semiotic resources. Resemiotisation firstly asks how meaning is conceptualised when there is a shift between different semiotic resources. Secondly, it is concerned with how meaning changes and/or stays the same when one semiotic sign replaces another. Lastly, through resemiotisation, meaning can be recorded analytically, and it can be modelled in theory. Resemiotisation thus creates the space for translation to move away from a process initially seen as a language only activity to a process where non-verbal semiotic resources could be used in the translation process.

Resemiotisation is a transformational meaning-making process (Iedema, 2003). Through the process of resemiotisation, one can see the influence semiotic resources have on one another and how these resources transform each other during the meaning-making process. Resemiotisation highlights the argument that semiotic resources carry different meanings with their movement from one to another; and subsequently how this meaning transforms between contexts if various semiotic resources are used. Since various semiotic resources are used in this particular meaning-making process, Iedema (2003) argues that resemiotisation "acknowledges" the significance of every semiotic resource that surrounds text as a possible tool for meaning-making. For example (referring back to the earlier example of the green cross): A person (person A) sees a building with the word *pharmacy* displayed on it, and next to the word is a green cross sign ✚. These two semiotic resources (language and sign) in combination send the message that you will find a pharmacy in this building. If this is illustrated as a sign process, it will look like the process in Figure 9 (below).

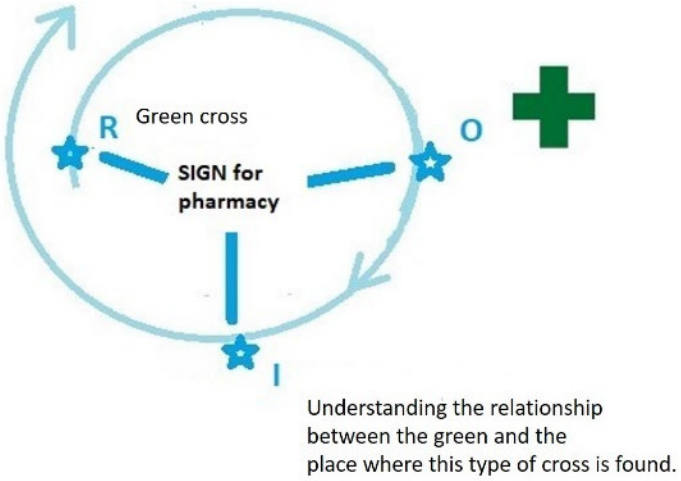


Figure 9: Initial sign process for pharmacy with the green cross

Later somebody else (person B) asks for directions to the pharmacy. Person A writes directions down and includes a picture with his written directions. The picture, however, is not the green cross sign but a medicine bottle  . Now the picture of the bottle becomes the sign representing the pharmacy. By doing this, the initial meaning of pharmacy (represented by the green cross) is transformed into a drawing of a medicine bottle (see Figure 10 below).

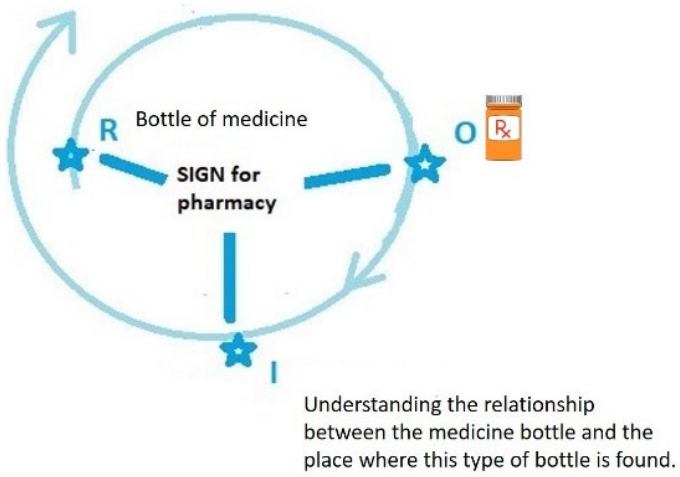


Figure 10: Subsequent sign process for pharmacy with the medicine bottle

This example illustrates two concepts: Firstly, it shows the process of intersemiotic translation; a verbal sign (the word *pharmacy*) was translated into the green cross sign (nonverbal sign). It secondly illustrates the concept of resemiotisation. The word pharmacy was not just conceptualised as a green cross, but a subsequent conceptualisation occurs in this communication process where the green cross became a medicine bottle. The medicine bottle still represents the initial concept of pharmacy, but there was a transference of meaning from the green cross to the medicine bottle.

Therefore, resemiotisation achieves two results: First, it provides an analytical means to trace how signs are created from one into the other as the communication processes unfold. Secondly, it asks why particular signs are used to communicate specific meaning within a specific social environment. Both these statements are investigated in the data of this research. Looking at multimodal texts through the lens of intersemiotic translation allows for each semiotic resource used in a multimodal text to be seen as smaller, individual parts of the translation process. These individual semiotic resources all carry meaning, which is subsequently translated from one to another as the translation process progresses. However, since these semiotic resources are all different, resemiotisation can illustrate not just how each semiotic resource makes meaning in its own way but also how the semiotic resources as a collective become a translation and meaning-making process.

2.3.3 The relevance of Peirce's triadic sign process with relation to resemiotisation and translation

Although the processes of resemiotisation have been investigated from different theoretical standpoints, O'Halloran states that there is still no comprehensive approach towards this particular field of study. This is interesting if all the multiple socio-cultural implications are considered to be underlying any resemotisation process. However, with resemiotisation, the question asked is how meaning is conceptualised when there is a shift between different semiotic resources. Thus, by using resemiotisation, one can "see" how meaning is re-produced from one semiotic resource to another. Conceptualising this shift between semiotic resources can be illustrated in more detail by using Peirce's icon, index, and symbol, since his theory of signs is about relationships. It is about showing the connection between text and sign in multimodal communication. When looking at a multimodal text, there is an assumption that the various smaller semiotic resources should link to one another to create a whole message. Thus, with resemiotisation, one can observe the meaning shift between semiotic resources; but combining this with the sign categories of icon, index and symbol, one is further able to see where each resource fits into the meaning-making process. Peirce's triadic sign process allows for meaning-making to be analysed so that the relationship between the different components of the process and the creation of meaning can be seen. Illustrating the process as a cycle, it is also then possible to analyse and show how individual meaning-making processes relate to each other and collectively create a "bigger" or more extensive meaning process, as shown in Figure 11 below.

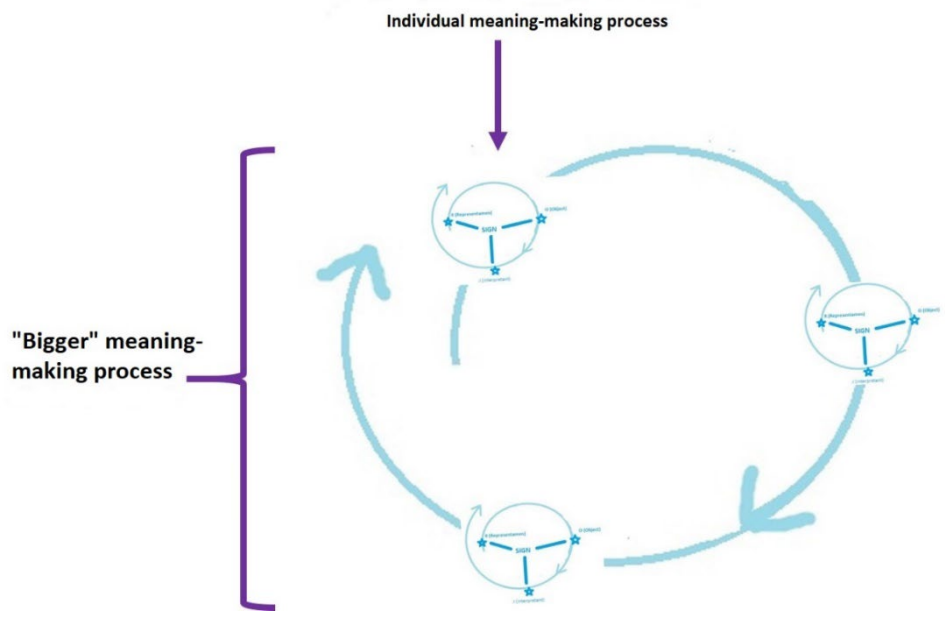


Figure 11: Collective meaning-making process

If this applied to the green cross/medicine bottle example of before, the collective meaning-making process will be illustrated as follow (see Figure 12 below).

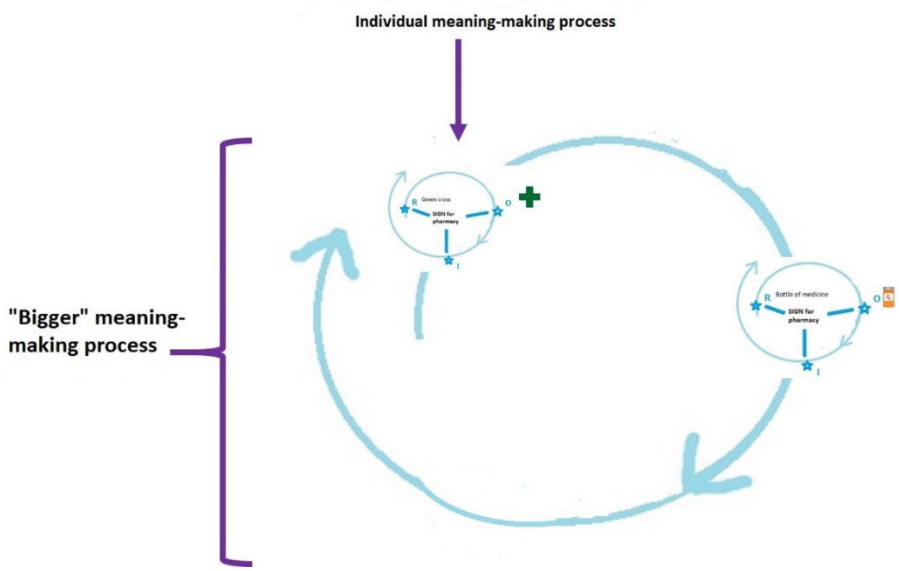


Figure 12: Collective meaning-making process for the concept pharmacy

2.3.4 Semiotic Resource

According to Fei (2004), a semiotic resource contains expression and content plane, which allow for the meaning-making potential articulated through these resources when used for communication. This includes not just language but other non-linguistic resources like image, sound, colour, movement etc. Our social world is a multimodal environment, and everyday meaning is made through the collaboration of a variety of semiotic resources. It thus becomes more and more pressing to understand the dynamics of this multimodal discourse environment and the role semiotic resources play in this environment. As the study of social semiotics evolves, the emphasis on the context of meaning-making through semiotic resources becomes more prevalent. Whether this meaning-making is studied from a multimodal perspective, translation, or semiotic point of view is irrelevant. What is essential is that the place of the semiotic resource is clearly understood since it is the central point from which all meaning and communication are created. Kress emphasises this by stating that *"it is no longer possible to avoid these issues in critical analyses, on the assumption, explicitly or implicitly held, that all (relevant) meaning in a text is, as it were, fully glossed in the verbal component of the text."* (Kress, 1993:188). The link between semiotics, multimodal communication, intersemiotic translation and resemiotisation seems to be the semiotic resources used to create meaning. Regardless of the theoretical framework, semiotic resources allow for the opportunity to study

semiotic systems and look at the specific roles these resources play when creating meaning and communication.

2.4 Conclusion

This chapter gave detailed descriptions of the theoretical frameworks of semiotics, multimodality, intersemiotic translation and resemiotisation. The chapter concluded with an explanation of the concept of semiotic resource and argued that multimodal communication, intersemiotic translation and resemiotisation are all concerned with a specific meaning-making process. This process is driven by semiotic resources, which is the central point of each of these theoretical frameworks. The suggestion was made that by studying the relationships between these semiotic resources, it will be possible to see how meaning is made and how said meaning is translated.

CHAPTER 3: MULTILITERACIES

3.1 Introduction

This chapter will start with a description of multiliteracies. It will discuss multiliteracies pedagogy and briefly at multiliteracies in the South African context. It will furthermore give insight into English as a Second Language or ESL as it is more commonly known and furthermore discuss incorporating multiliteracies pedagogy in ESL. The chapter will conclude discussing the link between multiliteracies, multimodality and intersemiotic translation and resemiotisation.

3.2 Overview on Multiliteracies

Today's world's increasing linguistic and cultural diversity is creating a diverseness in communication; this asks for a more comprehensive view of literacy than depicted by traditional approaches, where language plays a central role in the meaning-making and teaching process. Keeping the above mentioned in mind, the questions that emerge are, how do literacy educators apply the developing understanding of literacy in such a way as to meet the educational needs of students? What present-day literacy classroom practices limit students' success, and which of these practices should be revised or completely done away with? Similar observations to the above-mentioned motivated ten scholars from various disciplines to get together under the name *New London Group* to propose answers to these questions. From their discussions, the concept of multiliteracies pedagogy was actualised (Mills, 2009). Multiliteracies overcome the limitations set by traditional approaches, and it emphasises how negotiating the multiple societal cultural and linguistic differences is paramount to the pragmatics of students' learning. Cope and Kalantzis (2009) argue that since the way meaning is made and communicated changes continuously, there must be a reconsideration of how literacy is taught and learned. They further say that this change in meaning-making is increasingly more multimodal and that traditional emphasis on alphabetical literacy should be supplemented in a pedagogy of multiple modalities of meaning, which extends to modes like visuals, tactile representation and audio representations, to name a few (Cope & Kalantzis, 2009). As a result, multiliteracies cover a broader view of literacy. It factors in how literacy is shaped by cultural, social, and technological change (Anstey & Bull, 2006) and also proposes that literacy pedagogy should be diverse and multimodal.

The New London Group (1996) suggested two general principles to direct the multiliteracies pedagogy. The first states that the educational community must *"extend the scope of literacy pedagogy to account for the context of our cultural and linguistically diverse and increasing globalised society"* (New London Group, 1996:61). This reiterates Kress' (1996) concept of what he calls a pluricultural society, which argues that the *"primary economic, cultural, and political resource is the difference in cultural systems of all groups in a society"* (1996:163). Every cultural group within a society has unique solutions for the problems present in their specific context. However, it is important to note that even though cultural diversity is not a new phenomenon, it has not yet been adequately looked at in literacy pedagogy (Mills 2010). In this way, the multiliteracies framework recognises multiculturalism's value, which Kress (1996) argues to be a vital resource available for post-industrialised societies.

The second principle of multiliteracies states that *"literacy pedagogy now must account for the burgeoning variety of text forms associated with information and multimedia technologies"* (New London Group, 1996:61). This directly addresses the importance of incorporating new multimedia literacies in teaching practises (Mills, 2009). These two guiding principles shape the foundation of multiliteracies pedagogy.

In other words, this approach is two-pronged. Firstly, it looks at the increasing global co. In other words, this approach is two-pronged. Firstly, it looks at the increasing global connectedness and subsequent diversity this creates, and secondly, it shows the continuous integration and multiplicity of modes of communication. This is noticeable especially in multimedia, hypermedia and mass media, *"where the textual is also related to the visual, the audio, the spatial, the behavioural, and so on"* (New London Group, 1996:64). What multiliteracies thus effectively promote is the ability to move between and to (if necessary) combine different registers and dialects of English, other languages, and in particular different modes of communication.

The multiliteracies framework also draws on the work of Kress, Fairclough, and Halliday. It uses Halliday's (1978) conception of language as a social semiotic. In this way, there is a shift in focus from language to include all the semiotic systems assuming that meaning-making does not come about through language alone but includes all forms of symbolic representation.

According to Halliday, social reality is a semiotic construct, one in which language is one of many semiotic systems that is used to create reality. Although he focuses more on language, he himself argues that meaning exchange is a creative process in which language is one resource used for meaning-making. He further states language may be the principal semiotic resource for meaning-making, but that there are many others (Halliday, 1978). For Halliday, language consists of discourse. Language evolves in order to stay functional as a meaning-making resource (Halliday, 1978). This means that if one looks at linguistic structures in functional terms, language must be interpreted by studying the place and its role in the social process itself. And by doing so, ultimately look at the function of language in the meaning-making process.

From a multiliteracies approach, other semiotic systems are also studied as functional systems. Each individual's meaning-making resources include one or more languages, numerous symbol systems or modes of communication, and a multitude of discourses and genres, which constitute several literacies.

Finally, the framework relies on a pedagogy that emphasises a connection between a student's world of learning and his world of "living". This pedagogy stresses that learning material must be multimodal, scaffolded, and applied to a student's world outside of school. This pedagogical approach encompasses a more multimodal point of view in communicating content and message to students. Texts that are used for teaching and learning are more often than not non-linear in the sense that there is an integration between, for example, printed word and sound, graphics and image. In other words, multiliteracies pedagogy is directed towards integration. It further proposes a language pedagogy that removes "*disparities in educational outcomes"* (New London Group, 1996:63), and by doing so, arguably improves the life chances of all learners. The changes that are occurring in communities, public, and working environments demand a significant rethinking of what is taught in schools and how it is taught. The multiliteracies framework argues that we must move away from the idea that the main objective of literacy education (which is teaching rule-governed standard forms of the English language) should move towards an ideology that prioritises an ability to facilitate an abundance of discourses. Or, as Lamberti (1999) puts it, multiliteracies make it possible to view texts more holistically.

3.2.1 Multiliteracies Pedagogy

Drawing from the two overarching principles mentioned above, there are four main components in this pedagogy. The first principle is the concept of situated practice. Situated practice suggests immersion of students. Students must be in a learning community where meaningful activities are completed based on students' individual backgrounds and experiences (New London Group, 1996). Or, as Rowsell (2006) explains it, *"situated practice activities locate teaching within student skill sets; textual practices; texts; and lifeworlds"* (Roswell, 2006:54). Lifeworlds, are the *"spaces for community life where local and specific meanings can be made"* (New London Group 1996:70). Or, as Anstey and Bull (2006) put it, a student's lifeworlds include everything that exists outside of their school context. These lifeworlds present students with *"a complex range of representation resources, grounded in their cultural experiences and layers of their identities"* (Mills, 2006:230). For this reason, situated practice requires educators to use activities that are a) meaningful to the students that are learning from them and b) activities that have a link to the students' out of school experiences, for example, family experiences, peer relations, community groups, to mention a few. Through situated practice, multiliteracies enable educators to support culturally relevant pedagogy that breaks the previously existing boundaries between personal identities, ways of thinking, life skills, and school and community (Smolin & Lawless, 2010).

The second pedagogical component is that of overt instruction (New London Group, 1996). Overt instruction entails activities that: a) scaffold learning, b) focus a learner on the key facets of the experiences and activities within a community of learners, c) allow a learner to gain specific information at times when it can most usefully guide and organize practices, and d) building on and using what the learner already knows (i.e., background knowledge) and has accomplished (New London Group, 1996).

Critical framing is the next component of the multiliteracies pedagogy. The aim of critical framing is that learners will constantly criticize their learning and literacy practices in relation to the ideological, historical, political, and value-centred relations of specific systems of knowledge and social practice (New London Group, 1996). Rowsell (2006) explains that critical framing activities allow students to break down the layers within a text and analyse the parts in reference to language multimodality discourse and/or function.

The final component of multiliteracies pedagogy is transformed practice. The goal of multiliteracies theory is that students will take the skills and the knowledge they learned through the components of critical framing, overt instruction and situated practice, and then apply these to their lives in real-world contexts, outside of the school (Mills, 2006; New London Group, 1996). Transformed practice allows students to make connections to their learning and incorporate their cultural experiences, which results in various levels of creative change (Mills, 2006).

To summarize, Cope and Kalantzis (2000) state that the pedagogy behind the educational theory of multiliteracies is thus two-fold: It is a teaching pedagogy that suggests educational practices must adapt to cater for an increasingly globalized society, in which information is conveyed in a variety of forms, that are not just text-based and are often times primarily language-driven. And that educational practices must additionally be able to adapt to a variety of text forms used for teaching and communication. It must especially be able to illustrate the relationship between visual images and the written word.

Multiliteracies thus propose an understanding of the relationship between text and context and to additionally use new representational forms developed out of multimedia technologies. In fact, as stated above, a multitude of media is the central aspect of this literacy's pedagogy. This means that a significant amount of meaning-making happens between various mediums (modes). An example would be where the visual and the textual are related and how this subsequently creates the ability to use the new representational forms.

3.2.2 Multiliteracies in a South African context

According to Oostendorp (2017), a 2011 census showed that only 9.6% of South Africans use English as a first language. The conclusion can thus be made that for the majority of South Africans, English is a second and often even a third or fourth language. Galal (2021) reiterates this when he states that even though English only accounted for the sixth most common language spoken in households in 2018, it is the second-most prevalent language spoken outside households. It is still, however, the dominant language in the South African higher education environment (Oostendorp, 2017).

Steyn and Newfield (2006) explain that when referring to English in education in Africa, a distinction must be made between teaching and learning English as a subject and using English as a medium of instruction. The latter, in post-colonial Africa, has been rife with controversy. Steyn and Newfield (2006) state that since issues like power are at the heart of educational policy-making, there is a profound impact on the way African and South-African students learn and construct their identities. Countless studies have been done to address this issue around language and education in South Africa. One such example is a paper by Hilary Janks (2014) in which she states that regardless of the fact that South Africa has nine indigenous languages recognised as official languages, finding educational resources in these languages is difficult. She argues for a more diverse learning environment in which learners not only make meaning from the resources they have to learn from but that they also bring their own understanding to these resources. She thus advocates for a learning environment in which South African learners use a variety of resources for learning. This not only reiterates the second principle of Multiliteracies (see earlier discussion) but also shows how multimodality finds a place within the South African educational context. This is important since Archer (2010) argues that exploring modal specialisation and the affordances of modes with students is crucial for developing academic literacies practices in the South African higher education environment. Academic texts start to rely more on the co-presence of graphic material, such as imagery and writing. Images, for example, are starting to become more important as carriers of meaning in an array of academic disciplines (Archer, 2010). Implementing multiliteracies and multimodal pedagogy into classrooms, specifically in a South African educational environment, informs social justice and broadens the base for representation (Steyn, 2000). It can make the classroom environment more inclusive and allow for students to use the familiar resources in their environment to make meaning and to learn from.

The application of multiliteracies to text design and teaching can be seen in ESL (English as Second Language) classrooms. ESL students are often required to understand meaning-making from multimodal communicative platforms, which are integrated into ESL classroom pedagogical practices and texts used for learning and teaching.

3.2.3 English as a Second Language and English for Specific Academic Purpose

An English as a Second Language (ESL) programme is coursework that is specifically designed to help students who are learning English as their second, third, or in some cases, fourth language. These courses allow students to develop their English reading, writing, speaking and listening skills (ESLdirectory, 2021). The focus in an ESL classroom is not to teach English as a subject but rather how to use the language as a communication tool. This allows for adapted teaching methods and approaches, which gives more room for a pedagogical framework like that of multiliteracies. Multiliteracies can then potentially form the basis for developing teaching material and may be used as a guiding principle when teaching and engaging with students during lessons.

3.2.4 Incorporating Multiliteracies Pedagogy in ESL

Since language is taught as a communication tool, the approach in an ESL classroom encourages teachers to use various audio-visual aids like videos, pictures, and drawings (Kaplan, 2019). This makes the learning authentic and serves as a helpful tool in the learning process (Halwani, 2017). This is reiterated by a study done by Kleinman and Dwyer (1999) that found that using colour graphics in instructional modules promotes learning new concepts. Additionally, Joseph Macwan (2015) also states that visual medium is arguably the most effective medium to propagate ideas. Since visuals remain the same, it allows for equal rehearsal as well as consistent memory pathways to be created. Moreover, using visuals as a tool for teaching in an ESL classroom connects the course material to the learner's "lifeworlds", which is one of the pedagogical principles of multiliteracies. Also, if the audio-visual aids are taken from the students own lives (for example, images of objects already familiar to the students), it re-enforces the students' ability to link the newly learned information to background information, that is already established and familiar to the student. A study conducted by Mathew and Alidmat (2013) found that the act of teaching and learning can often become monotonous when the only resource available is a textbook. They further found that audio-visual aids as a resource when teaching language is helpful for learners and equally helpful for teachers. Consequently, there is a strong argument for teaching with various resources and or activities in an ESL lesson. In addition, these activities or resources work well as teaching aids if scaffolded.

Scaffolding breaks up learning into smaller "pieces" and provides a tool, or structure, with each piece (Alber, 2014). For example, when teaching reading, you might start with a preview of the text firstly focus on the key vocabulary before you read the text as a whole. You may also divide the reading text into smaller parts that you read and discuss as you go. According to Walqui (2006), scaffolding is a collaborative and contingent social process that supports learners and turns them into independent thinkers. It is an interactive process that creates social interaction between a student and a teacher. Donato (1994) argues that scaffolding creates a space where the novice (student) can interact and learn with the knowledgeable (teacher). This learning process enables the student to gain adequate support from the teacher, and with that support, not just acquire knowledge but also become independent. In an educational setting, the scaffolding process allows for temporary guidance and assistance by a teacher at the start of a lesson in order for learners to later develop skills and knowledge on their own. According to Hartman (1997), scaffolding can refer to models, cues, prompts, hints, partial solutions, think-aloud modelling and direct instruction. To put it another way, it is an instructional method that not only assists with problem-solving but also allows students to complete tasks and achieve outcomes and goals.

Scaffolding has an essential role in language instruction; like in an ESL classroom, it is considered an effective teaching approach, specifically assisting students in extending their competence (Piamsai, 2020). A study by Kayi-Aydar (2013) showed that in an ESL class observed by the researcher, scaffolding occurred routinely while the students interacted with their teacher during various classroom activities. This is especially true when looking at speaking and motivating students to speak in an ESL classroom. Wijetunge et al. (2016) claim that scaffolding can be used to not only improve a student's ability to speak the language that is learned but also to motivate the student to become more interactive during class. Additionally, scaffolded activities form part of overt instruction, which is the second pedagogical principle of multiliteracies. Overt instruction emphasizes creating scaffolded activities that will ultimately allow a learner to attain certain information when it can most favourably guide and organize practices. It will further develop critical thinking skills, which is another pedagogical principle of multiliteracies pedagogy.

Critical thinking in an academic environment is the ability of a student to categorize, differentiate, describe, compare and contrast and write in the conventions of the academic discipline studied (Pally, 1997). In ESL classrooms, critical thinking skills are developed by sustained content study (Pally, 1997). Critical thinking links directly to critical framing, which is another pedagogical principle of multiliteracies. The aim of critical framing and critical thinking is similar; both ask a student to analyse and break down layers of information in order to fully understand it. In order for students to learn and practice this skill, teaching in an ESL classroom require a teacher to thus use diverse teaching strategies. This will ultimately help students to critically think about the content and help them with problem-solving (Singh et al., 2020). Ideally, ESL teachers should not only employ diverse teaching strategies but also use a multitude of resources.

Today's globalised digital era expects students to engage with various multimodal texts. This ispartly due to the role of social media. Students actively communicate on these platforms and communication like these advocates for a transformation in teaching and learning. Lessons must become more multimodal in order to promote students' capabilities in making meaning (Ganapathy, 2016). This means that teachers must create and use more multimodal classroom resources and not just rely on plain written texts and textbooks. The assertion that is made is thus that there should be a restructuring of the teaching and learning materials used in an ESL classroom (Ganapathy, 2016). These materials should become more multimodal to cater to the semiotic rich and digital-age students live and learn in. An example of such material is the textbooks used in the modules presented at the Academic Language and Literacy Development (ALLD) unit at the University of the Free State (UFS). A detailed discussion of the ALLD and the texts are chosen for analysis will be discussed in the next chapter.

3.3 The link between Multiliteracies, Multimodality and Intersemiotic translation and Resemiotisation

In the world we are currently living in, creating multimodal communication is an everyday practice. This is due to the increased use of digital technology, which enables meaning-making using a wide range of modalities and sheds new light on the meaning-making process itself (Magnusson & Godhe, 2019). According to Lemke (2006), using these various modes to create meaning and then mediating them through platforms like digital devices affects

communication. Even though there is still a tendency, especially in formal settings like schools, to cling to the "traditional" way of meaning-making, which is predominantly paper-based texts (Kress, 2010), there are instances, like the literacy classes at the UFS where a more blended approach is starting to take off. This means that technology is beginning to play a more prominent role in the teaching and learning environment and that paper-based texts and textbooks are becoming more multimodal. The shift from the traditional way of teaching enables students to use more of the semiotic resources from their social environment in their educational environment. Iyer and Luke (2010) claim that today's students engage with complex semiotic systems; this theoretically then allows for multiliteracies to become more central in educational pedagogy. Applying a multiliteracies framework creates the space for multimodality to become "the tool" for creating the resources used in an educational environment. However, just using random resources available to create multimodal texts without planning or understanding what each resource can do could undermine the intention of a framework like multiliteracies. This circles back to the question this research attempts to answer. Studying multimodal texts through the scope of intersemiotic translation while using resemiotisation as an analysis tool allows for a better understanding of how the various resources, as a whole, create meaning and form coherent multimodal communication. With resemiotisation, it is possible to understand the meaning-making potential of semiotic resources. Additionally, resemiotisation transforms meaning-making and, in turn, can generate expansive learning. According to Fernández-Fontecha et al. (2018), this can lead to a reconstruction of knowledge, which is the objective of education.

3.4 Conclusion

This chapter gave a detailed description of multiliteracies. It gave insight into English as a Second Language or ESL as it is more commonly known and furthermore illustrated how multiliteracies pedagogy can be incorporated in an ESL classroom and in ESL course material. It concluded with looking at multimodality and intersemiotic translation and the place it has in multiliteracies' pedagogy and ESL classroom practices.

Chapter 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter will start with a brief description of the research design used in this particular research. Next, a description of the data will be given, and an explanation of the data selection process. Furthermore, an explanation of the analysis method will be provided, and the chapter will conclude with a description of the programs and software used to do the actual data analysis.

4.2 Research design

4.2.1 Qualitative research design

This was a qualitative research study. Qualitative research involves a variety of methods and approaches within different research subjects. Hence, the multitude of definitions explaining this type of research. For Rutberg and Boudikis (2018) it is a focus on "*lived experiences"* (Rutberg & Bouikidis, 2018: 209). In otherwords, one can say that qualitative research aims to find the answers to questions concerned with understanding the meaning and experience of dimensions of humans' social worlds. This understanding is created by describing characteristics of the human experience or social objects. Flick (2014) claims that qualitative research's interest is in analysing subjective meaning or the social production of issues, events, or practices. This happens by collecting non-standardised data and analysing images and texts rather than statistics and numbers. In other words, qualitative research is not statistical, and it can incorporate multiple realities. Strauss and Corbin (1990) reiterate this by stating that the term *qualitative research* means any type of research that produces findings not discovered through statistical procedures or any other means of quantification. For them, it is this research about persons' lived experiences, feelings, emotions and behaviours. It is thus research that inherently aims to understand the meaning of human action (Jackson et al., 2007).

There are a variety of methods used when conducting qualitative analysis. This particular qualitative research focused on content analysis. Content analysis is the umbrella term for various ways for conducting systematic, qualitative textual analysis that involves categorizing, contrasting, and comparing a set of data to test a hypothesis. Basically, qualitative content analysis involves theorizing, interpreting, or making sense of data by firstly breaking it down

into segments; secondly coding and categorizing these segments; and then finally establishing a pattern for the entire data set by relating the categories to one another (Gubrium & Holstein, 1997).

One of the benefits of qualitative research is that it produces a detailed description of participants' experiences, feelings and opinions. Additionally, it also interprets the meanings of participants' actions (Denzin, 1989). Secondly, qualitative research seeks to understand the human experience in specific settings. To illustrate, Denzin and Lincoln (2002) state that qualitative research encompasses an array of epistemological viewpoints, interpretive techniques, and research methods of understanding human experiences. Thirdly, interpretivism research, like qualitative research, is viewed as ideographic research, i.e., the study of individual cases or events (Klein & Meyers, 1999); and it can illustrate an understanding of different people's voices, events and meanings. Fourthly, qualitative research allows for research to discover a participant's inner experience, as well as the opportunity to figure out how meanings are shaped through and in culture (Corbin & Strauss, 2008). Lastly, qualitative research design has a more flexible structure, which means it can be constructed and reconstructed to a greater extent (Maxwell, 2013).

4.2.2 Research question

The research question this study seeks to answer is: what relationship, if any, exists between the written text in a textbook and the other semiotic resources used for communication, and how do these resources compare to one another across different subject fields? To answer the research question, the study will investigate the role intersemiotic translation plays in creating multimodal communication by specifically studying a particular textbook used in an academic literacy class for Natural Science students. The analysis will find what semiotic resources were utilised for meaning-making in the multimodal text. The findings will then be compared to a second text from a textbook used in a different subject field. In this case, a text from a textbook used in an academic literacy class for Humanities students. The comparison aims to investigate whether specific semiotic resources are used more frequently than others and if there is a relation between subject field and resource. Thus, the question here is: do specific subject fields use specific semiotic resources in the meaning-making process?

4.3 Data selection

The following two textbooks were chosen: Richard Lee's (2009) *English for Environmental Science in Higher Education Studies* (textbook used for students in the Natural and Agricultural Science faculty); and Christina Latham-Koenig and Clive Oxeden's (2013) *English File Intermediate Student's Book* (textbook used for students in the Humanities faculty). These two textbooks were specifically chosen since I had the opportunity to teach on both these courses which used these particular books. I am a trained academic facilitator; I am TEFL (Teaching English as a Foreign Language) certified, and for the last ten years, I have been teaching at ALLD, specifically on some of their Academic Literacy courses. Therefore, I am familiar with the content of each of these books and thought that the texts would make an interesting and insightful multimodal and intersemiotic translation study. Below is a short description of each textbook.

English for Environmental Science in Higher Education Studies - Richard Lee

This textbook is a skills-based course designed for students in the field of environmental science who are taking their tertiary level studies in an English-medium environment. It provides exercises in the essential academic skills that all students need, for example, writing, listening, and speaking. It further provides students with the specialised language theywould need in the field of Environmental Science. The listening exercises and reading contentin the textbook are taken from science texts and lectures. The textbook consists of twelve eight-page units combining language and academic skills teaching. There is also a vocabulary and academic skills bank in each unit which students can use for further reference and revision. The listening exercises in the textbook is on an additional CD that can be found in the back of the book. In this textbook, Unit 5 (*Energy Resources*) was be analysed.

English File Intermediate Student's Book - Christina Latham-Koenig and Clive Oxeden

English File Intermediate Plus Student's Book is suitable for CEFR level B1 - B2 English courses. It provides a balance of vocabulary, pronunciation, grammar, and other skills to give students exposure to the English language. Lesson content covers various general and engaging topics in a relatable way to create opportunities for students to practise and improve their use of the English language. Additionally, the book has an audio component, ensuring that students not only practise reading and writing English but listen to English and gain familiarity with the

language and how the language sounds. This text was not part of the descriptive analysis but was used as part of the comparison that was done after the analysis. Comparing two texts from different subject fields was done to see whether similar semiotic resources were used in the meaning-making process or if certain semiotic resources were used in certain subject fields only. For the comparison, Unit 1, *Mood Food and Family Life,* was used. Both these textbooks are used in the Academic Literacy courses presented at the ALLD at the University of the Free State.

4.3.1 The Academic Language and Literacy Development unit

The Academic Language and Literacy Development (ALLD) unit at the University of the Free State (UFS) in South Africa is one of the units at the Center for Teaching and Learning at the UFS. The main objective of the ALLD is to support students in the development of their academic language by means of academic literacy courses (Center for Teaching and Learning, 2020). The Englishacademic literacy courses presented at the ALLD are designed to support students studying across the various disciplines at the UFS. The main focus of these courses is on 1) teaching students to write correctly structured academic assignments and 2) developing students' writingability in various discourses. A further emphasis is placed on intensive and extensive reading,listening, and note-taking; since these skills are all believed to be vital to developing academic skills. Students are introduced to various topics relevant to their respective disciplinesthrough continued content-based instruction.

The outcomes of the literacy courses are as follows (Centre for Teaching and Learning, 2020):

- Critical reading, which is the ability to extract main ideas and key details from anacademic text.
- Academic writing is the ability to express information and opinions clearly withappropriate organisation and structure in a written mode.
- Oral skills, which are the ability to fluently, critically, and creatively express theiropinions about a variety of issues in the mode of oral discussion.
- Critical thinking, which refers to the ability to evaluate, apply, and analyse information.
- Listening and note-taking, which is the ability to collect and organize important ideas.

To meet these outcomes, students are introduced to a variety of topics relevant to the respective disciplines. This is done with the help of the textbooks used in class. The textbooks used in these courses presented at the ALLD must be content-orientated and enable a student to reach the outcomes of the courses. Therefore, textbooks must allow students to practise (and acquire) reading, writing, listening, and speaking skills. However, the UFS's language of instruction is English; this means that students who enrol at the university must take their courses in English, regardless of whether English is their home language or not. Many students enrolled at UFS speak English as a second (L2) and often a third (L3) or even fourth (L4) language, and subsequently, this means that language may be a barrier to learning for many students. Table 2 below has more specific detail with regards to the South African languages spoken by the students at the University of the Free State (DIRAP, 2021).

Table 3: South African languages spoken by students at the University of the Free State

Home Language (as indicated by student)	2018	2019	2020	2021
English (L1)	5564	5707	8818	16961
Afrikaans (L1)	7038	6277	5155	3701
IsiNdebele (L1)	181	231	207	159
IsiXhosa (L1)	3616	3821	3621	2676
IsiZulu (L1)	7523	8456	7971	5888
Sepedi (L1)	1317	1559	1454	1104
Sesotho (L1)	10011	10252	9173	6677
Setswana (L1)	1847	2387	2427	1821
Tshivenda (L1)	681	703	644	512
Using English as L2, L3, L4	32214	33686	30652	22538
Total Students	37778	39393	39470	39499

When looking at the information in the table, it seems that there was a gradual increase in students identifying English as their home language (L1) over the last four years. However, there are still many students who identify other South African languages as their home language. For them, English is a second (L2), third (L3) or even fourth (L4) language.

When comparing students identifying English as L1 to students identifying English as L2, L3 or L4, it seems that most students at the University of the Free State are not home language speakers of English (see Figure 13).

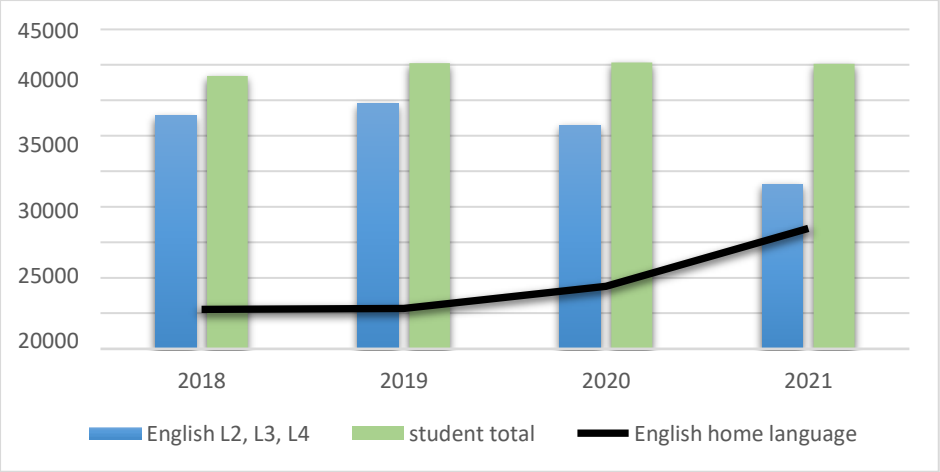


Figure 13: English L1 compared to English as L2, L3, L4

This means the textbook must serve an additional purpose. The English used in the textbooks must be easy enough for an L2, L3 and L4 speaker to follow and understand. At the same time, textbooks need to simultaneously allow students to better their English so that they are not only able to understand the content of the other modules in their curriculum but are ultimately able to use English to complete assignments and tests. This is obviously an almost impossible task since not all students enrolled in the literacy modules are second language English speakers. As mentioned earlier, some speak English as a third or fourth language. With this in mind, the best option for the ALLD was to approach the courses as if they were ESL courses. That means that certain principles overlap. ALLD, just like ESL, teaches English as a communicative tool. The texts that are used for teaching are specifically designed for non-native speakers of English. This means the textbooks in the ALLD courses are multimodal. They use various semiotic resources as a basis for teaching, which is why these texts are good examples for researching multimodal communication and multimodality; plus, they are suitable to analyse as an example of intersemiotic translation.

4.4 Method of Analysis

4.4.1 Analysis Questions

The research question this study asked was what relationship if any, exists between the written text and the other semiotic resources used for communication? To answer the research question, in other words, to investigate the relationship between semiotic resources, I analysed the data using by looking at the role that resemiotisation plays in the meaning-making process. Additionally, I decided to combine resemiotisation with the Peircean trichotomy of icon, index, and symbol to analyse the data. Resemiotisation asks how meaning is conceptualized when there is a shift between different semiotic resources. In other words, with resemiotisation, I could "see" how meaning was re-produced from one semiotic resource to another. Conceptualising this shift between semiotic resources could be illustrated in more detail by using Peirce's icon, index, andsymbol. Peirce's theory of signs is about relationships. It is about showing the connection between text and sign in multimodal communication. When looking at a multimodal text, there is an assumption that the various smaller semiotic resources should link to one another to create a whole message. Hence, with resemiotisation, I could observe the meaning shift between semiotic resources; but combining this with the sign categories of icon, index and symbol, I was further able to see where each resource fits in the meaning-making process. To illustrate this, the analysis was done by using the following five questions.

1. *What are the semiotic resources used for meaning-making?*

When Ellenström (2010) discusses modalities and mode, he refers to the semiotic resources used to make meaning in a multimodal environment as *entities*. Although I agree with his conceptualization of entity, the term semiotic resource was used to describe the analyses that follow. This was for clarity since the various theoretical frameworks discussed in the literature all had their own terminology. Using one term throughout makes it easier for the reader to follow.

2. *In which material modalities do these semiotic resources partake?*

Ellenström's (2010) concept of material modality is the medium's interface used for meaning construction. Thus, if a textbook is used, the medium of meaning construction the material modality will be the actual physical material the textbook is made of, paper or cardboard etc.

3. *With what logic do the signs icon, index, or symbol function?*

Understanding the logic of the relationship between the representamen and the object used in the meaning-making process helps in the understanding of how each sign functions and contributes to the communication process. Additionally, it also illustrates the multiliteracies premise that learning is more effective when various semiotic resources are used in the learning process. As discussed in chapter 2, Peirce's triadic sign process allows for meaning-making to be analysed so that the relationship between the different components of the process and the creation of meaning can be seen. It is important to note that even at a basic level like this, a semiotic resource can be interpreted, categorised and subsequently be assigned a function in more than one way. To put it another way, there is an ambiguity overlap in terms of meaning when working with these signs since a particular semiotic resource will not always be categorised and assigned the same meaning in the same way. The meaning assigned to a semiotic resource in Peirce's sign system relies on the context in which the meaning is being made. If, for example, a photograph is studied, it will be deduced that it has properties in common with its object, and therefore it can be an iconic sign. However, it is physically and directly influenced by its object, and it further indicates the presence of something else; therefore, a photograph can also be an index. Lastly, it requires a learned process of "understanding to read the image" and can hence be a symbol (Johansen, 2016). This means that in the analysis in this research, all sign functions were allocated based on the context of the analysed text.

The text that was analysed is from a textbook. Thus, the context in which this text would be used is educational; in other words, the intended outcome of the text is to inform or teach. In order to use this text as intended, i.e., as a tool to teach, the process of scaffolding is being used as part of the meaning-making process. Scaffolding (as discussed in chapter 3) breaks up learning into smaller parts, firstly making meaning from the smaller parts and then gradually

connecting all the smaller parts to form a more extensive meaning-making process. Keeping in mind that with Peirce's sign categories, one sign can be categorised in more than one way (see discussion in chapter 2 for sign categories), allocating functions to the signs in this researchwill be based on the context of the communication. The analysed text can theoretically be usedin various contexts, but since it was taken from a university textbook, the assumed context herewill be education. The functions allocated to the signs in this analysis will be based on an educational context, where scaffolding is used to help with the meaning-making process. In the analysis, signs will thus be assigned a *main function* and an *additional function.* It is important to note that the *additional function* was mentioned in the analysis, but only the *main function* was discussed and illustrated. The assigned functions were from the researcher's point of view, which argumentatively made sense in the context of using the text as an educational tool.

4. *What affordances do the semiotic resources and sign types offer?*

As discussed earlier in chapter 2, affordance is the potential of a given semiotic resource to function as a sign in the meaning-making process. In contrast, constraints, on the other hand, are a semiotic resource's limitations. Semiotic resources have specific meaning-making potential based on past uses and a set of affordances based on possible "new" future uses (Jewitt, 2012). Therefore, just as a specific semiotic resource will theoretically be more suitable in a particular meaning-making context, another semiotic resource will be more constricted for use in the same meaning-making process.

5. *How are the semiotic resources linked into a meaning-making whole?*

Answering the four questions (discussed above) formed the basis of my analysis. My analysis showed how meaning is constructed through the process of resemiotisation, which was illustrated through Peirce's icon, index, and symbol signs. This demonstrated how the semiotic resources are small, individual meaning-making processes and how these individual processes subsequently connected to each other to collectively communicate a whole message that was comprised of the smaller individual meaning-making processes. The analysis further showed how the meaning constructed from these texts is part of a learning process. A student gains more knowledge about the particular concept dealt with in the textbook unit that will be analysed. The fact that the analysed text is multimodal also demonstrated how the pedagogical

principles of multiliteracies could be applied when using a multimodal text as an educational tool.

4.5 Software used for analysis

Before looking at the data analysis, it must be noted that I thought of using a software program called Multimodal Analysis Image as an analysis tool. I started the data analysis using the program; but extracting the data from the program and then subsequently adding it to *Microsoft Word* in a compatible format was somewhat problematic and time-consuming for the following reasons: 1) The demo version of the program was used, which limits what can be done with the analysed data. The demo version does not allow for any data to be exported. Thus, if working with the demo version, I had to make screenshots of each step of the analysis and then convert it into a format that can be used outside the program. 2) In a screenshot, the various sections andsub-sections are small and difficult to read, even if the screenshot is resized and added to a word document or another software program. 3) Looking at the data in the software program is ideal; however, you must have a licensed version of the program to access the data, which may be problematic for anyone who does not have this particular software program. 4) Leaving the analysis in the software program would also mean that someone would have to use both *Multimodal Analysis Image* and *Microsoft Word* to read this research, which is not ideal. Subsequently, I decided to scan the pages of the textbooks and convert them into Portable Document Format (PDF). As PDF's, the scanned pages were resized with more clarity, which made them easier to read. I could then also take smaller, separate parts of the scanned PDF pages and edit them using *Microsoft PowerPoint*. Using *PowerPoint,* I was able to convert parts of the scanned pages into pictures and augment them with descriptions using text boxes, which gives a similar end product as *Multimodal Analysis Image.* I then added the pictures to this *Word* document. Presenting my research in a *Word* document made more sense since it is a frequently used software program, which means that more people would have access to it in comparison to something like *Multimodal Analysis Image.*

4.6 Conclusion

In this chapter, a short description of the research design and a description of the data was given. In addition to this, the chapter explained the data selection process and the method used

to analyse data. It concluded with a discussion of the programs and software used to do the actual data analysis.

CHAPTER 5: DATA ANALYSIS and COMPARISON

5.1 Introduction

The following chapter is a detailed analysis of Text 1. The data analysis will answer the primary research question: *what relationship, if any, exists between the written text in a textbook and the other semiotic resources used for communication?* The findings of the analysed text will then be compared to a different text from a textbook from a different subject field as the analysed text. The comparison will subsequently answer the additional question, i.e., *how do these various semiotic resources compare across two different subject fields?* The chapter will conclude with a discussion of the findings of the comparison.

5.2 Text 1: English for Environmental Science in Higher Education Unit 5 – Energy Resources.

The unit analysed in the first text is Unit 5 of the *English for Environmental Science in Higher Education* textbook. It is titled *Energy Resources*, and the content aims to give students a broad understanding of what is meant by the term "energy resources". The unit is from pages 38 to 45 in the textbook. Page 116 to 119 in the back of the textbook contains transcripts for the listening exercises. The unit is divided into four sections: *vocabulary*, the first section, *listening* as a second section and *extending skills*. The last two pages are a *vocabulary bank* and a *skills bank* giving students additional information in assisting with the practice of the skills they've learned in previous sections.

Additionally, even though this is a multimodal text, I still understand that language plays an integral part in meaning-making. In this case, the language, visuals, and audio were studied, not just the non-language parts of the text.

Please note that various parts are already referred to as pictures and figures in the scanned texts themselves. Thus, to avoid confusion, the scanned pages of the textbook will be referred to as data samples. Where the text refers to the audio recording, I added the transcript specific to the particular recording. The entire Unit 5, together with the transcripts, is added as an addendum. Then lastly, to make it easier to follow, and for the subsequent discussion of the results, the analysis will be sorted into the following sections: A *Vocabulary Section*, a *Listening*

Section, an *Extended Skills* section and a *Vocabulary Bank* and *Skills Bank* section. The tables below show how the sections and sub-sections are divided and where each can be found in the textbook.

Table 4: Data Sample: Vocabulary section

***Vocabulary* section (pages 38 and 39)**	
Sub-section 1	Exercise A (p.38) + pictures (p. 39)
Sub-section 2	Exercise B (p.38) + blue block of words labelled *a* (p.38)
Sub-section 3	Exercise C (p.38) + brown block of text titled *Faculty: Environmental Science Lecture: Introduction to energy resources* (p.38)
Sub-section 4	Exercise F (p.38) + graph (p. 39)

Table 5: Data Sample Listening section

***Listening* section (pages 40 and 41)**	
Sub-section 5	Exercise B (p.40) + audio recording on CD (See transcript Unit 5, Lesson 2, Exercise B, 1.22 part 1)
Sub-section 6	Exercise D (p.40) + Exercise B (p.40) + audio recording on CD (See transcript Unit 5, Lesson 2, Exercise D, 1.23 part 2)
Sub-section 7	Exercise E (p.40) + Exercise B (p.40) + audio recording on CD (See transcript Unit 5, Lesson 2, Exercise E, 1.24 part 3)
Sub-section 8	Exercise A (p.40) + images of slides on the right-hand side of page 40
Sub-section 9	Exercise C (p.40) + Exercise B + images of slides on the right-hand side of page 40

Table 6: Data Sample: Extended Skills section

***Extended Skills* section (pages 41, 42 and 43)**	
Sub-section 10	Exercise A (p.41) + picture of student notes on the right-hand side of page 41
Sub-section 11	Exercise B (p.41) + audio recording on CD (See transcript Unit 5, Lesson 3, Exercise B, 1.25 part 4)
Sub-section 12	Exercise A (p.42) + line graph (p.43)
Sub-section 13	Exercise E (p.42) + information blocks on solar power and hydro power (p.43)

Table 7: Data Sample: Vocabulary Bank and Skills Bank section

***Vocabulary Bank* and *Skills Bank* section (pages 44 and 45)**	
Sub-section 14	Vocabulary sets (p.44)
Sub-section 15	Describing trends (p.44)
Sub-section 16	Signpost language in a lecture (p.45)

5.2.1 Data Sample: Vocabulary Section

The first section of the analysis was the vocabulary section (see Figure 14 below). This is pages 38 and 39 in the textbook.

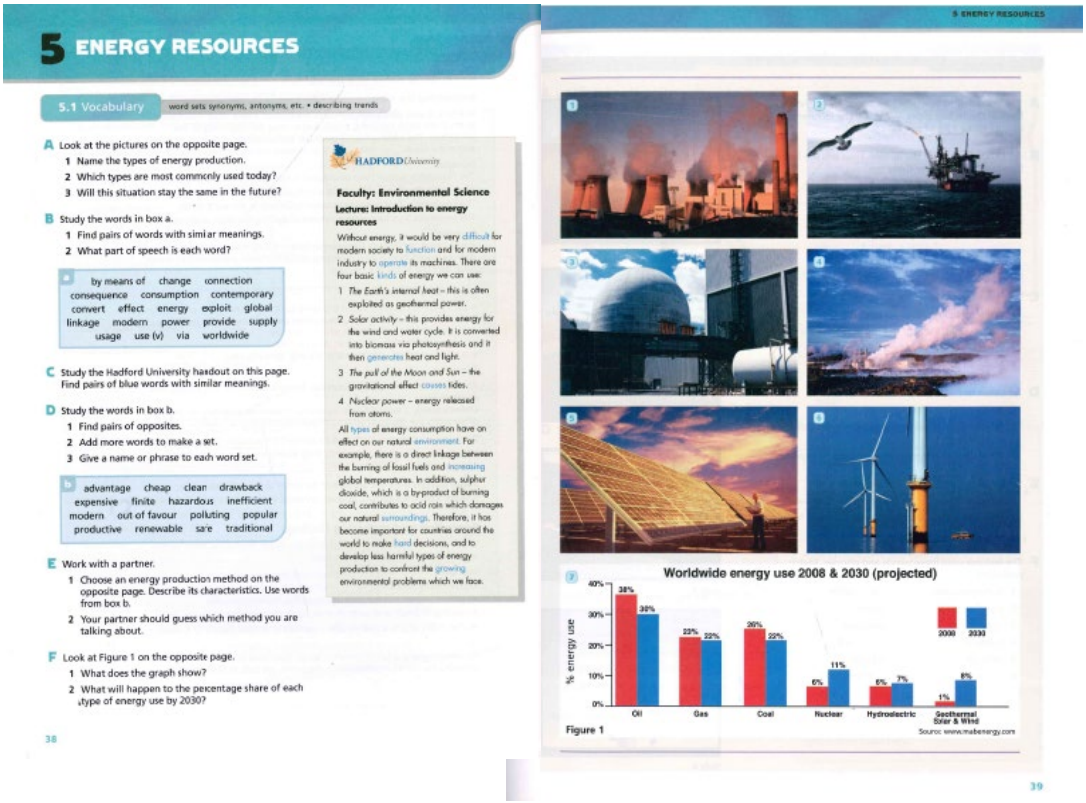


Figure 13: Vocabulary Section

The unit starts with a vocabulary exercise, Exercise *5.1,* which is further divided into five sub-sections marked A to F. This unit aims to help students to understand what is meant by the term *energy resources*. The first exercise in this unit allows students to broaden their vocabulary in this particular field of science, i.e., energy resources. Learning and expanding vocabulary is crucial for the improvement of reading and writing skills. Vocabulary helps with

comprehending the content that is dealt with, thus, helping with the construction of meaning. An expanding vocabulary further assists in communicating ideas and messages, and lastly, developing vocabulary helps with language development (Seifert, 2016). All of the skills mentioned above are necessary for students to engage with subject matter through writing in a proper manner. Mastering the aforementioned skills are especially important in the Academic Literacy course. If students do not have a decent subject-specific vocabulary, writing structured, content-specific assignments will be challenging. Teaching the skill of writing while allowing students to broaden their subject-specific vocabulary is one of the cornerstones of Academic Literacy classes. The fact that the text is multimodal emphasises the multiliteracies' argument that it is important to incorporate different modes of communication and meaning-making and that other semiotic resources (i.e., semiotic resources that is not language) are also functional for meaning-making.

1. **What are the semiotic resources used for meaning-making?**

Page 38 and 39 consist of a combination of printed text (language), numbers and images, which vary in colour. The top portion (band) of page 38 is blue with black and white written text. The body area of page 38 is predominantly white and covered with black and some blue written text. Right underneath the blue band is a smallish blue textbox, with white written text and a smaller grey textbox, with black written text. Additionally, there are two more blue text boxes and one brown textbox on page 38. The blue text boxes are filled with black and some white written text. In the brown textbox on page 38, the colour of the written text is predominantly black, but some parts are blue and grey. At the top of the brown textbox, there is a small, coloured illustration of leaves. There is white space between the textboxes and the written text on page 38 (open, blank spaces). Besides the blue band, most of page 39 is filled with a brown textbox. This textbox is composed of a series of colourful images and a bar graph that is blue and red. The bar graph consists of a title, scale, labels, bars, key, and data values printed in black.

Some written text on page 38 and 39 are printed in bold. On page 38, there are a couple of places where the text and numbers are bold. The title of the paragraph of text in the brown textbox on page 38 is bold. The numbers under each exercise are bold.

The written text and numbers on both page 38 and 39 differ in font size. The size of the written text and number in the band of page 38 is significantly bigger than the text and numbers on the rest of page 38. Most of the written text on page 38 seems to be similar in size. However, the written text in the little blue and grey textbox near the top of the page is somewhat smaller than the rest of the text; this is also true of the text in the brown textbox. On the other hand, the blue letters (A – E), which indicate the sub-sections of content on this page, are bigger than the rest of the text.

2. **In which material modalities do these semiotic resources partake?**

The content is presented on two A4 pages. The pages are three-dimensional since they can be measured in width, length and height. The pages form a unit (Unit 5 – *Energy Resources*) of a textbook *(English for Environmental Science in Higher Education*). At first glance, the pages appear glossy and "sleek", and they are easy to handle. The pages are a bit frayed around the edges, and they have some minor creases in one or two corners. On closer inspection, the pamphlet stitching on the inside of the book's spine is slightly visible; it is still intact and keeps the pages in place. Additionally, it makes it easy to turn the pages. The content on the pages is printed. Some parts of the pages have no printed content, and on some of these spaces, there are notes and marks made with pen and/or pencil.

3. **With what logic do the signs, icon, index, or symbol function?**

Before analysing the various signs present in *Data Sample 5.1*, I want to reiterate that even though a meaning overlap is inherent to this sign system, as stated earlier, the descriptions and analyses were obtained from my point of view as an instructor of the course this textbook is used in. I will identify *main function(s)* and *additional function(s)* based on the context (educational) in which this text is used and the scaffolding process (as discussed earlier in chapter 4). However, as I also said earlier, other interpretations are possible.

In this data sample, the written text's (language – English) main function is indexical. The text is categorised as indexical since some parts of the language in the text are used to guide or point the student to a particular piece of information. The written text thus acts as direct instructions, cues, prompts and hints (Hartman, 2002). This is all part of the scaffolding process, which aids in the meaning-making process and allows students to complete tasks and

achieve outcomes and goals. The additional function of the written text is symbolic since all language is symbolic.

The functions of the images are iconic, indexical, and symbolic. Some of the images have properties in common with their object and therefore function as iconic signs. However, some images further indicate the presence of something else; they guide or point the student to somethingspecific in the text, or they serve as a cue or a hint to information (for example, background information) which the student will need in the meaning-making process. Therefore, the argument can be made that images also function as indexical signs. The data will be broken down into smaller sub-sections to highlight and discuss examples of each of the signsmentioned above. The reason for breaking *Data Sample 5.1* into smaller sub-sections is to illustrate a) how the smaller sub-sections are a meaning-making process on their own, and also b) to illustrate how the smaller sub-sections, although individual meaning-making processes, all connect and contribute to another meaning-making process. Again, remember that only themain functions will be discussed in detail and indicated in the figures; all additional functionswill only be mentioned in the analysis.

Sub-section 1

The segments of this sub-section 1 are marked with purple boxes.

The first sub-section that was analysed at the top of page 38 (as seen in Figure 15 below), with some information on page 39 (also Figure 15).

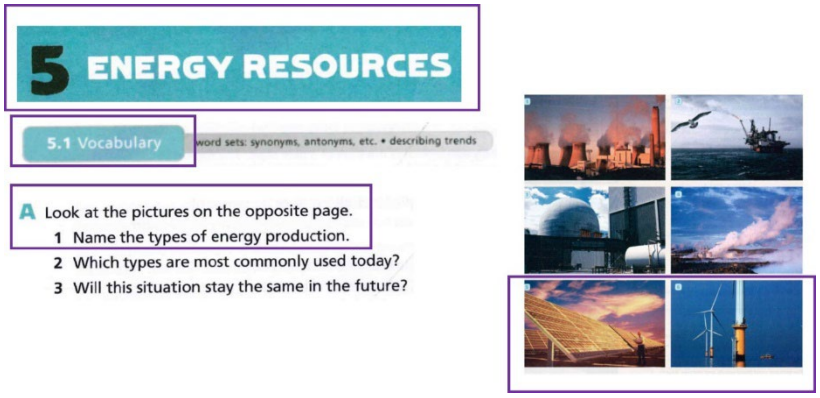


Figure 14: Sub-section 1

This analysis starts with the big rectangle titled *5 Energy Resources* and the smaller blue textbox titled *5.1 Vocabulary* (see highlighted below). Together with this, the prompt for *exercise A* will be analysed and instruction number 1 in *exercise A*. Lastly, pictures number 5 and 6 on page 39 also form part of this data sub-section.

Firstly, there are three blue entities in this data subset. They are the big blue rectangles, the smaller blue textbox, and the blue letter A. Their colour links them together, indexing that they are related. Still, their relative sizes show what would be considered more general information and what would be more specific in terms of information. The unit's topic (*Energy Resources*) is written in the biggest blue rectangle. There is a general overlapping of the topic for the whole unit. The smaller blue textbox gives more specific information and, by doing so, linking in the smaller blue textbox to the big blue rectangle. In the smaller textbox, it is indicated that the vocabulary relating to energy resources will be taught in that particular section of the unit. The blue capital letters A – F become more specific since they indicate how vocabulary exercises will be divided.

The big blue rectangle at the top of the page gives two pieces of general information. The *5* in the rectangle is symbolic but mainly functions as indexical since it indicates where the student is currently at in terms of units completed in the textbook. This is the fifth, meaning four units prior to this one could have already been done. The words *Energy Resources* are also found in the rectangle, indicating that this unit will focus on the concept of resources of energy. The phrase *Energy Resources* is symbolic since it is language, but also mainly functions as indexical since it indicates that this is the place where one would start to read about the concept of *Energy Resources*. It indicates where this unit starts but also shows where the previous unit ends. The smaller blue textbox starts to give more specific information in terms of the concept of *Energy Resources*. The number *5.1* in the smaller blue textbox is symbolic but mainly functions as an indexical sign because it indicates that this is the first section of Unit 5. In addition, it tells the student the type of exercise that will be focused on, in this case, a vocabulary exercise. The word *vocabulary* in the smaller blue textbox is also symbolic since it is language but mainly functions as indexical. It indicates that this is the place where one would start to learn about the vocabulary used within the field of *Energy Resources.* The assumption then can be made that vocabulary related to the concept of energy resources will be focused on specifically in this exercise.

Furthermore, the bigger blue letter, A, indicates to the student that this is where the first sub-section of the vocabulary exercise begins. The blue A is symbolic but mainly functions as indexical since it points to the presence of something else; in this case, it refers back to the smaller blue textbox (5.1 Vocabulary) above the blue A. Additionally, the colour of the letter A is an indexical sign as it creates an additional reference back to the textbox, which is also blue. So here, too, the colour is used as an indexical tool to indicate how the different parts of this exercise connect to one another.

The exercise prompt (the sentence - *Look at the pictures on the opposite page*) tells the student to now pay attention to the pictures on page 39. After reading the prompt, the student will now know to look at the pictures on page 39. The main function of the prompt is as an indexical sign. The prompt as a whole "points" the student to the pictures on the opposite page. In other words, the sentence, the indexical sign, links the written material to the photographic material on the next page. The additional function of the prompt is symbolic.

The first instruction of exercise A (*1. Name the types of energy production*) is symbolic, but it mainly functions as an index. It asks the student to look at each picture on page 39, thus pointing the student to the pictures on the opposite page, and from the information, they get from the picture, be able to say what type of energy resource is represented by each picture. The pictures on page 39 are numbered from 1 to 6. Each picture is a photograph of a specific object related to energy. Understanding that the instruction in exercise A 1 *(Name to the types of energy production)* links to the picture on the opposite page shows how the indexical sign (the written instruction) links to the visual images, the iconic/indexical signs on the opposite page.

Pictures 5 and 6 will be looked at as examples. Both pictures 5 and 6 mainly function as iconic and indexical signs. The picture is iconic since both pictures have specific properties in common with their object. Picture number 5 is a photograph of a solar panel. A real solar panel will look similar to the picture in the textbook. There is then a likeness between the object in the picture and the real object. This is similar to picture 6. Picture number 6 is a photograph of a wind turbine. An actual turbine would have similarities to the photograph in the textbook. However, here both pictures also function as indexical signs. They give the student a cue or hint about how these types of infrastructures look in the real world. This activates the student's

background knowledge and subsequently directs the student to something else, in this case, the actual piece of infrastructure.

Additionally, suppose there is no background knowledge yet. In this case, the fact that there is a relationship or link between the verbal and the visual in the text will theoretically facilitate the learning process, which will lead to establishing the knowledge. Furthermore, the additional function of the images is symbolic.

After looking at the analysis of sub-section 1 above, the conclusion is made that the main sign functions in this section of the data sample are indexical and iconic (see Figure 16 below).

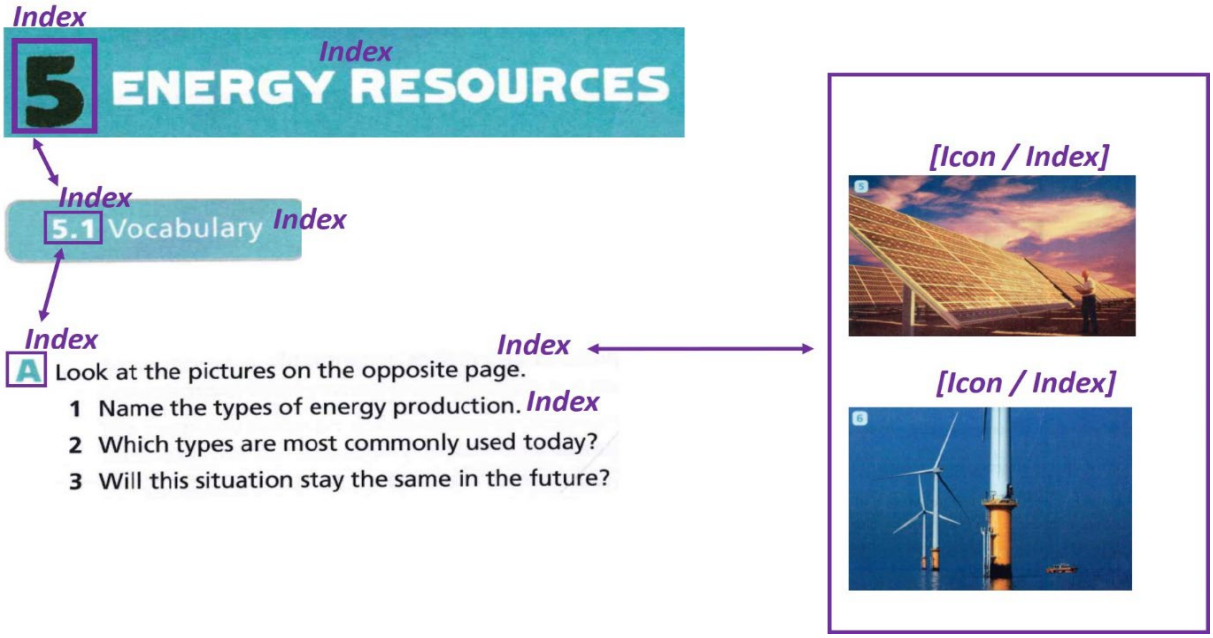


Figure 15: Sign functions present in data sub-section 1

Sub-section 2

The segments of sub-section 2 are marked with purple boxes. The next sub-section that was part of the analysis is also on page 38 of the textbook (Figure 17 below). It was *Exercise B* together with the blue block titled *a*. and the exercise prompt.

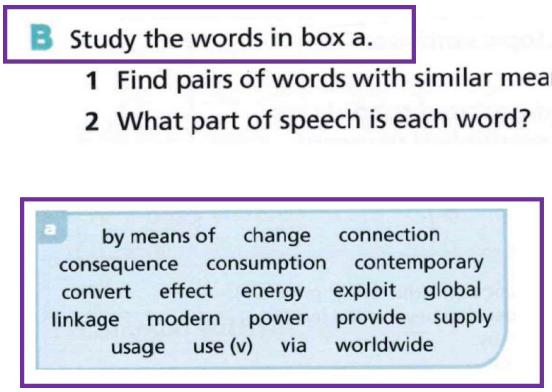


Figure 16: Sub-section 2

As in the previous sample, here the bigger blue letter, B, not only indicates to the student where the particular sub-section of this vocabulary exercise begins but also refers back to the smaller blue textbox that tells the student the type of exercise that will be focused on (again, a vocabulary exercise). Thus, the blue B is mainly an indexical sign since 1) it points to the presence of something else, in this case, it refers back to the smaller blue textbox above, and 2) it also indexes that it refers to the second object in a row of more than one object since B is the second letter of the alphabet. The fact that B comes after A points to the fact that the B "thing," i.e., the exercise, is the second thing in a row. Additionally, here the colour blue is again indexical. The blue letter B, just like the letter A in the previous sub-section, links to the big blue rectangle and the blue textbox for a further indexical connection since it creates an additional reference back to the textbox, which is also blue. The letter B's additional function is symbolic.

The exercise prompt (the sentence – *Study the words in box a*) signals the student to now pay attention to the blue box on page 38 marked *a*. After reading the prompt, the student will now know to look at the blue box of words. The prompt is mainly an indexical sign. The prompt "points" or indicates to the student the specific blue box that goes with exercise B (see below). This illustrates the relationship between the indexical sign, the exercise prompt, and the blue block of words and shows how these separate pieces of information are linked to each other. The prompt's additional function is symbolic.

The blue block (block a - the collection of words) is mainly indexical. It not only helps to direct the student to particular words on the page, but it also creates a boundary around the words, lumping them together. The block helps to show that these particular words should be viewed as a group or a set.

The words in the blue block mainly function as symbolic signs. The second instruction in exercise B asks the student to "pair" the words. The word pairs are synonyms for each other, thus also like translations which makes them symbolic.

From the above analysis of this sub-section of the data sample, it is evident that the main sign functions are indexical and symbolic (see Figure 18 below).

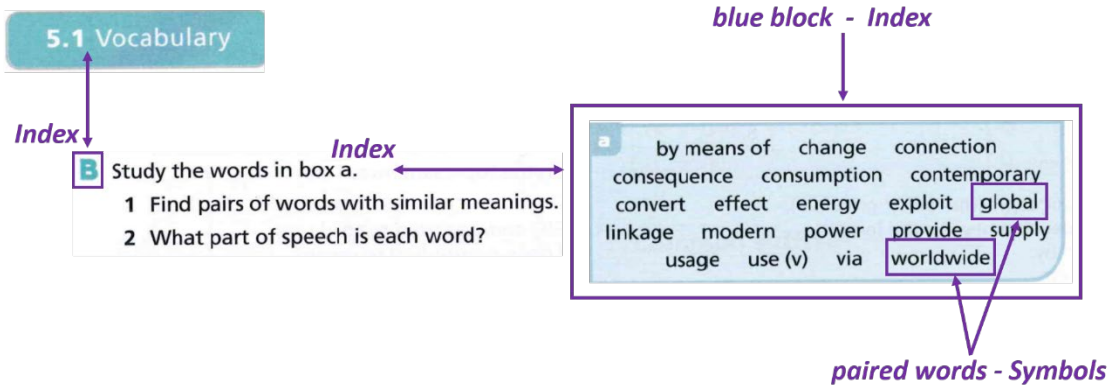
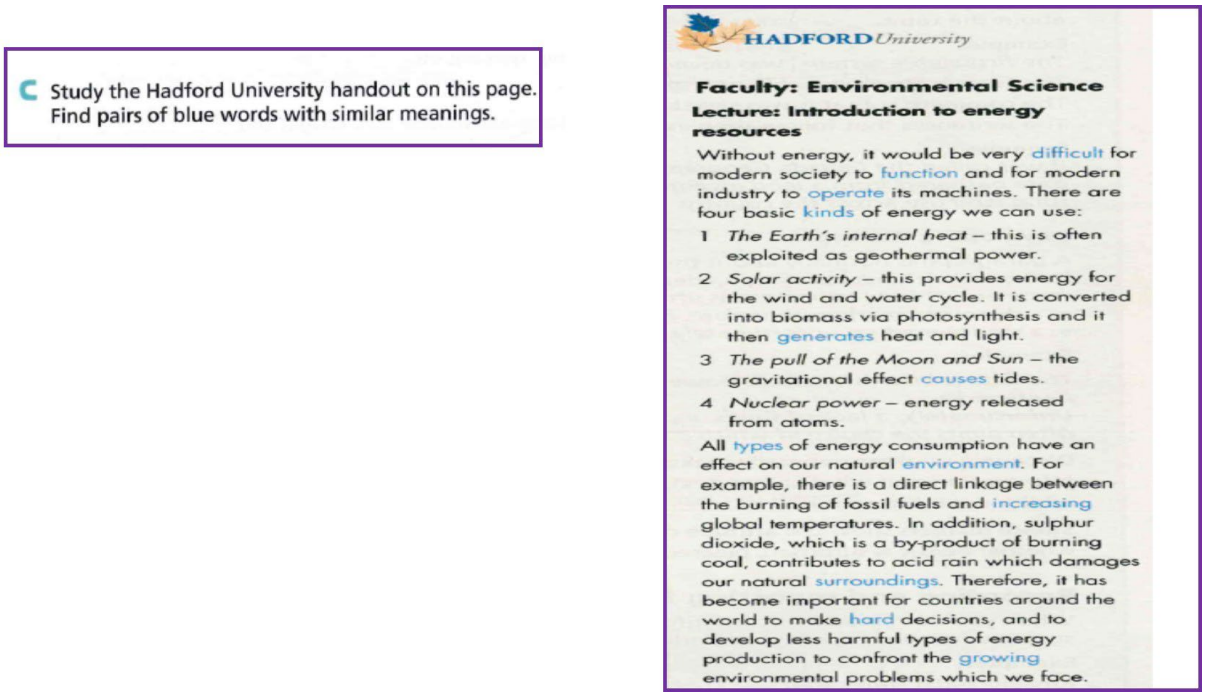


Figure 17: Sign functions present in data sub-section 2

Sub-section 3

The segments of sub-section 3 are marked with purple boxes. The third section, which was studied, is exercise *C* and the brown block of text on the right-hand side of page 38 (Figure 19 below). The exercise prompt was also studied.



C Study the Hadford University handout on this page. Find pairs of blue words with similar meanings.

HADFORD *University*

Faculty: Environmental Science

Lecture: Introduction to energy resources

Without energy, it would be very difficult for modern society to function and for modern industry to operate its machines. There are four basic kinds of energy we can use:

1 *The Earth's internal heat* – this is often exploited as geothermal power.
2 *Solar activity* – this provides energy for the wind and water cycle. It is converted into biomass via photosynthesis and it then generates heat and light.
3 *The pull of the Moon and Sun* – the gravitational effect causes tides.
4 *Nuclear power* – energy released from atoms.

All types of energy consumption have an effect on our natural environment. For example, there is a direct linkage between the burning of fossil fuels and increasing global temperatures. In addition, sulphur dioxide, which is a by-product of burning coal, contributes to acid rain which damages our natural surroundings. Therefore, it has become important for countries around the world to make hard decisions, and to develop less harmful types of energy production to confront the growing environmental problems which we face.

Figure 18: Sub-section 2

Similar to letters A and B from the previous data sample sections, the blue letter, C, indicates where this particular exercise begins and where the previous exercise (B) ends. Also, as in the previous sample, here the bigger blue letter, C, not only indicates to the student where the particular sub-section of this vocabulary exercise begins but also refers back to the smaller blue textbox that tells the student the type of exercise that will be focused on (again, the vocabulary exercise). The blue C is then mainly an indexical sign since 1) it points to the presence of something else, in this case, it refers back to the smaller blue textbox above that which tells the student what type of exercise this is, and 2) it also indexes that it refers to the third object in a row of more than one object. The fact that C comes after A and B points to the fact that the C "thing," i.e., the exercise, is the third thing in a row. The colour (blue) is again indexical, like the previous examples of the letters A and B. The C also additionally functions as a symbolic sign.

The exercise prompt (the sentences – *Study the Hadford University handout on this page* and *Find pairs of blue words with similar meanings*) tells the student to now pay attention to the larger brown box on page 38 titled *Hadford University*. After reading the prompt, the student will know that the brown of the written text on the right-hand side of the page will have the information needed to answer the exercise prompt. The prompt is symbolic but mainly functions as an indexical sign. The prompt "points" the student to the brown box, showing how the box and the exercise prompt are linked. The brown box (page 38, titled *Hadford University*) is indexical. It assists in directing the student to particular text which must be read to complete exercise C. The box furthermore creates a boundary around the text which must be focused on. The box helps to show that this specific text and not anything else on the page should be used to do exercise C.

In addition, in this particular prompt, there is a phrase that narrows down the instruction even more. The prompt talks about *blue words*, asking that a particular focus should be placed on the blue words in the brown box. Thus, the phrase *blue words* within the prompt is another indexical sign indicating where the focus should be in the brown textbox. When looking at the brown box, it is noticeable that some of the words are printed in blue ink. Here again, colour serves as an indexical sign. It links the particular words (printed in blue) to the exercise prompt, showing the student to which words in the text careful attention should be paid.

Looking at this section of the analysed data sample (analysis above), the conclusion is made that the main sign function is indexical (see Figure 20 below).

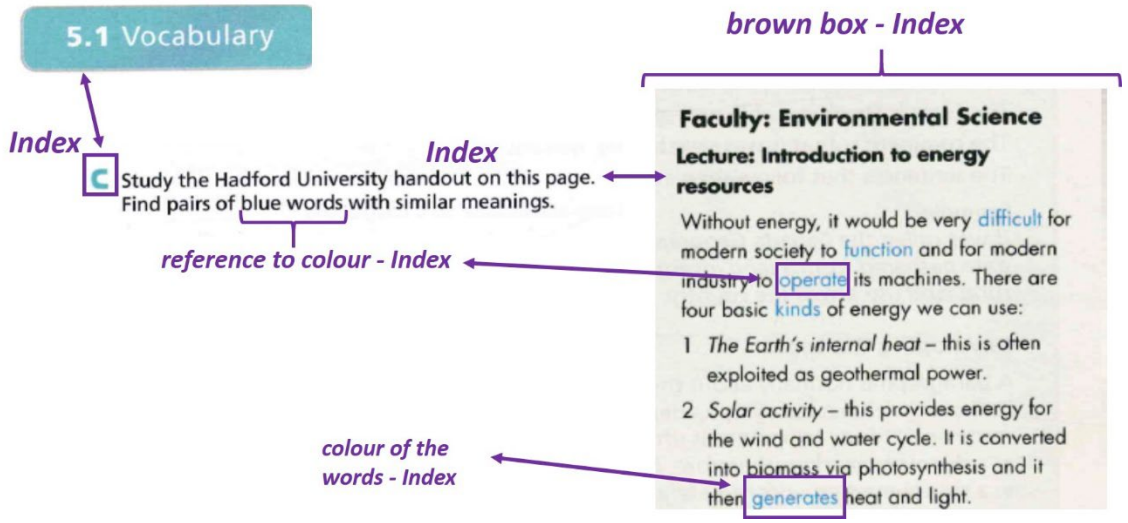


Figure 19: Sign functions present in data sub-section 3

Sub-section 4

The segments sub-section 4 are marked with purple boxes. The last sample section that was looked at is exercise *F* on page 38 and Figure 1 on the bottom of page 39. The exercise prompt was analysed, as well as questions 1 and 2 (see Figure 21 below).

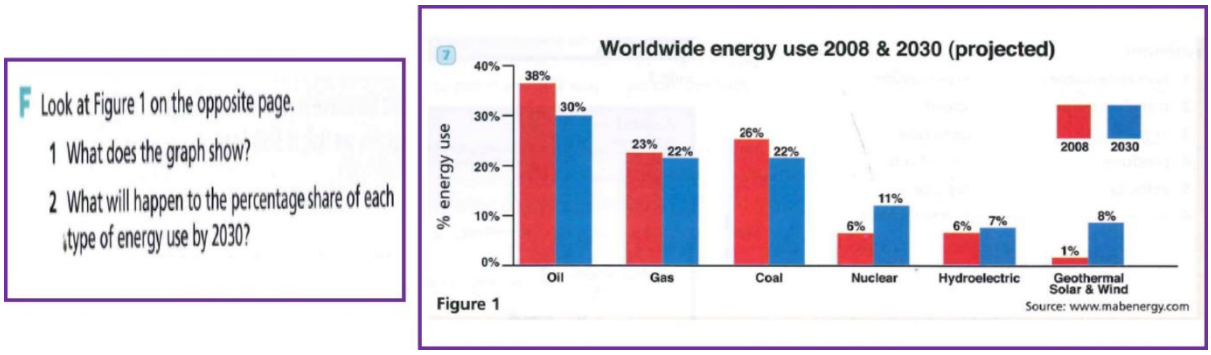


Figure 20: Sub-section 3

The blue letter, F, indicates where this specific sub-section of the vocabulary exercise begins. It also refers back to the smaller blue box at the top of the page to indicate which type of exercise F is, and thus mainly functions as an indexical sign since it points to the presence of something else: the smaller blue textbox above (*5.1 Vocabulary*). It further indicates where the previous exercise (E) ends. Similar to letters A, B and C from the previous data sample sections, the blue letter F indicates where this particular exercise begins and where the previous exercise (E) ends. In a similar way to previous samples, the blue F indicates to the student where the sub-section of this vocabulary exercise begins. It also refers back to the smaller blue textbox, which informs the student that the type of exercise to be focused on here is still a vocabulary exercise. The blue F is thus an indexical sign since 1) it points to the presence of something else, the smaller blue textbox above, and 2) it also indexes that it refers to the sixth object in a row of more than one object. The fact that F follows on A to E points to the fact that the F "thing," i.e., the exercise, is the sixth thing in a row. The colour of the letter F (blue) is again indexical, like with the previous examples of the letters A, B and C. The letter F is also a symbolic sign (additional function).

The exercise prompt (the sentence – *Look at Figure 1 on the opposite page*) tells the student to pay attention to the figure (bar graph) on page 38 titled *Figure 1: Worldwide energy use in 2008 & 2030*. After reading the prompt, the student will now know to focus on the bar graph. The prompt is a symbolic sign, but it mainly functions as an indexical sign. The prompt "points"

the student to the bar graph, therefore showing how the written text and the figure are linked. Furthermore, Question 1 (*What does the graph show?*) and Question 2 (*What will happen to the percentage share of each type of energy use by 2030?*) are both indexical since they direct the student to the red and blue bars of the bar graph (Figure 1) and suggest that these bars on the graph must be studied more closely for information. Although the bar graph is indexical and symbolic, it mainly functions as an iconic sign since it bears a partial similarity to the object it represents. The blue and red bars, which respectively represent the amounts of energy usage of the respective energy resources, are iconic. They are separate representations of the percentages of energy usage for each energy type; the length of the bars indicates the amount of energy used. Thus, there is a relation between the energy usage and the size of the bars on the graph.

The numerical values and the mathematical symbol for percentage (*%*) are mainly symbolic signs. Symbolic signs represent their object through the association of ideas. In the case of symbols, some underlying agreement, habit, law or convention exist, which means that invoking some symbol invokes its associated object. In this case, there is an agreed-upon way in which numerical values and the mathematical symbol (*%*) are "read".

After looking at the analysis of sub-section 4 above, the conclusion is made that the main sign functions in this section of the data sample are indexical, iconic, and symbolic (see Figure 21 below).

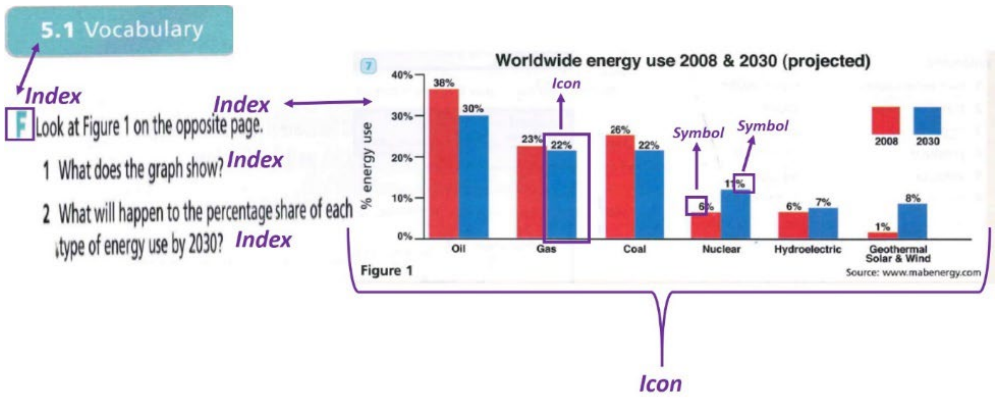


Figure 21: Sign functions present in data sub-section 4

4. What affordances do the semiotic resources and sign types offer (pp. 38 – 39)?

The use of various coloured text and visual imagery helps the student to focus attention on specific parts of the information on these pages. These allow the student to understand which parts of information link together and which subsequently create a whole message. Colour plays an important role in the cohesion of the text. The use of various coloured text and visual imagery helps the student to focus attention on specific parts of information on these pages. It allows the student to understand which parts of the information link together. This subsequently creates a whole message. The fact that blue is repeatedly used not just in the textboxes but also in the text assists in showing how the information in the textboxes and the information under each of the subsequent coloured capital letters (the blue A, B, C etc.) are linked, and how all the information in the subsections relates back to the main heading, and thus the main topic. It also helps with the structure of the text and the scaffolding process because it helps divide the information on the page into smaller pieces that are then processed piece by piece.

Visual imagery allows the student to see similar characteristics between images on the page and the real-life things these images depict. The open spaces on the pages help with the organisation of information as well as creating a boundary of some sort, which again helps with scaffolding since it divides the information into smaller sections. The iconic signs in the data sample give additional information to the student, which the written text by itself would not necessarily have been able to do. This is because additional information in the written text, even if the student could comprehend with perhaps some difficulty, would have made the text too detailed and somewhat lengthy. The photos show the forms of energy. The student can hence connect the pictures (icons) to the written text and, in combination, gain more detailed information, which would not have been possible if only one of the two resources were available. The graph shows the amounts of energy used relative to each other.

The indexical signs help to navigate the content. They guide the student through the content and create a link between the different pieces of content so that the student would be able to see how each separate part connects to form the whole. Similarly, the indexical signs direct a student to take a particular action (*look at……, study the……..)*. To clarify, they assist the student in gaining a better understanding of how to scaffold the content on the page, which is especially helpful within an educational context like the one in which this text is used. Scaffolding helps students with the meaning-making process since it illustrates how smaller

parts connect and form a bigger picture or a more complete meaning. It also helps to show in what order the information on the page should read, so where to start, what to look at next etc.

The symbolic signs help with comprehension and organisation. The numbered instructions under each sub-section of the exercise help the student understand the order the content must be read and completed. The percentage sign (%) and numerical values in the graph give a clear idea of what type of information is worked with. In other words, it helps the student to understand that the graph is about proportions and the comparison thereof.

What is also important here to look at specifically is the potential and constraints of using these various signs in the meaning-making process. Using icons like pictures gives a visual representation of the concept or idea being communicated; in this case – the concept of energy resources via pictures of the infrastructures specific to the particular resources. It gives information that the student may not have. This makes it possible for the student to link a word to a concept and then subsequently to see what the concept represents. Using the pictures of solar panels and the wind turbine to communicate the aforementioned concepts allows the student to get a clear visual of how these different energy infrastructures look since it exactly resembles the said infrastructure. Seeing the resemblances between the actual thing and the concept taught in the book might be more difficult if there were only written descriptions of these and not pictures. Although a written description can be detailed, it may not be helpful if the student is not fluent in English. And, since part of the aim of this textbook is to enable second language English speakers to become more confident and fluent in English, a written description without the visual, no matter how thorough it is, may be more challenging for an ESL learner to comprehend. Although, if the student of this text has no knowledge of energy resources and has not yet seen any of these infrastructures in real life, the picture may still be problematic as a tool of meaning-making. Say the student of this text is a student who has never seen any of these infrastructures in real life. If the text is used in class as a teaching tool, the student will have a teacher or friends that may help him navigate through the pictures and give the student the additional, needed information to make meaning. But say the student is alone, at home, for example, with only the textbook and no other person or tool to help with the meaning-making process, then having only pictures may again become problematic. This brings us to the argument mentioned earlier by Bezemer and Kress (2016); using semiotic

resources in combination to create meaning may give more information. Understanding the potential of visuals and the constraints of this particular semiotic resource has allowed for a better understanding of what the resource is capable of and how it can combine with other resources to facilitate meaning-making.

A similar argument can be made for the graph that is analysed in Exercise F, in sub-section 4. The graph gives a clear visual representation of how much or little each particular energy resource was used, which can be seen very clearly when looking at the graph. To explain this visual representation in written text only would have arguably also been more difficult to comprehend, especially for second language English speakers still mastering the language. Additionally, part of the question in Exercise F is to determine energy usage over a particular period of time. The graph gives two different coloured bars for each energy resource to illustrate the usage over time. The fact that the two bars for each resource on the graph are not the same height or colour visually illustrates how much each energy resource was used. However, this particular visual may be constraining because the student must know how to "read" a graph. Getting information from graphs is only helpful if one understands how to "decipher" the information. Bar graphs are normally used when comparing two or more values or to compare values over a period of time. The data on a bar graph is either displayed vertically or horizontally. If the student of this text does not know this, they would have difficulty finding useful information from the graph. So again, the argument can be made that understanding the constraints and potential of a specific sign will help when that particular sign is chosen to use as a resource in a meaning-making process. And using signs in combination may aid in the meaning-making process.

5. How are the semiotic resources linked into a meaning-making whole (pp. 38 – 39)?

The meaning-making process on these two pages starts at the top of page 38. The topic of the unit is *energy resources.* In this case, resources of energy are the object that will be studied. However, when studying pages 38 and 39, it is clear that the specific part of the object that willbe focused on here will be vocabulary. So here, the concept of energy resources will be represented by focusing on the vocabulary related to this concept. Knowing that it is vocabularyis evident from the types of exercises on page 38. The exercises focus on words only – recognising words, giving meaning to words, pairing words, using particular words fordiscussion etc. Thus, looking at the nature of the

exercises, an understanding has been createdthat vocabulary related to the concept of energy resources will be focused on to construct meaning.

Meaning creation happens through resemiotisation. More than one semiotic resource is used in this process of meaning-making. In this case, it seems like it starts with the written text and then from there, it is re-produced into visual resources. From these visuals, it is re-produced into written text again. The student of the text must be able to connect the visual semiotic resources to the written part of the text. From here, by combing through the two semiotic resources, the student creates further meaning through a subsequent semiotic resource. For example, in exercise A the exercise prompt (written text) directs the student to the pictures on page 39. Thus, the meaning-making process starts with the written text.

The student is directed to the pictures then back to the first instruction. Instruction 1 asks the student to name, i.e., identify the types of energy production represented by the pictures on page 39. As such, the moment the student looks at the pictures and understands that to create meaning (i.e., to answer the instruction), the instruction should link to the pictures, the meaning-making shifts from one semiotic resource to the next. And since these are different semiotic resources that are used in this meaning-making process, resemiotisation occurs. To illustrate further, picture number 6 on page 39 (wind turbines) is a photograph of an actual piece of infrastructure found in a particular place where a specific type of energy is produced. Reading the first instruction and then subsequently studying the picture creates the understanding that the picture (wind turbine) represents a specific type of energy resource (wind power). To createmeaning from the picture, one must understand the relation between the instruction and the picture. Looking at the picture without reading the instruction would make it difficult, or maybe even impossible, to know what specific information one must get from it. It may also be difficult to understand why the picture is in the text if it is looked at without reading the prompt or instruction in exercise A. So, connecting the instruction and prompt in exercise A tothe picture on page 39 gives not only a reason for the presence of the picture as part of the text,but it also, more importantly, explains what precise meaning must be created using the picture.This meaning-making process can be illustrated by Peirce's sign process, Sign 1 below. Answering the instruction, i.e., naming the picture, is the *representamen* in the sign process. The answer - wind turbine – represents or stands in the place of the picture on page

38. The picture (picture number 6) is the *object* in this process because it is represented by the vocabulary learned (the phrase wind turbine) from this exercise. Understanding that there is a relationship between both these semiotic resources, the picture (picture nr 6) and the written semiotic resource (answer to the exercise instruction, the phrase wind turbine) and that both of the resources collectively create the meaning is the *interpretant* of the sign process (see sign process illustrated by Figure 22 below).

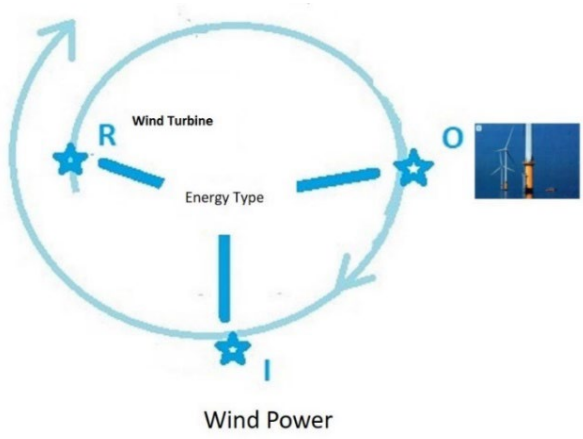


Figure 22: Constructing meaning in a single sign – Energy Type

A similar meaning-making process happens in Exercise F. The bar graph gives specific information about the usage of various energy resources. Each blue and red bar set shows how a particular energy resource is either used more or less over a certain period of time. Students are asked to look at the graph and describe the increase or decrease of usage over a specific period of time. The last set of bars on the graph (Geothermal, Solar & Wind) will be used as an example to illustrate the sign process. The bars of the graph refers to the proportion of worldwide energy coming from each energy source. The blue and red bars are thus the *representamen* sincethey represent the actual usage of said energy resources. The calculation (showing the energy usage for each energy resource) the student makes by studying the bars is the *object* of this meaning-making process. The answer to the calculation is represented on the graph bycomparing the red and blue bars. The understanding that the information given by the bars on the bar graph indicates an increase or decrease in the usage for each energy resource is the *interpretant* in this meaning-making process (See sign process illustrated by Figure 23 below).

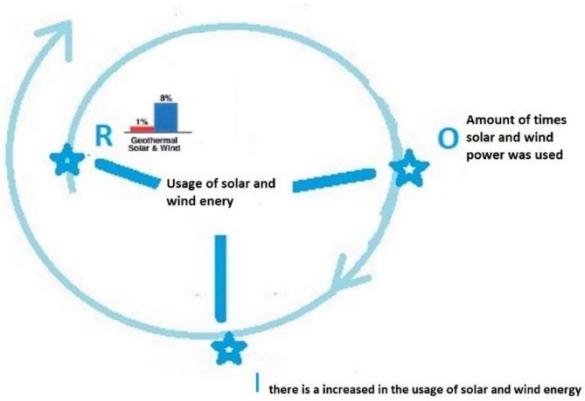


Figure 23: Constructing meaning in a single sign – Energy Usage

Like the meaning-making process with the picture of the wind turbine (described earlier), it is important here to see that if the student only looked at the visual and written semiotic resources as separate entities of meaning, without also looking at them as entities that link, the meaning-making process would theoretically not necessarily have transpired. The graph on its own does give information, but the written instructions in exercise F tell the student the purpose of the information. This clarifies what the information on the bar graph should be used for. The same is true for the written instructions in exercise F. Although the instructions are not difficult to read or understand, if the link between the instructions and the graph is not clear, or if the student does not have the graph to look at, it would be impossible to find answers to the instructions in exercise F.

Besides these singular meaning-making processes illustrated above, another meaning-making process happens in this text; when the single processes are combined into a collective process, that creates greater meaning. Exercise A and the pictures on page 39 will be the first example. Looking at each picture and going through the same process of meaning-making for each of the pictures will ultimately lead to the realization that each picture on page 39 represents the distinct manner in which energy is produced. As such, the conclusion that can be reached is that collectively all the pictures construct one whole concept of meaning – different types of energy resources (see Figure 24 below). Thus, a meaning-making process is achieved by combining the content on page 38 with the content on page 39 with the understanding that the two pages as a whole communicate one message. This is learning more about energy resources through creating vocabulary.

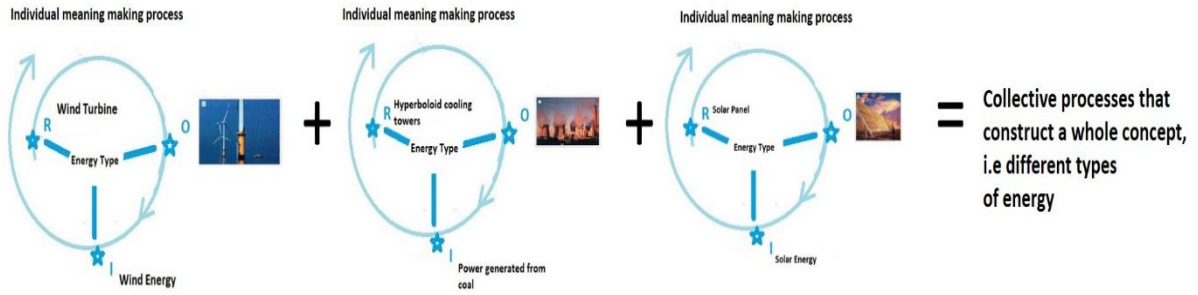


Figure 24: Collective meaning-making from a combination of signs – Energy Types

This is similar to the bar graph on page 39. Studying each set of blue and red bars will ultimately lead to the understanding that the graph shows the projected use of particular energy resources over a specific period of time (2008 and 2030). Since all the bars are in sets on one graph, the student will theoretically realise that the collective meaning made from each individual set of bars on the graph should be looked at as one piece of information – where the ultimate message is that various types of energy resources were used in different amounts to generate energy over a particular period of time (see Figure 25 below).

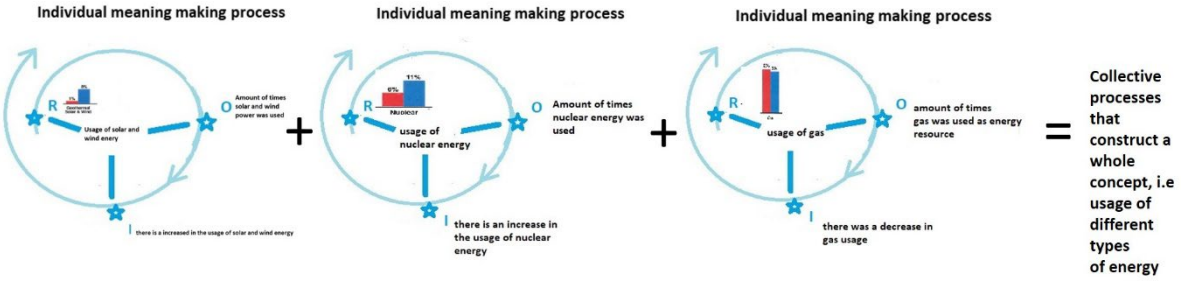


Figure 25: Collective meaning-making from a combination of signs – Energy Usage

Furthermore, for a student to understand that vocabulary will be the primary way in which learning about energy resources will occur on pages 38 and 39, the student will first have to construct meaning from each of the individual exercises on page 38 (exercises A – F). Each exercise is essentially a set of smaller sign processes. These smaller sign processes are separate meaning-making processes that collectively contribute to the construction of the "whole", meaning that one only acquires from looking at all the smaller parts as singular processes working collectively to create the "whole" meaning. Additionally, for a student to understand that vocabulary will be the primary way in which learning about energy resources will take

place on pages 38 and 39, the student will first have to construct meaning from each of the individual exercises. These individual exercises represent the vocabulary the student is supposed to learn in this part of Unit 5. The exercises in the vocabulary section of the text are thus the *representamen* in the meaning-making process. The newly learned vocabulary is the *object* of this sign process since it is represented by the exercises in this part of Unit 5. Seeing the relation between the exercises and the newly learned vocabulary and further understanding that the vocabulary is used to learn more about energy resources is the *interpretant* of this sign process. This can be illustrated by the sign process below (Figure 26).

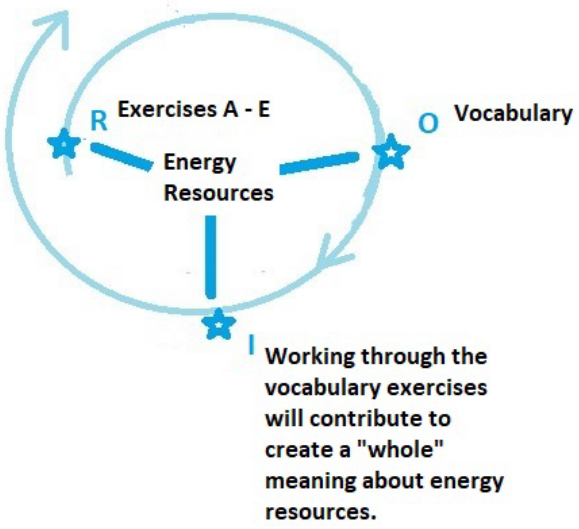


Figure 26: Constructing “whole” meaning from vocabulary exercises

Additionally, after constructing meaning from the graph, a student will see that exercise A allowed learning about types of energy resources. In contrast, exercise F allowed learning about the usage of these energy types. Therefore, separately these two exercises focused on a particular section of information about the main idea (energy resources); however, as a collective, both exercises construct an even more extensive meaning of energy resources (see Figure 27 of the meaning-making process below).

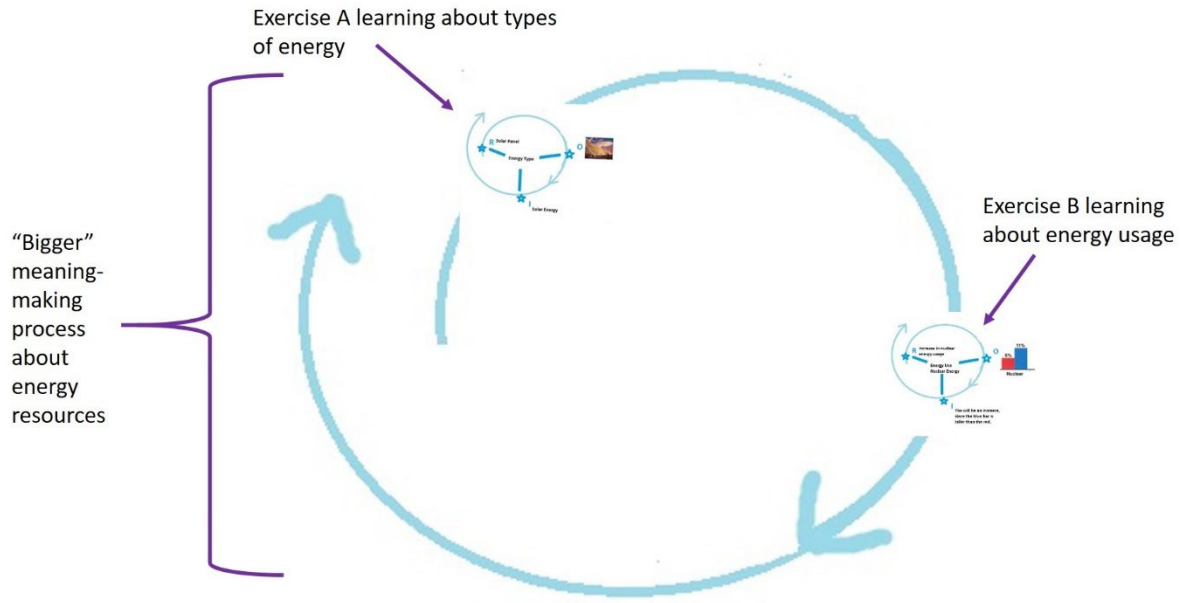


Figure 27: Collective construction of meaning-making – Energy Types and Energy Usage

Conclusion of Vocabulary Section

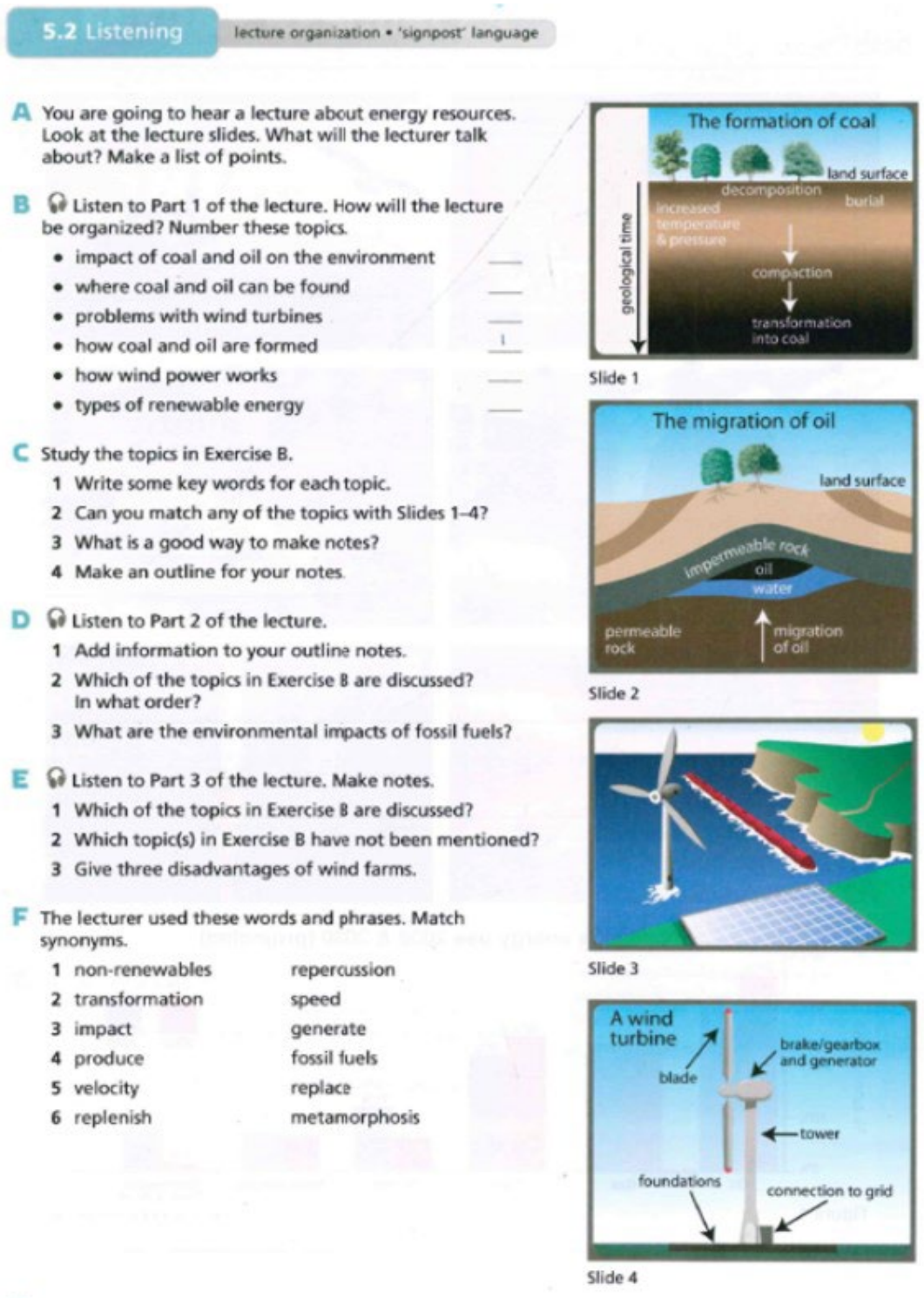
The texts are all in English; thus, students (in this case, students in the English literacy classes at the University of the Free State) who use this textbook also get the opportunity to practise using English as a medium of instruction to construct meaning. They are required to write, read, and speak English while working through the exercises on page 38. Since English is the primary medium of instruction at the tertiary institute they attend, these types of exercises allow them to practise extracting main ideas and key details from an academic text; expressing information and opinions clearly in a written mode; and critically thinking about how to analyse, evaluate and apply to meaning they made from the exercises. These are skills specifically listed as outcomes of the Academic Literacy class in which these textbooks are used.

Using various semiotic resources, the multimodal text constructs meaning through vocabulary, which communicates an understanding of the concept of energy resources. On pages 38 and 39, the primary tool for meaning construction is vocabulary. With each exercise, a student is expected to use the vocabulary learned to further engage with the concept of energy resources. By using a multimodal text, students are exposed to various modes, creating a learning process

which according to the educational theory of multiliteracies, is more successful. In addition to this, the various semiotic resources used in this multimodal text illustrates meaning-making through resemiotisation. The meaning that is made from one semiotic resource is resemiotised and used to produce a subsequent semiotic resource that carries the meaning forward. The small singular meaning-making processes that gradually connect to form a greater meaning-making process is indicative of a scaffolding process. In an education context, this teaching methodology refers to an assortment of instructional techniques that a teacher uses to move progressively towards better understanding and, ultimately, independence in the learning process. With scaffolding, concepts are broken up into smaller parts or sections, which in theory makes for an easier learning process. Looking at this text and starting the meaning-making process with singular resources first and then connecting the resources to create a bigger meaning mimics the scaffolding process, which also plays a part in getting the student of the text to see that each semiotic resource has a particular place and plays a particular role in the meaning-making process.

5.2.2 Data Sample: Listening Section

The next data sample in the analysis was the listening section (see Figure 28 below), which can be found on page 40 in the textbook.



5.2 Listening lecture organization • 'signpost' language

A You are going to hear a lecture about energy resources. Look at the lecture slides. What will the lecturer talk about? Make a list of points.

B Listen to Part 1 of the lecture. How will the lecture be organized? Number these topics.

- impact of coal and oil on the environment ___
- where coal and oil can be found ___
- problems with wind turbines ___
- how coal and oil are formed 1
- how wind power works ___
- types of renewable energy ___

C Study the topics in Exercise B.

1 Write some key words for each topic.
2 Can you match any of the topics with Slides 1–4?
3 What is a good way to make notes?
4 Make an outline for your notes.

D Listen to Part 2 of the lecture.

1 Add information to your outline notes.
2 Which of the topics in Exercise B are discussed? In what order?
3 What are the environmental impacts of fossil fuels?

E Listen to Part 3 of the lecture. Make notes.

1 Which of the topics in Exercise B are discussed?
2 Which topic(s) in Exercise B have not been mentioned?
3 Give three disadvantages of wind farms.

F The lecturer used these words and phrases. Match synonyms.

1 non-renewables	repercussion
2 transformation	speed
3 impact	generate
4 produce	fossil fuels
5 velocity	replace
6 replenish	metamorphosis

Slide 1

Slide 2

Slide 3

Slide 4

40

Figure 28: Listening Section

Exercise *5.2* (on page 40) follows exercise *5.1,* and while *5.1* focuses on vocabulary, exercise *5.2* is a listening exercise. The main aim of this exercise is still to give the student a clear understanding of what is meant by the concept of *energy resources*. However, in this exercise, instead of focusing on vocabulary, students will have to listen to audio in which the concept of *energy resources* is discussed.

Listening is assuming greater importance in language classrooms, with several reasons for the skill's growing demand. Second language acquisition research has given a significant boost to listening. As Rost (1994) points out, listening is crucial since it provides auditory input for the learner. Without understanding information at the correct level, learning cannot start. Listening is thus a fundamental skill to master and directly influences the success of learning to speak a language. While aural input takes place, students are able to interact using spoken communication, which strengthens the speaking skill in turn.

In addition to this, learning to listen improves language ability (Renukadevi, 2014). The intonation, rhythm, sound,and stress of a language can only be shaped through listening and speaking. To understand nuance in language, one must be able to listen. In terms of communicative language teaching, it is often argued that the basis for communicative competence lies in the skill of listening. Consequently, listening forms the concrete basis for complete language proficiency (Yildirim & Yildirim, 2016). Masteringthe aforementioned skill is especially important in the Academic Literacy course, in which thistextbook was used since one of the outcomes of this course is listening and note-taking. If students struggle to listen, content-specific assignments will be challenging. Teaching the skillof listening while allowing students to broaden their subject-specific vocabulary is one of the cornerstones of ESL, where language (in this case, English) is used appropriately for study. The fact that the text is multimodal emphasises the multiliteracies' concept that understandinginformation becomes easier and more successful if the meaning is made through various modes.

1. **What are the semiotic resources used for meaning-making?**

Pages 40 consists of a combination of written text (language), numbers and images, which vary in colour. The top portion of page 40 is a smallish blue block with white lettering, and adjacent to it is a smaller grey textbox with black lettering. The body area of page 40 is predominantly

white and covered with black and some blue written text. Some of the text has a small black illustration of headphones next to it. Important to note here the headphones are an important illustration in the context of this section of the text since this section focuses on auditory information. On the right-hand side of page 40, there are four coloured illustrations. Between the illustrations and the written text on page 40, there is white space (open, blank spaces).

Some written text on page 40 is printed in bold. On page 40, there are a few places where the text and numbers are bold. The numbers under each exercise are bold. The written text and numbers on page 40 differ in font size. Most of the written text on page 40 seems to be similar in size. However, the written text in the smallish blue box at the top is slightly bigger than the rest of the written text on the page, whereas the text in the smaller grey textbox near the top of the page is somewhat smaller than the rest of the text on the page. On the other hand, the blue letters (A – E) that indicate the sub-sections of content on this page are larger than the rest of the text.

2. **In which material modalities do these semiotic resources partake?**

The content is presented on two A4 pages. The pages are three-dimensional since they can be measured in width, length and height. The pages form part of a comprehensive ESAP textbook. At first glance, the page appears glossy and "sleek", and it is easy to handle. The page is a bit frayed around the edges, and it has some minor creases in one or two corners. On closer inspection, the pamphlet stitching on the inside of the book's spine is slightly visible; it is still intact and keeps the page in place. Additionally, it makes it easy to turn the pages. The content on the page is printed in ink. Someparts of the page have no printed content, and on some of these spaces, there are notes and marks made with pen and/or pencil.

Together with the printed content on this page, the textbook, there is also a Compact Disc (CD), a moulded plastic disc that contains digital data. A picture of this CD is attached in ADDENDUM A. The data is scanned onto the disk by a laser beam. The top part of this particular CD is predominantly pink coloured. The mirror band, stacking ring and plastic hub are visible, but all of this is also slightly pink to blend in with the rest of the pink top of the CD. The lettering on the top of the CD is pink, black, and white. This gives information in terms of the content that can be found on this particular disc. In this case, it states the name of

the textbook (*English for Environmental Science in Higher Education Studies*) and the specific section of the textbook that this disc will be used with (*Units 1,3,5,7 Tracks 1.1 – 1.37*). The back of the CD has no colour or written text. The mirror band, stacking ring and plastic hub are again visible when looking at the back, but one can also see the main printable area of the disc. The printable area is aluminium coated with plastic. This contains the data that a CD student reads; the disk is thus the medium through which the audio recordings will be accessed.

3. With what logic do the signs, icon, index, or symbol function?

Before analysing the various signs present in this section, I would like to reiterate again that even though a meaning overlap is inherent to this sign system, as stated earlier, the descriptions and analyses are from my point of view. I will identify *main function(s)* and *additional function(s)* based on the context (educational) in which this text is used and the scaffolding process (as discussed earlier in chapter 4). However, as I also stated earlier, other interpretations are possible.

In this data sample, the written text's (language – English) main function is indexical. The text is categorised as indexical since some parts of the language in the text are used to guide or point the student to a particular piece of information. The written text hence acts as direct instructions, cues, prompts and hints (Hartman, 2002). This is all part of the scaffolding process, which aids in the meaning-making process and allows students to complete tasks and achieve outcomes and goals. The additional function of the written text is symbolic since all language is symbolic.

The main function of the illustrations is indexical and additionally function as iconic; the numbers and audio recordings both are indexical (main function) and symbolic (additional function). In the rest of this section, the data will be broken down into smaller sub-sections of samples to highlight and discuss examples of each of the aforementioned signs. Please note that even though this section of the chapter is focused on listening as part of the meaning-making process, not all of the exercises on the page make use of a listening component. The listening sections will be analysed and discussed first. After that, the exercises which have no listening component will briefly be looked at as well. This provides a better explanation of the meaning-making process as a whole.

Sub-section 5

The segments of this sub-section that was analysed are marked with purple boxes.

The first sub-section of the listening exercises to be studied are exercise *B* on page 40 (see Figure 29 below). The exercise prompt was studied. Since the actual audio recording is not available online and cannot be added to this research, the transcript of the audio recordingis included. However, please keep in mind that the actual audio recording is used as a semiotic resource in the meaning-making process. The transcript is added only for clarification.

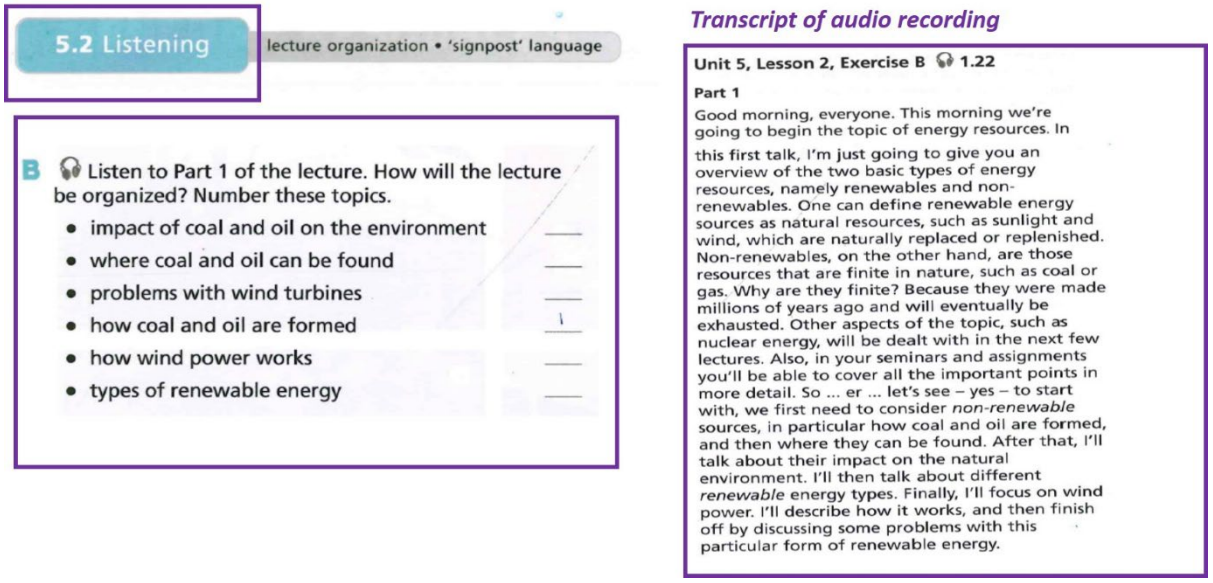


Figure 29: Sub-section 4

The bigger blue letter, B, not only indicates to the student where this particular sub-section of this listening exercise begins but also refers back to the smaller blue textbox that tells the student the type of exercise that will be focused on (again, a listening exercise). The blue B thus mainly functions as an indexical sign since it points to the presence of something else; it refers back to the smaller blue block above (*5.2 Listening*). The colour of the letter B is a further indexical sign since it creates an additional reference back to the textbox, which is also blue. So here, the colour is used as an indexical tool to indicate how the different parts of this exercise connect to one another. The letter B's additional function is symbolic. Next to the B is an illustration of headphones. The main function of the illustration is indexical since it points to the audio track. It makes the student aware that here, there will also be a listening component to this exercise. The additional function of the headphone illustration is iconic. Directly after

the illustration of the headphones, one finds the prompt of the exercise. The prompt tells the student that to do the exercise, they will have to make notes while listening to an audio component (see above for transcript Unit 5 Lesson 2 Exercise B 1.22 Part 1). Also, the prompt mainly functions as an indexical sign since it "points" the student to the audio recording played off the CD. To be exact, the sentence, the indexical sign, links the written material to the audio material on the CD, both of which the student needs in order to complete this exercise. The prompt's additional function is symbolic. The prompt guides the student to respond in a particular way. It asks the student to make a list, thus creating meaning with written text again. The audio the student will have to listen to mainly functions as an indexical sign since it serves as a cue and/or a hint that directs the student back to specific information in the text. The additional function for the audio is symbolic. In the first data sample, there was an example of written information resemiotised into visual information. In this section, we have aural information, which is resemiotised to written information. While listening to the audio, the student must attain information, make meaning from the aural information and then link the aural information back to written information in the text.

From the above analysis of this sub-section of the data sample, it was evident that the main sign function was indexical (see Figure 30 below).

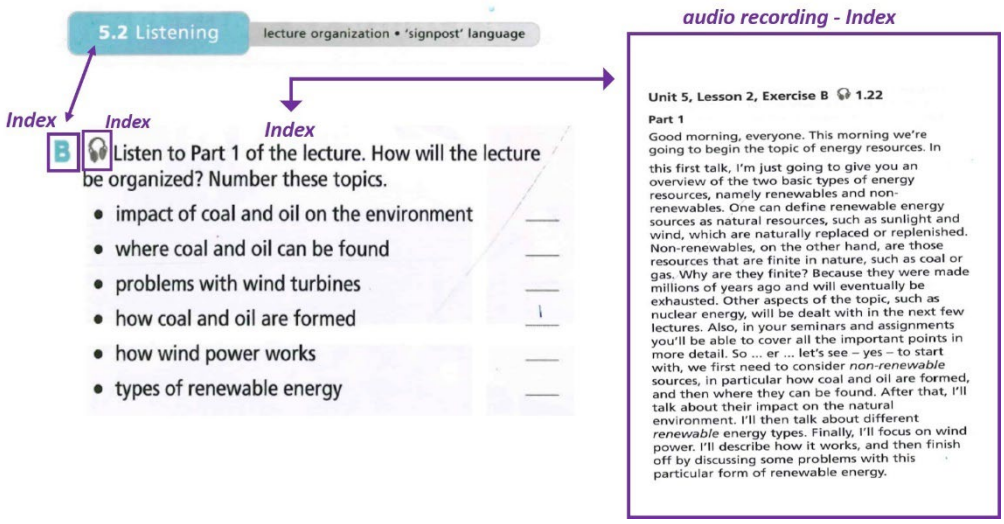


Figure 30: Sign functions present in data sub-section 5

Sub-section 6

The segments of this sub-section that was analysed are marked with purple boxes.

The next section, that was studied, is exercise *D* (see Figure 31 below), also on page 40. The exercise prompt and instruction number 2 was analysed. The transcript of the audio recording is included again.

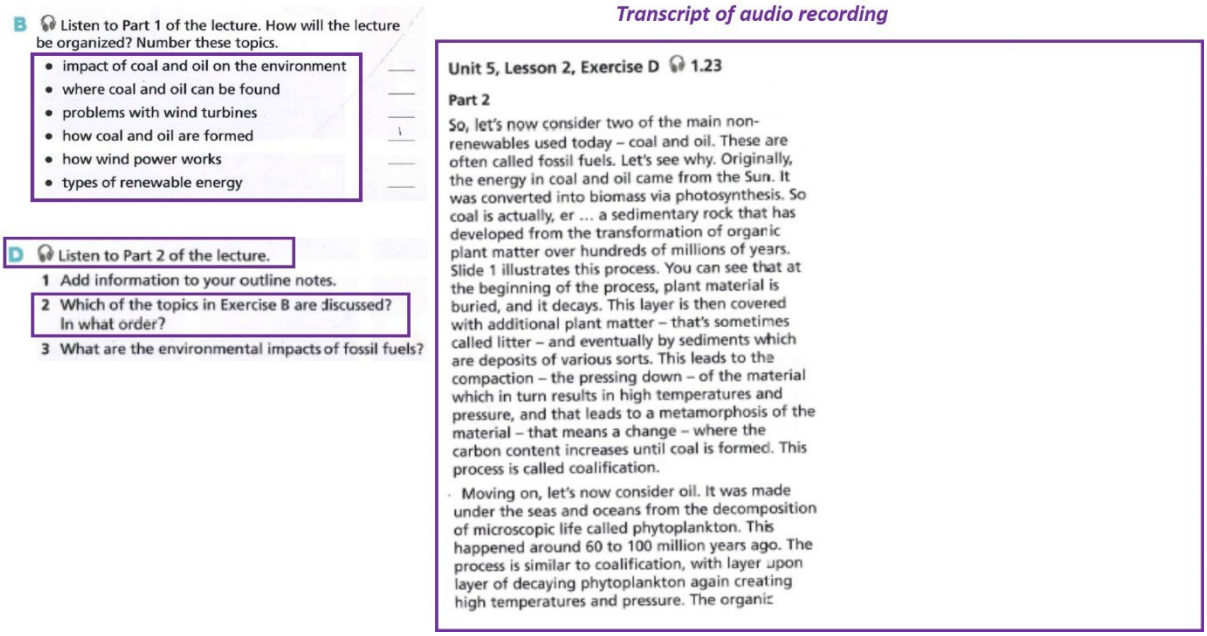


Figure 31: Sub-section 5

The bigger blue letter, D, not only indicates to the student where this particular sub-section of the listening exercise begins, but it also refers back to the smaller blue textbox instructing the student as to the type of exercise (again, a listening exercise). The blue D's main function is thus indexical since it points to the presence of something else; it refers back to the smaller blue textbox above (*5.2 Listening*). The D's colour is a further indexical sign since it creates an additional reference back to the textbox, which is also blue. The additional function of the D is symbolic. Next to the D is an illustration of headphones. The illustration is mainly indexical since it points to the audio track. It makes the student aware that here, there will be some listening involved. The additional function of the illustration is iconic.

Directly after the illustration of the headphones, one finds the prompt of the exercise. The prompt instructs the student that in order to do the exercise, they will have to make notes while listening to an audio component (see above for transcript Unit 5 Lesson 2 Exercise D 1.23

Part 2). The prompt's main function is as an indexical sign. The prompt directs the student to the audio recording, which will be played from the CD. In other words, the sentence, the indexical sign, links the written material to the audio material on the CD. Both of these are needed by the student in order to complete this exercise. The prompt's additional function is symbolic. The audio the student will have to listen to functions as symbolic, but the main function of the audio is indexical. The audio directs the student back to the exercise instructions, and in this case, instruction number 2 will be focused on specifically. Instruction number 2 (*Which of the topics in Exercise B are discussed? In what order?*) asks the student to do two things. Firstly, to go back to exercise B and look at the list of topics while listening to the audio recording to identify which of the topics in B are mentioned in the audio recording. Then it asks the student to write down these topics in the order in which they are mentioned in the audio recording. The instruction is thus mainly an indexical sign since it points the student not only to the audio recording but also back to exercise B. The additional function of instruction number 2 is symbolic.

After looking at the analysis of sub-section 6 above, I concluded that the main signfunction in this section of the data sample was indexical (see Figure 32 below).

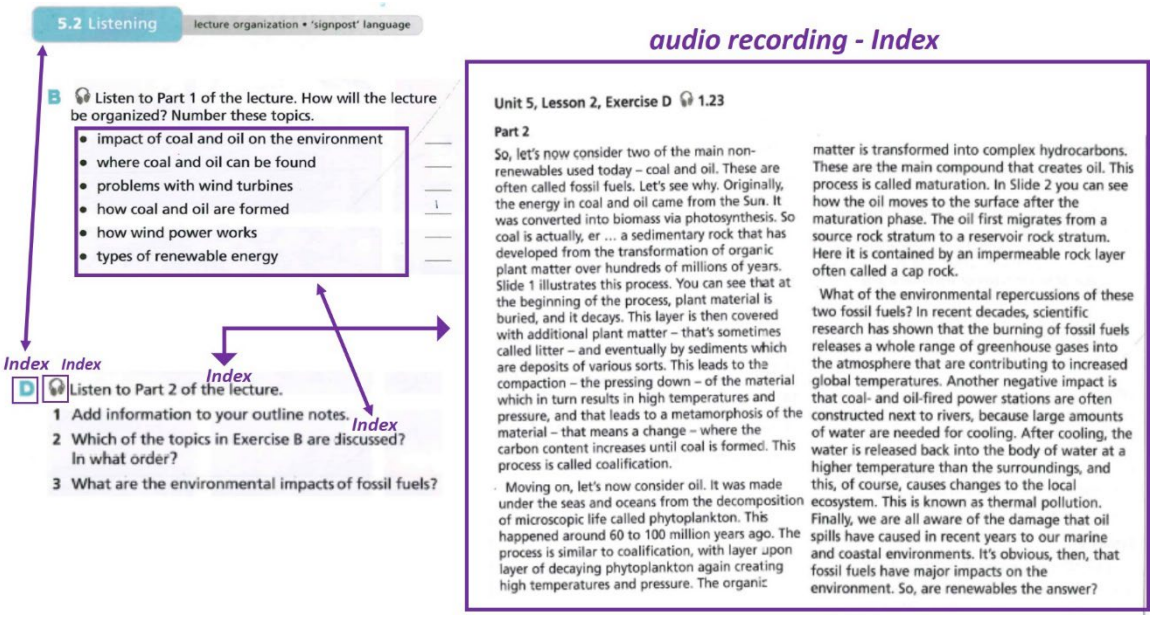


Figure 32: Illustration 1: Sign functions present in data sub-section 6

Sub-section 7

The segments of sub-section 7 are marked with purple boxes.

The next data section that was analysed was exercise E, page 40 (see Figure 33 below). The exercise prompt and exercise instruction number 2 was studied. The transcript of the audio recording is included.

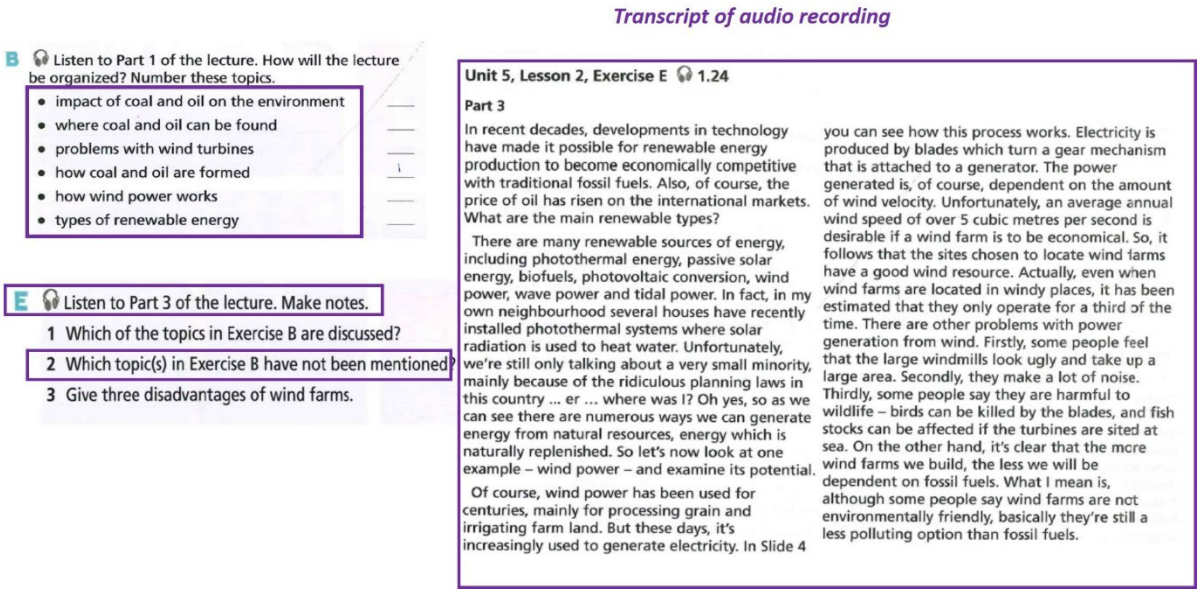


Figure 33: Sub-section 6

As previously stated, here, the bigger blue letter, E, not only indicates to the student where this particular sub-section of this listening exercise begins but also refers back to the smaller blue textbox that lets the student know the type of exercise which will be focused on (again, a listening exercise). Thus, the blue E is mainly an indexical sign because it points to the presence of something else; it refers back to the smaller blue block above (*5.2 Listening*). The E's colour is a further indexical sign since it creates an additional reference back to the textbox, which is also blue. The additional function of the E is symbolic. Next to the E is an illustration of headphones. The illustration's main function is indexical since it directs the student to the audio track. It makes the student aware that here, some listening activities will be involved. The additional function of the illustration is symbolic.

Directly after the illustration of the headphones, one finds the prompt of the exercise. The prompt tells the student that in order to do the exercise, they will have to make notes while listening to an audio component (see above for transcript Unit 5 Lesson 2 Exercise E 1.24).

The prompt is an indexical sign which "points" the student to the audio recording to be played from the CD. The main function of the prompt is indexical. It directs the student from the text to the audio, hence linking the written material and the audio material on the CD, both of which the student needs to complete this exercise. The additional function of the prompt is symbolic. The audio recording is an indexical sign as it points the student back to the prompt and guides the student's response in a very specific way; it asks the student to make a list, thuscreating meaning with words. Instruction number 2 (*2. Which topic(s) in Exercise B have not been mentioned*) asks the student to go back to exercise B while listening to the audio recording.After this, the student has to do a comparison of the topics mentioned in the audio recording and the topics listed in exercise B to see which ones are not mentioned again. The instruction is an indexical sign. It points the student back to the content of exercise B, which they need to complete in the meaning-making process. The instruction's additional function is symbolic.

From the analysis of sub-section 7 (above) of the data sample, the conclusion made was that the main sign function was indexical (see Figure 34 below).

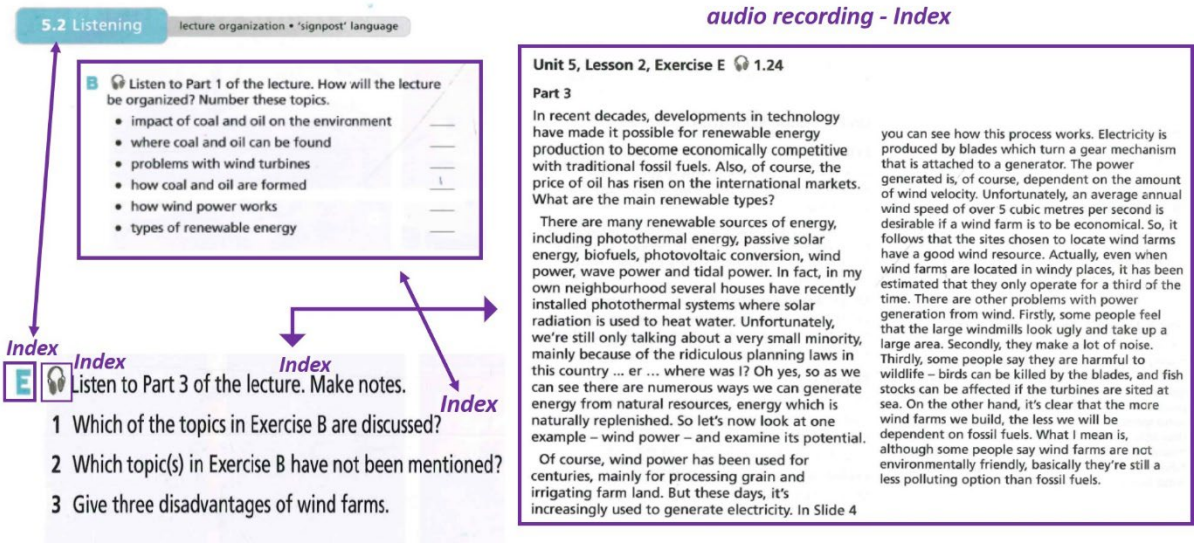


Figure 34: Sign functions present in data sub-section 7

Sub-section 8

The segments of sub-section 8 w are marked with purple boxes.

Exercise *A* and the four slides on the right-hand side of page 40 (Figure 35) is the next section that was studied. In exercise A, the exercise prompt and two slides was analysed.

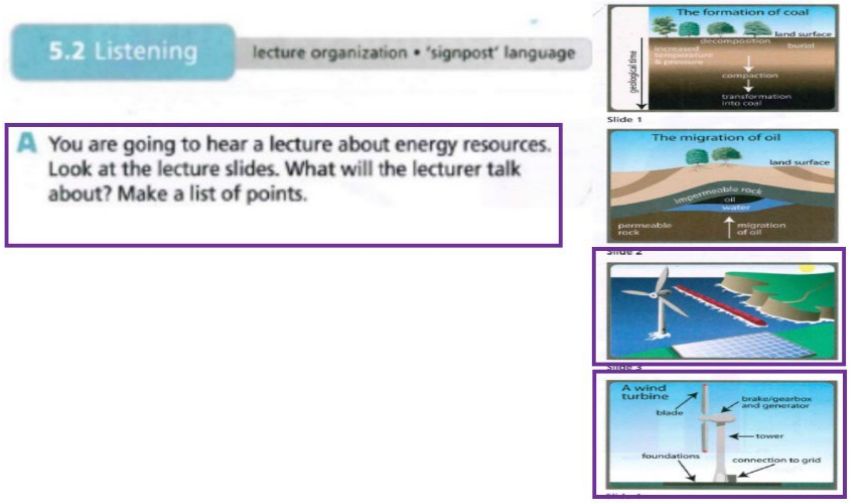


Figure 35: Sub-section 7

The blue letter, A, indicates to the student that this is where the first sub-section of the listening exercise begins. The blue A is thus mainly an indexical sign since it points to the presence of something else; in this case, it refers back to the smaller blue textbox (5.2 Listening) above the blue A. Further, the colour of the letter A is an indexical sign because it creates an additional reference back to the textbox, which is also blue. The additional function of the A is symbolic. The exercise prompt's main function is indexical (the sentence -*You are going to hear a lecture about energy resources. Look at the lecture slides. What will the lecturer talk about? Make a list of points.*). It signals that the student needs to now study the slides on the right-hand side of the page. The additional function of the prompt is symbolic.

The slides on page 40 are numbered from 1 to 4. It seems like each slide is a depiction of the infrastructure of processes related to energy. Each slide is a drawing of a concept or process that relates to energy resources. The student will thus have to study each slide and see if the information depicted in each slide gives more information about energy resources. As examples, Slides 3 and 4 will be discussed. Both slides 3 and 4's main function is iconic since it resembles something else. Both slides have specific properties in common with their object.

In this case, both slides resemble a wind turbine. There is thus a likeness between the object in the picture and the real object. The additional function of the slides is indexical.

However, here both pictures also function as indexical signs. They give the student a cue or hint as to how these types of infrastructure look in the real world. This activates the student's background knowledge and, therefore, subsequently directs the student to something else, in this case, the actual piece of infrastructure. Additionally, suppose there is no background knowledge yet; in that case, the fact that there is a relationship or link between the verbal and the visual in the text will theoretically facilitate the learning process, which will lead to establishing the knowledge. Furthermore, the additional function of the images is symbolic.

This section of the analysed data sample (analysis above) concludes that the main sign functions were indexical and iconic (see Figure 36 below).

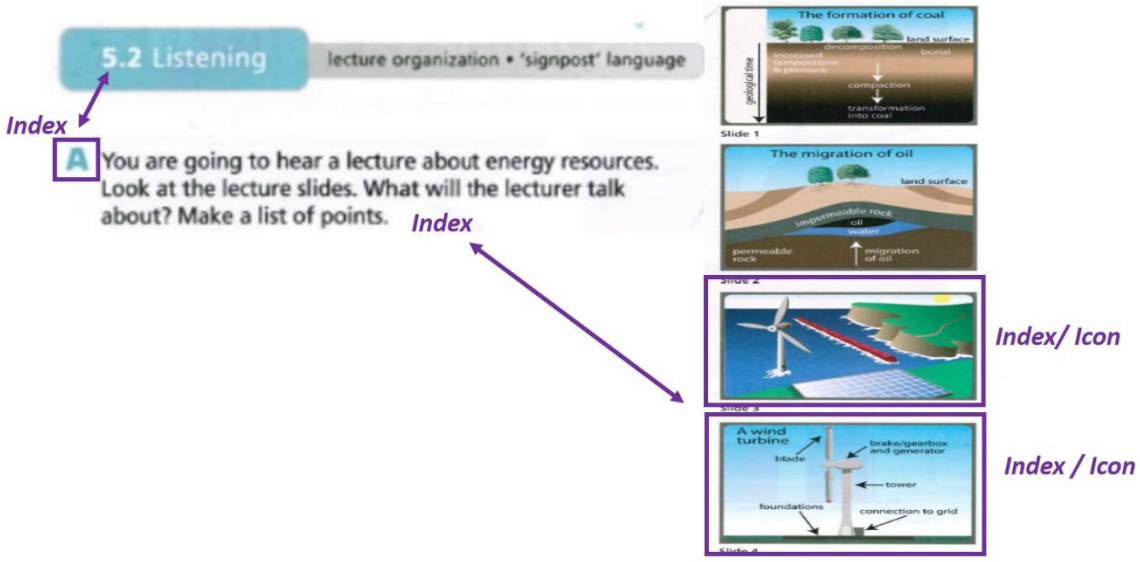


Figure 36: Sign functions present in data sub-section 8

Sub-section 9

The segments of sub-section 9 are marked with purple boxes.

The next data sample section that was looked at is exercise *C* on page 40 and the slides on the right-hand side of page 40 (see Figure 37 below). The exercise prompt and instruction number 2 was analysed.

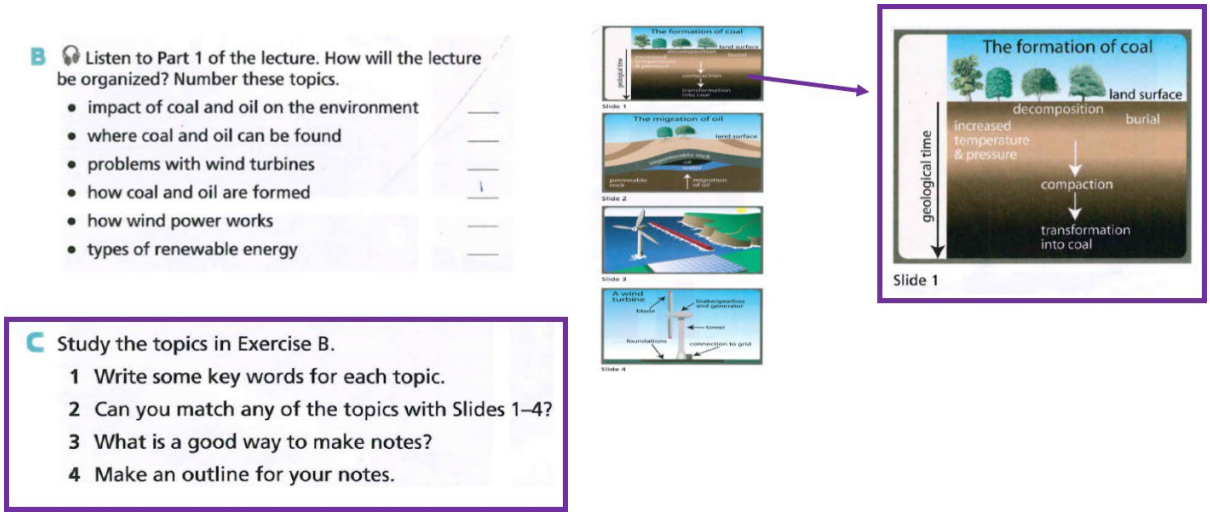


Figure 37: Sub-section 8

Similar to the previous data sample sections, the blue letter, C, indicates where this particular exercise begins and where the previous exercise (B) ends. Additionally, just like A and B, it also refers back to the blue block above, which tells the student what type of exercise C is. This shows that C mainly functions as an indexical sign. It is also blue, so the letter's colour is again an indexical sign like in the previous examples. The additional function of C is symbolic. The exercise prompt (the sentence – *Study the topics in exercise B*) tells the student to go back to exercise B. After reading the prompt, the student will know to again look at the topics listed in exercise B. The prompt mainly functions as an indexical sign. The prompt "points" the student to the list of topics listed in the previous exercise. In other words, the sentence, the indexical sign, links the written material to the photographic material on the next page. The additional function of the prompt is symbolic.

Instruction number 2 (*2. Can you match any of the topics with Slides 1 – 4?*) asks the student to look at each slide on page 40, and from the information gained from the slides, they need to be able to connect the topics listed in exercise B to the slides on the right-hand side of the page. The instruction points to topics listed in exercise B as well as the slides on page 40. This main function of the instruction is thus indexical. The additional function of the instruction is symbolic.

The slides on page 40 are numbered from 1 to 4. It seems like each slide is a depiction of the infrastructure of processes related to energy. Slide 1 will be looked at as an example. The slide mainly functions as an indexical sign since it refers to something else, in this case, the process of coal formation. The additional function of the slide is iconic.

To do the exercise and create meaning from it, the student will thus have to understand that the written text (exercise prompt) is linked to the illustrations (Slides 1 – 4) on the right-hand side of the page. Understanding that the instruction in exercise C 2 *(Can you match any of the topics with Slides 1 – 4?)* links to the slides on the right-hand side of the page shows how the indexical sign (the written instruction) links to the illustrations (the indexical/symbolic signs) on the page. When a student then, for example, looks at Slide 1, they will see that the slide illustrates the formation of coal. Going back to the topics in Exercise B, the student will notice that topic number 4 is *how coal is formed.* The student will then be able to link Slide 1 to topic number 4. This shows how the indexical sign (exercise instruction) links to the visual resource on the page.

Looking at the analysis of sub-section 9 above, the main function in this section of the data was indexical (see Figure 38 below).

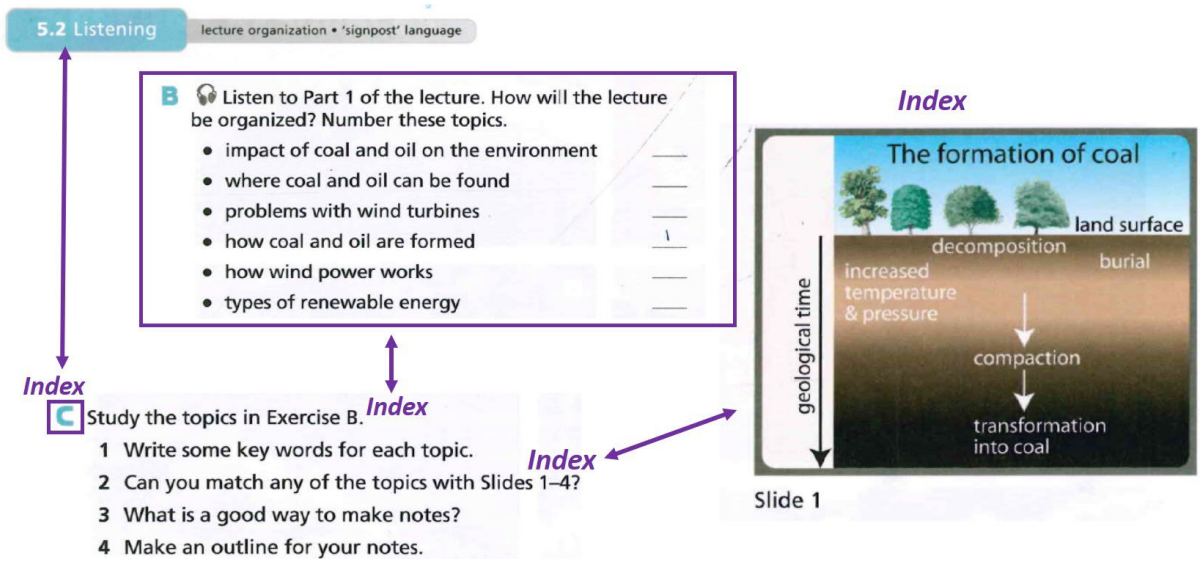


Figure 38: Sign functions present in data sub-section 9

4. What affordances do the semiotic resources and sign types offer?

The use of various coloured text and visual imagery helps the student to focus attention on specific parts of the information on these pages. It allows the student to understand which parts of information link together. Subsequently, this creates a whole message. Colour plays an important role in the cohesion of the text. The use of a variety of coloured text and visual imagery assists the student in focusing attention on specific parts of the information on these pages. It allows the student to understand which parts of the information link together, which subsequently creates a whole message. The fact that blue is repeatedly used as a colour in the textboxes and in the text shows how information in the textboxes and information under each of the subsequent coloured capital letters (the blue A, B, C etc.) are linked. It also helps with the structure of the text and the scaffolding process.

The visual imagery allows the student to grasp the similarities between the images on the page and the things these images represent in real life. Furthermore, the data sample's visuals give the student additional information that the written text by itself not necessarily would have been able to. Hence, the student can connect the pictures to the written text and, in combination, gain more detailed information; this would not have been possible if only one of the two resources were available.

The indexical signs help to navigate the content. These guide the student through the content and create a link between different pieces of content so that the student would be able to see how each separate part connects to form a whole. Also, the indexical signs direct a student to take a particular action (*listen to……, study the…….)*. Specifically, they assist the student in better understanding how to scaffold the content on the page, which is especially helpful within an educational context like the one in which this particular text is used. Scaffolding helps students with the meaning-making process because it illustrates how smaller parts connect and form the bigger picture or a more complete meaning. In addition, it helps to show in what order the information on the page should be looked at, so where to start, what to look at next, etc.

The audio recordings on the CD allow the student to get a real-life representation of the English language. They allow the student to hear how the language sounds and give them an example

that they can use as a model to practise their pronunciation and intonation of the language. The audio allows for interaction with the language, which the written text is unable to do.

What is also important here to look at specifically is the potential and constraints of using these various signs in the meaning-making process.

Using visual semiotic resources like pictures gives a visual representation of the concept or idea being communicated – in this case, the concept of energy resources via the pictures of the infrastructure specific to the particular resources. For example, using the pictures of the wind turbine to communicate the aforementioned concepts allows the student to get a clear visual of what this energy infrastructure looks like because it resembles said infrastructure. Seeing the resemblances between the actual thing and the concept taught in the book might be more difficult if there were only written descriptions, in English, of these and not pictures. Although a written description can be detailed, it may not be helpful if the student is not fluent in English. And since part of the aim of this textbook is to enable second language English speakers to become more confident and fluent in English, a written description without the visual, however, thorough it is, may be more challenging for someone to comprehend. Although, if the student of this text has no knowledge of energy resources and has not yet seen this infrastructure in real life, the picture may still be problematic as a tool of meaning-making. This brings us to the argument mentioned earlier by Bezemer and Kress (2016); using semiotic resources in combination to create meaning may give more detailed information. Understanding the potential of visuals and the constraints of this particular semiotic resource has allowed for a better understanding of what the resource is capable of, as well as how it can combine with other resources to facilitate meaning-making.

A similar argument can be made for the audio recordings. Although the audio recordings allow the student to listen to English, which allows for real-life representation of how English sounds, this choice of semiotic resource relies on the assumption that the person listening already has more advanced knowledge of the language. A person with very limited exposure to English will not necessarily be able to follow the audio recordings, especially since the recordings use very specific jargon. In addition to this, suppose the speaker or speakers on the recordings speak a dialect of English or speak English with a certain accent. In this case, it may be problematic for the student to follow if the student has no prior exposure to the specific accent and or dialect. It may even be difficult for the textbook user to understand and follow the audio

recordings without any help (such as with a transcript). Since this textbook was theoretically designed to assist second language English speakers, dialects of English may presumably be difficult for them to understand, which would render the audio recordings not that useful as a resource for meaning-making.

So again, the argument can be made that understanding the constraints and potential of a specific sign will be beneficial when that particular sign is chosen to use as a resource in a meaning-making process. And using signs in combination may aid in the meaning-making process.

5. How are the semiotic resources linked into a meaning-making whole?

The meaning-making process on this page starts at the top of page 40. The unit started on pages 38 and 39 with the topic of *energy resources*. And where the two previous pages focused on the vocabulary related to the topic, here the concept of energy resources will be taught by using an audio component with the written text. Knowing that the activities involve listening is evident from the types of exercises on page 40. These exercises clearly state that there are audio recordings that must be listened to in order to complete the exercises on the page (these are on the CD that accompanies the textbook). Therefore, looking at the nature of exercises, on page 40, an understanding is created that the concept of energy resources will be explained through an audio and written component.

Meaning creation occurs through resemiotisation. More than one semiotic resource is used in this process of meaning-making. In this case, it seems like it starts with the written text and then from there, it is re-produced into the audio recordings. Then from the audio, it is re-produced into written and, in some places, visual information, again. The student of the text must be able to connect auditory semiotic resources to the written part of the text. Then by combing through these semiotic resources create further meaning through a subsequent semiotic resource. For example, in exercise B, the exercise prompt (written text) directs the student to the audio recording (Part 1). The meaning-making process starts thus with the written text. The student is directed to listen to the audio and then also look at a list of topics in exercise B. The prompt in B asks the student to listen to the audio recording while looking at the listed topics and order how the topics will be discussed in this and subsequent recordings. Hence, the

moment the student looks at the audio and understand that to create meaning (i.e., to answer the instruction), the written instruction in Exercise B should link to the audio, meaning-making shifts from one semiotic resource to the next. Since these are different semiotic resources that are used in this meaning-making process, resemiotisation takes place. To illustrate further, the list of topics in Exercise B are pieces of information all pertaining to renewable and non-renewable energy resources. Reading exercise B's instruction and then subsequently listening to part of the audio recording creates the understanding that the recording helps with organizing the topic list. To create meaning from the list of topics, one must understand the relation between the audio and subsequently link this to the list of topics.

Looking at the list of topics without listening to the audio recording would make it difficult to know what exactly should be done with the information in the list. It may also be challenging to understand why the list is part of the text without listening to the audio recording. So, connecting the instruction in exercise B to Part 1's audio recording not only provides a reason for the presence of the list of topics as part of the text, but it also, more importantly, explains what particular meaning must be created using the list. This meaning-making process can be illustrated by Peirce's sign process, Sign 1 below. Ordering the list of topics in Exercise B is the *representamen* in the sign process. The audio recording - Part 1 – represents or stands in the place of the list of topics. The audio (Part 1) is, therefore, the *object* in this process as it is represented by the list of topics from this exercise. Seeing the relationship between the topics listed and the audio recording (auditory semiotic resource) and understanding that the audio and the topics collectively creates the meaning about energy resources is the *interpretant* of the sign process (see Figure 39 below).

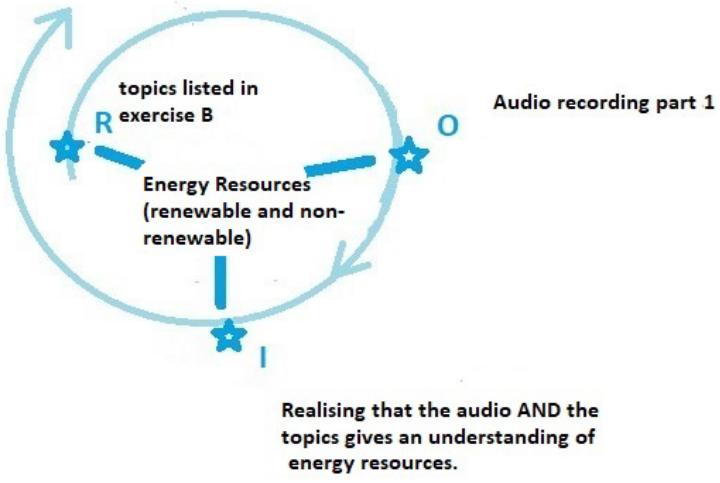


Figure 39: Constructing meaning in a single sign – Information on energy resources (with Audio recording part 1)

There is a similar meaning-making process with Exercise E (Subsection 7 of the data analysis). The meaning-making process starts with the written text, the prompt. The prompt directs the student to listen to part 3 of the audio. Then, instruction number 2 informs the student to, while listening to the audio, look at the list of topics in Exercise B and note which topics are not discussed in part 3 of the audio recording. Thus, the moment the student looks at the audio and understands that to create meaning (i.e., to answer the instruction), the written instruction number 2 in Exercise E should link to the audio. Meaning-making shifts from one semiotic resource to the next. And since these are different semiotic resources that are used in this meaning-making process, resemiotisation takes place. To illustrate further, the list of topics in Exercise B are pieces of information all pertaining to energy resources (renewable and non-renewable). Reading exercise E's instruction (number 2) and then subsequently listening to part of the audio recording creates the understanding that some topics on the list in exercise B will not be mentioned in part 3 of the audio recording. To understand what meaning should be created from the list of topics, one must understand the relation between the audio (part 3) and its link to the list of topics.

Listening to the audio recording without keeping the instructions in Exercise E in mind would make it difficult to know what exactly should be done with the information in the audio (part 3). It may also be difficult to understand why this particular audio recording is part of the text without reading the instructions in Exercise E. In this way, connecting the instruction in exercise E to Part 3 audio recording gives not only a reason for the presence of the audio recording, but it also, more importantly, explains what particular meaning must be created using the list with the recording. This meaning-making process can be illustrated by Peirce's sign process, Figure 41 below. Studying the list of topics in Exercise B is the *representamen* in the sign process. The audio recording - Part 3 – represents or stands in the place of the list of topics. The audio (Part 3) is thus the *object* in this process since it is represented by the list of topics from this exercise. Understanding that there is a relationship between both these semioticresources, the topics listed and the auditory semiotic resource (Part 1) and that both of these resources collectively create meaning is the *interpretant* of the sign process (Figure 40 below).

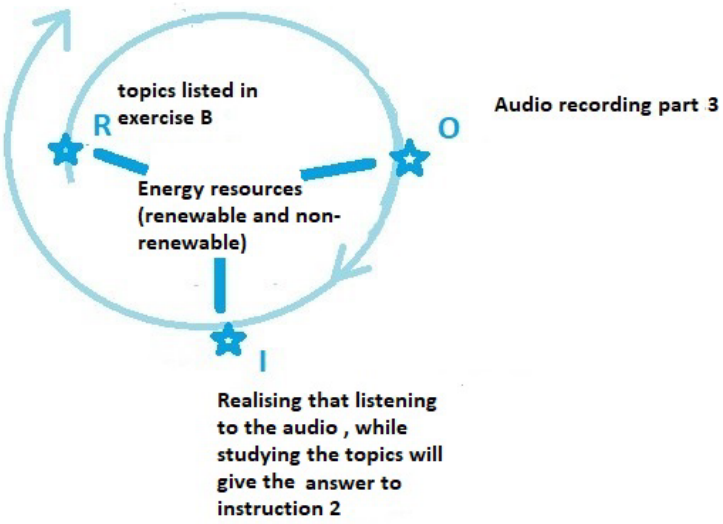


Figure 40: Constructing meaning in a single sign – Information on energy resources (with Audio recording part 3)

Even though these exercises create meaning as separate smaller units, another meaning-making process occurs on this page. This is when these separate listening exercises are not only looked at as separate processes of meaning-making but also as parts that together form a "whole". For a student to understand that listening to audio material will be a primary way to learn about energy resources (on page 40), the student will first have to construct meaning from the individual exercises on this page (exercises A – F). Each exercise is essentially a set of smaller sign processes. These smaller sign processes are separate meaning-making processes collectively contributing to the construction of the "whole" meaning. This is something only gained from studying all the smaller parts as singular processes working collectively, creating the "whole" meaning.

In addition to this, for a student to understand that listening to audio recordings will be a primary method in which learning about energy resources on page 40, the student will first have to construct meaning from each individual exercise. These individual exercises form part of the resources the student has at their disposal to learn and understand the content of this part of Unit 5. The exercises are thus the *representamen* in the meaning-making process. The listening parts, i.e., the audio recordings, are the *object* of this sign process since they are represented by the exercises in this part of Unit 5. Seeing the relation between these exercises and the audio and further understanding that the audio in combination with the written text is

used to learn more about energy resources is the *interpretant* of this sign process. This can be illustrated by the sign process below (Figure 41).

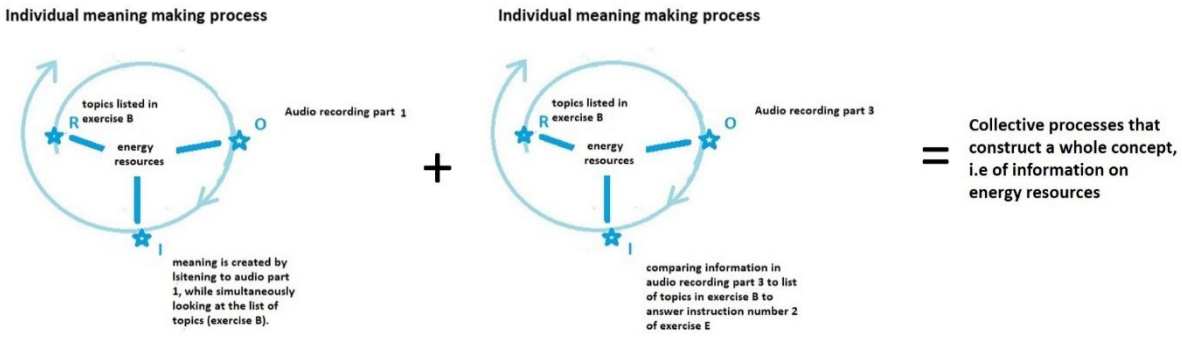


Figure 41: Collective meaning-making from a combination of signs – Information on energy resources

Furthermore, each exercise on page 40 (the ones with the listening component and those without the listening component) are essentially sets of smaller singular sign processes. These smaller sign processes are separate meaning-making processes that collectively contribute to the construction of the "whole", meaning one only obtains from looking at all the smaller parts as singular processes working collectively creating the "whole" meaning. Additionally, for a student to understand that listening will be a primary way learning about energy resources will happen (on page 4), the student will first have to construct meaning from each individual exercise. The individual exercises represent the newly learned knowledge about the concept (energy resources) the student is supposed to learn more about in this part of Unit 5. The exercises are thus the *representamen* in the meaning-making process. The newly learned knowledge about energy resources is the *object* of this sign process since it is represented by the exercises in this part of Unit 5. Seeing the relation between the exercises and the newly learned knowledge and further understanding that these exercises (listening and non-listening) are used to learn more about energy resources is the *interpretant* of this sign process. This can be illustrated by the sign process below (Figure 42).

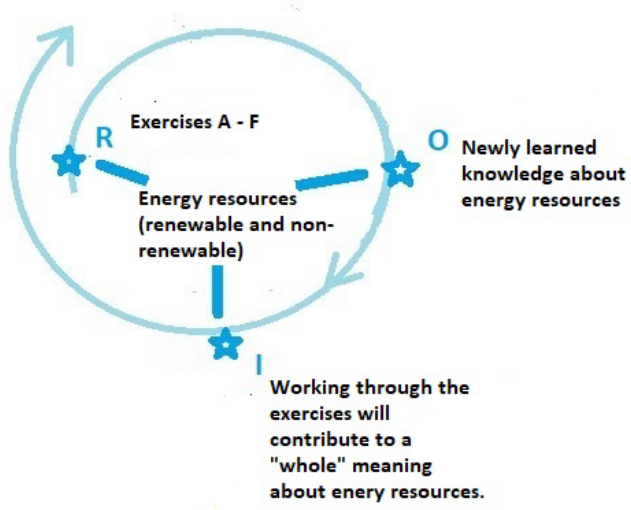


Figure 42: Constructing "whole" meaning from all exercises

Conclusion of Listening Section

The texts are all in English; thus, students (in this case, students in the literacy classes at the University of the Free State) who use this textbook also get the opportunity to practise using English as a medium of instruction to construct meaning. They are required to write, read, and speak English while working through the exercises on pages 40 - 41. Since English is the primary medium of instruction at the tertiary institute they attend, these types of exercises give them the opportunity to practise extracting main ideas and key details from an academic text; expressing information and opinions clearly in a written mode; and critically thinking about how to analyse, evaluate and apply to meaning they made from the exercises. These are skills specifically listed as outcomes for the Academic Literacy class in which these textbooks are used.

Using various semiotic resources, one of which is auditory, the multimodal text constructs meaning, which communicates an understanding of the concept of energy resources. On page 40, the primary tool for meaning construction is listening, and with some of these exercises, a student is expected to use the audio recordings to further engage with the concept of energy resources. By using a multimodal text, students are exposed to various modes, which according to the educational theory of multiliteracies, makes the learning process more successful. In addition, the various semiotic resources used in this multimodal text illustrates meaning-making through resemiotisation. The meaning made from one semiotic resource is resemiotised

and used to produce a subsequent semiotic resource. The small singular meaning-making processes that gradually connect to form a greater meaning-making process is indicative of a scaffolding process. In an educational context, this teaching method refers to an assortment of instructional techniques which a teacher uses to progressively move a learner towards having a better understanding and, ultimately, independence in the learning process. With scaffolding, concepts are broken up into smaller parts or sections, which in theory makes for an easier learning process. Looking at this text and starting the meaning-making process with singular resources first and then connecting these resources to create greater meaning mimics the scaffolding process. This also plays a part in getting the student of the text to see that each semiotic resource has a particular place and plays a particular role in the meaning-making process.

Finally, after constructing meaning from the vocabulary section and from the listening section, a student will see that both sections allowed learning about energy resources, and as a collective, both sections construct a "bigger", more extensive meaning-making process of energy resources (see Figure 43 of the meaning-making process below).

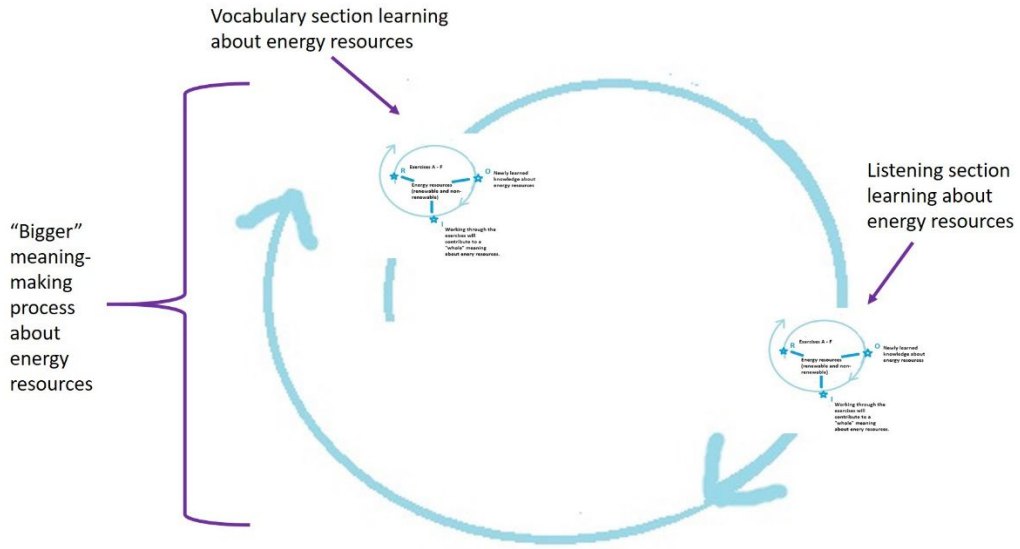


Figure 43: Collective construction of meaning-making from Vocabulary and Listening

5.2.3 Data Sample: Extending Skills Section

The next part of the text that was analysed was the extended skills section, which is pages 41 – 43 in the textbook (Figure 44 below).

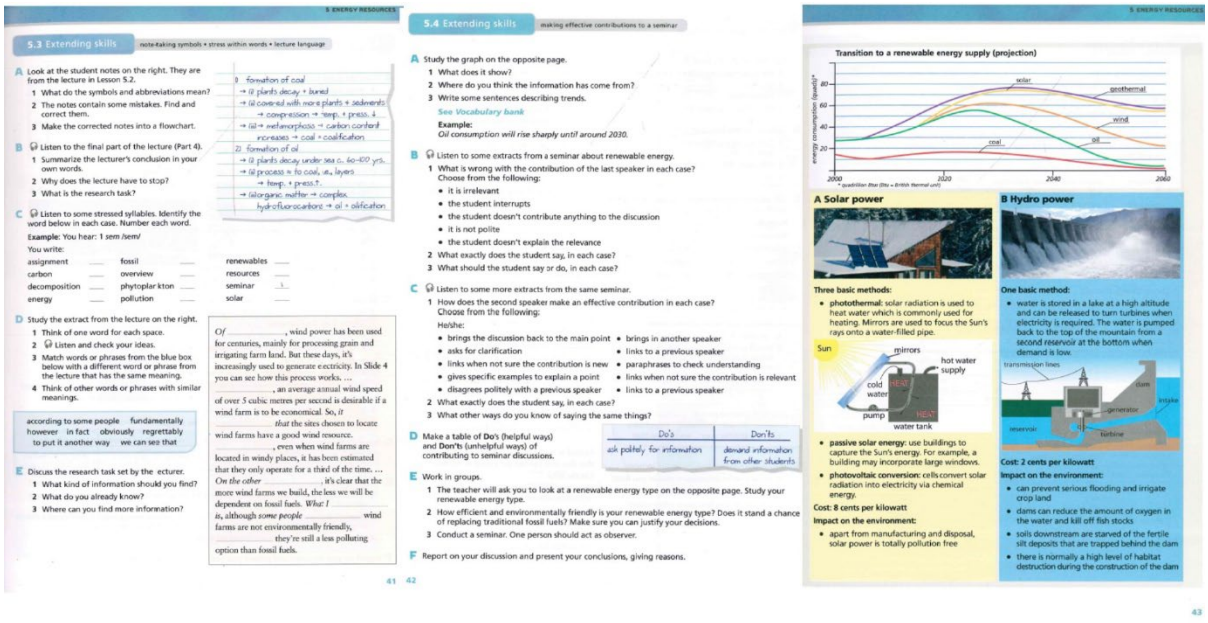


Figure 44: Extended Skills

Exercise *5.3* and *5.4 Extending Skills* follows exercises *5.1* and *5.2*. The main aim of this exercise is still to give the student a clear understanding of what is meant by the concept of *energy resources*. This section of the textbook is pages 41, 42 and 43, and it does not just focus on a specific skill like the previous two sections. Instead, it allows students to practise skills learned in previous sections while expanding their knowledge about energy resources.

Repetition is vital in learning since it helps to transition a newly learned skill from theconscious to the subconscious. Repeating a task or skill over time makes it gradually become easier to do. One of the biggest mistakes that can be made in a teaching environment is to forego the return or repetition. According to Bruner (2001), the learning process is a slow engagement with concepts; this slow and gradual engagement builds to a critical mass when astudent acquires the concept. In other words, repetition matters because it strengthens the engagement process. The argument can thus be made that quality of learning can be seen if there is a conscious design in repetitive engagement in courses.

Mastering skills through repetition is especially important in the Academic Literacy course, in which this textbook was used since one of the outcomes of this course is critical thinking.

Mastering skills like listening and writing allows students to engage with the content on a deeper level, which promotes critical thinking. The fact that the text is multimodal emphasises the multiliteracies' proposition that understanding information becomes easier and more successfulif the meaning is made through various modes.

1. **What are the semiotic resources used for meaning-making?**

Page 41 and 42 consist primarily of written black text (language), which vary in colour and size. The top portion of page 41 is a smallish blue block with white lettering, and adjacent to this is a smaller grey textbox with black lettering. The body area of page 40 is predominantly white and covered with black and some blue written text. Some of the text has a small black illustration of headphones next to it. Besides the written text, there is one picture on page 40. The picture illustrates a note of some sort. Through closer inspection, it seems like a handwritten note indicative of something a student would write during a lecture. Together with the written text on page 40, there are also two-coloured blocks of text: a smaller blue block and a bigger brownish block of text at the bottom half of the page. There is white space (open, blank spaces) between the picture, the written text, and two blocks of text. Some written text on page 41 and 42 are printed in bold. On page 41 and 42, there are a few places where the text and numbers are bold. The numbers under each exercise are in bold text. The written text and numbers on page 41 and 42 differ in font size. Most of the written text on page 41 and 42 seem to be similar in size. However, the written text in the smallish blue box at the top is slightly larger than the rest of the written text on the page, whereas the text in the smaller grey textbox near the top of the page is somewhat smaller than the rest of the text on the page. On the other hand, the blue letters (A – E) that indicate the sub-sections of content on these pages are bigger than the rest of the text.

The written text and numbers on page 41 and 42 differ in font size. Most of the written text on these pages seems to be similar in size. However, the written text in the smallish blue and grey textbox near the top of the pages is smaller than the rest of the text; this is also true of the text in the brown textbox. In contrast, the blue letters (A – E) that indicate the sub-sections of content on this page are fairly bigger than the rest of the text.

The information on page 43 is sorted into three blocks. On the top of the page, there is a colourful line graph. The line graph consists of a title, data, legend, source, y-axis, and x-axis. Underneath the line graph, there are two blocks that are a combination of written texts and images. The images are printed in colour. Most of the written text on page 43 is printed in bold and is similar in size. The information on the line graph is in a slightly smaller print than the rest of the page.

2. In which material modalities do these semiotic resources partake?

The content is presented on three A4 pages. The pages are three-dimensional since they can be measured in width, length and height. The pages form part of a comprehensive ESAP textbook. At first glance, the pages appear glossy and "sleek" and are easy to handle. The pages are a bit frayed around the edges and have some minor creases in one or two corners. On closer inspection, the pamphlet stitching on the inside of the book's spine is slightly visible; it is still intact and keeps the pages in place.

Additionally, it makes it easy to turn the pages. The content on the pages is printed in ink. The pages are colourful and consist of illustrations and pictures together with the written text. Some parts of the pages have no printed content, and on some of these spaces, there are notes and marks made with pen and/or pencil.

Together with the printed content on this page, the textbook, there is also a Compact disc (CD), a moulded plastic disc that contains digital data. The data is scanned onto the disk by a laser beam. The top part of this particular CD is predominantly pink coloured. The mirror band, stacking ring and plastic hub is visible, but all of this is also slightly pink to blend with the rest of the pink top of the CD. The lettering on the top of the CD is pink, black, and white. This gives information in terms of the content which can be found on this particular disc. In this case, it states the name of the textbook (*English for Environmental Science in Higher Education Studies*) and the particular section of the textbook that this disc will be used with (*Units 1,3,5,7 Tracks 1.1 – 1.37*). The mirror band, stacking ring and plastic hub is again visible when looking at the back of the CD, but one can also see the main printable area of the disc. The printable area is aluminium coated with plastic, which contains the data read by a CD reader.

3. With what logic do the signs, icon, index, or symbol function?

Before analysing the various signs present in this Data Sample, I would like to reiterate that even though a meaning overlap is inherent to this sign system, as stated earlier, the descriptions and analyses were arrived at from my point of view as an instructor of the course in which this textbook is used. I will identify *main function(s)* and *additional function(s)* based on the context (educational) in which this text is used and the scaffolding process (as discussed earlier in chapter 4). However, as I also stated earlier, other interpretations are possible.

In this data sample, the written text's (language – English) main function is indexical. The text is categorised as indexical since some parts of the language in the text are used to guide or point the student to a particular piece of information. The written text thus acts as direct instructions, cues, prompts and hints (Hartman, 2002). These are all part of the scaffolding process, which aids in the meaning-making process and allows students to complete tasks and achieve outcomes and goals. The additional function of the written text is symbolic since all language is symbolic.

The main function of the illustrations is indexical and additionally function as iconic and symbolic; the numbers and audio recordings both are indexical (main function) and symbolic (additional function). In the rest of this section, the data will be broken down into smaller sub-sections of samples to highlight and discuss examples of each of the aforementioned sign functions.

Sub-section 10

The segments of sub-section 10 are marked with purple boxes.

The first sample section that was analysed was the small blue block (*5.3 Extending Skills*) and exercise A (see Figure 45). In exercise A, the exercise prompt and the first instruction (*1*) was studied.

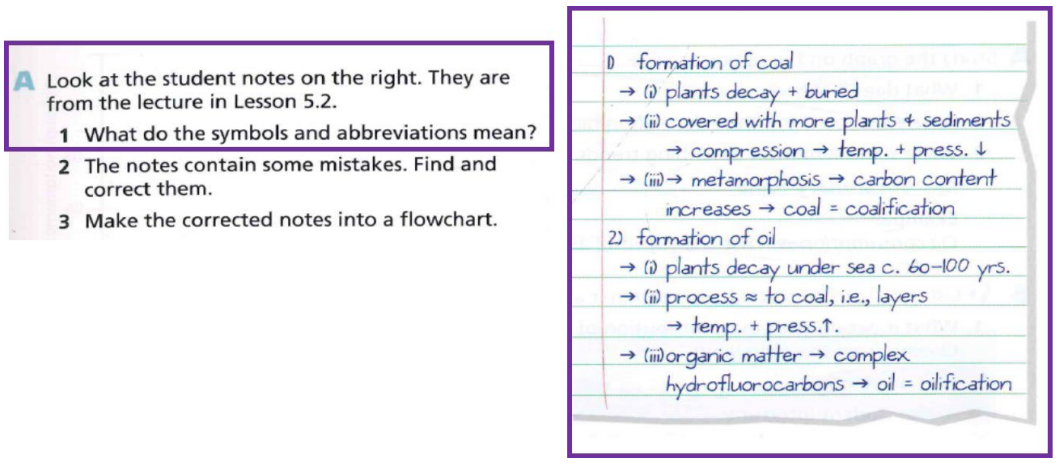


Figure 45: Sub-section 10

The smaller blue block informs the student of the type of exercise which will be focused on (in this case, an extending skill exercise), while the bigger blue letter, A, indicates to the student that this is where the first sub-section of the vocabulary exercise begins. The blue A's main function is as an indexical sign since it points to the presence of something else; in this case, it refers back to the smaller blue block (5.3 Extending Skills) above the blue A. Additionally, the colour of the letter A is an indexical sign since it creates a reference back to the textbox, which is also blue. So here, the colour is likewise used as an indexical tool to indicate how the different parts of this exercise connect to one another. The A's additional function is symbolic.

The exercise prompt (the sentence - *Look at the student notes on the right. They are from Lesson 5.2*) tells the student to now pay attention to the picture on the right-hand side of the page. The prompt directs the student to look at the picture next to exercise A. The prompt is thus also mainly an indexical sign since it "points" the student to the picture next to the exercise. In other words, the sentence, the indexical sign, links the written material to the photographic material next to the written text on this page. The prompt's additional function is symbolic.

The first instruction of exercise A (*1. What do the symbols and abbreviations mean?*) is mainly indexical. It points the student to the note (picture next to the exercise) and further asks the student to specifically pay attention to the symbols and abbreviations, not the written text. The student must then try and figure out what these symbols and abbreviations mean in the note's context. Understanding that the instruction in exercise A 1 *(What do the symbols and*

abbreviations mean?) links to the picture next to the exercise shows how the indexical sign (the written instruction) relates to the visual on the page. Instruction 1's additional function is symbolic.

The meaning-making in the note takes place between the written text and the symbols. The note seems to be a summary of two processes: the formation of coal and oil. Since it is a summary, some of the text is abbreviated. In addition to the text, the note contains the positional numerical system (1, 2), roman numerals (i, ii, iii,), various arrows signs (← ↑ → ↓), the mathematical symbol for addition (+), the dash symbol (-); and an *equal to (=)* and *almost equal to (≈)* symbol. The main function of the note is symbolic because it contains a variety of mathematical symbols and numerals that needs to be "read" in a specific way. In the case of symbols, some underlying agreement, habit, law or convention exists, which means that invoking a specific symbol invokes its associated object (Atkin, 2010). There is an underlying agreement regarding how to "read" these symbols and numbers within a mathematical/ scientific context. To understand the meaning, the student will have to have some background knowledge of mathematics and science. For example, the ↓ arrow indicates that something goes down or decreases. The + symbol means to add together. Thus, the sentence in the note: *compression* → *temp. + press.* ↓ means the following:

Compression happens (→) when temperature drops (↓) and (+) pressure increases (↓). Important to note: Ordinarily, the assumption is made that a downward arrow (↓) means something is decreasing or becoming less. In this case, the downward arrow means to increase since compression happens when a physical force presses inwards on an object. The downward arrow here then is thus indicative of the inward force pressing down, which illustrates the increase in pressure. Therefore, making meaning from this requires the student to have the background knowledge about compression as a process to understand that the downward arrow do have one meaning. In this context, the arrow does not indicate a decrease but anincrease.

From the above analysis of this sub-section of the data sample, it was evident that the main signfunctions were indexical and symbolic (see Figure 46 below).

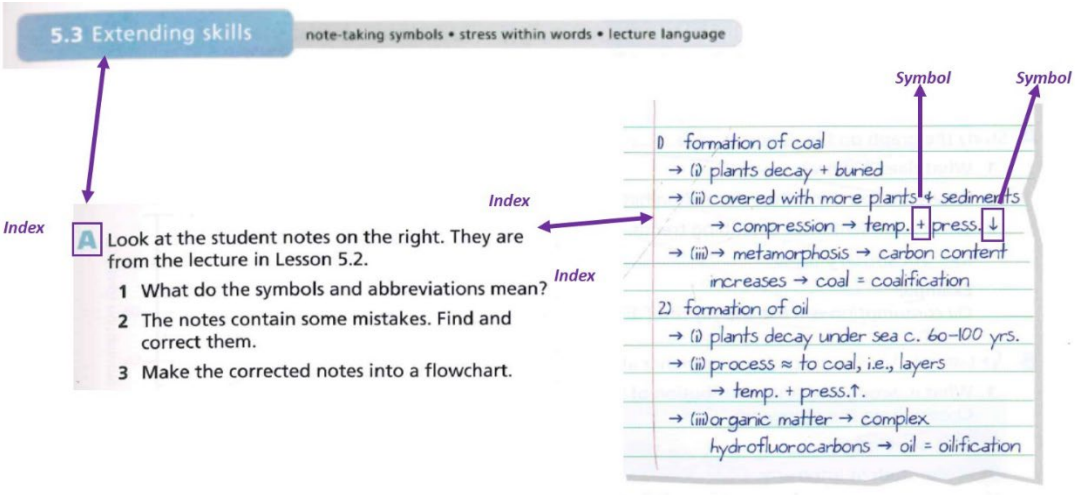


Figure 46: Sign functions present in data sub-section 10

Sub-section 11

The segments sub-section 11 are marked with purple boxes (Figure 47 below). The next sample section that was focused was exercise *B*. The exercise prompt and instruction number 2 was studied. The transcript of the audio recording is included.

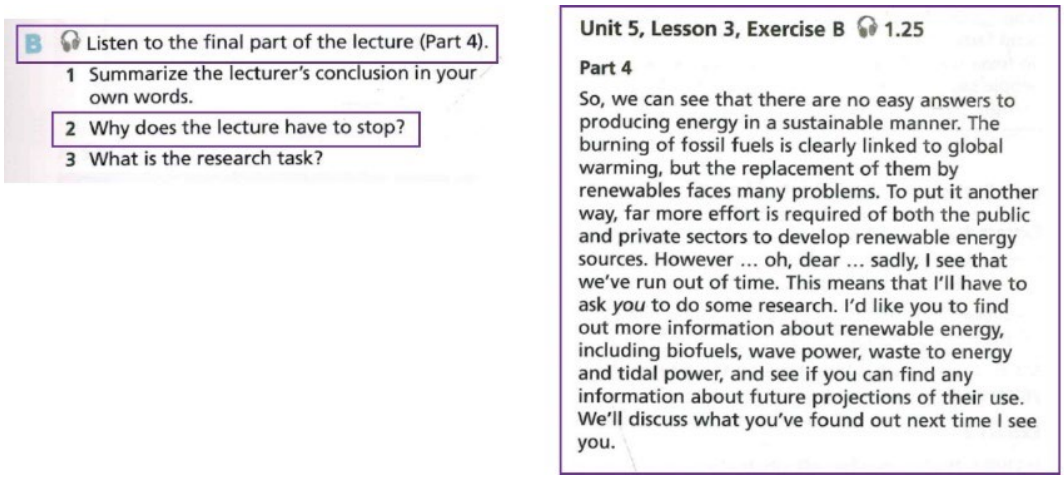


Figure 47: Sub-section 9

The bigger blue letter, B, not only indicates to the student where the particular sub-section of this exercise begins, but it also refers back to the smaller blue block, which tells the student the type of exercise to be focused on (extending skills). The blue B functions mainly as an indexical sign since it points to the presence of something else; it refers back to the smaller blue block above (*5.2 Extending Skills*). Like the previous sample, the colour of the letter is a further

indexical sign since it creates a reference back to the textbox, which is also blue. So again, colour is used as an indexical tool to indicate how the different parts of this exercise connect to one another. The additional function of the B is symbolic.

Next to the B is an illustration of headphones. The illustration functions mainly as indexical since it points to the audio track. It causes the student to be aware that here, there will also be some listening involved. The illustration's additional function is iconic. Directly after the illustration of the headphones, one finds the prompt of the exercise. The prompt tells the student that in order to do the exercise, they will have to listen to an audio component (see above for transcript Unit 5 Lesson 3 Exercise B 1.25 Part 4). The prompt's main function is indexical since it "points" the student to the audio recording, which will be played from the CD. In other words, the sentence, the indexical sign, links the written material to the audio material on the CD. Both of which the student needs in order to complete this exercise. The additional function of the prompt is symbolic.

Instruction number (*Why does the lecture have to stop?*) asks the student to answer a specific question by listening to information given in the audio recording. Thus, the student will need to listen to the recording and figure out if the person speaking gives any indication as to why the lecture must stop. Therefore, the instruction is mainly an indexical sign as it "points" the student to the audio recording. Understanding that the instruction in exercise B 2 *(Why does the lecture have to stop?)* links the audio to the written text shows how the indexical sign (the written instruction) relates to the auditory component of this exercise. The additional function of the instruction is symbolic.

The audio recording's main function is indexical since it directs the student back to the exercise instruction, and in this case, instruction number 2. When looking at the transcript, there is a specific place where the speaker states that the lecture will stop since there is no more time left in the lesson. (See transcript "*oh dear…….sadly I see that we've run out of time").* Hearing this part of the lecture must give the student enough information to answer instruction number 2.

From the analysis of sub-section 11 (above) of the data sample, the conclusion was made that themain sign function is indexical (see Figure 48 below).

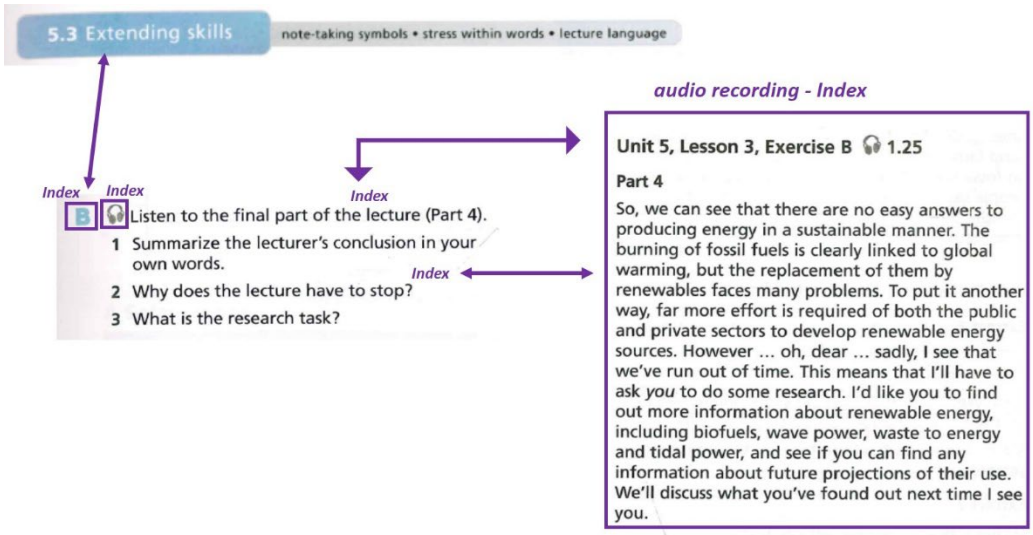


Figure 48: Sign functions present in data sub-section 11

Sub-section 12

The segments of sub-section 12 are marked with purple boxes.

The next sample section, which was looked at, is exercise *A* on page 42 and the line graph on page 43. The exercise prompt and instruction number 1 was discussed (see Figure 49).

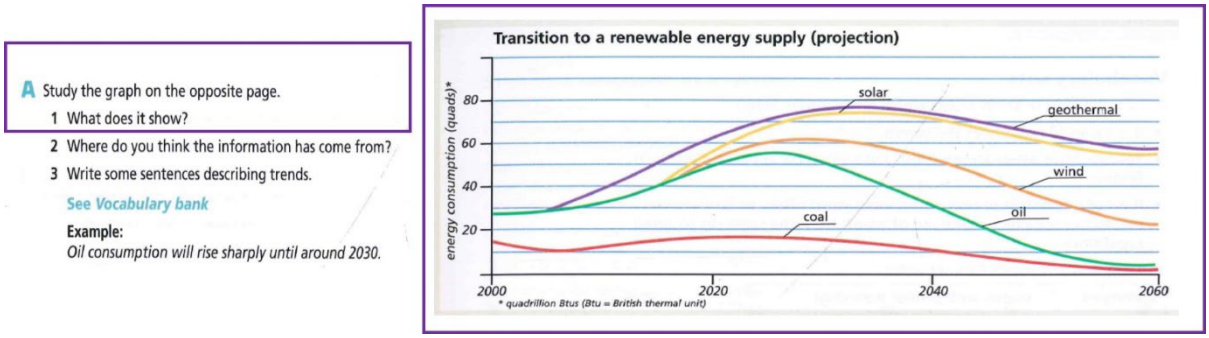


Figure 49: Sub-section 10

The blue letter, A, indicates where this particular sub-section of the vocabulary exercise begins. It also refers back to the smaller blue box at the top of the page to indicate which type of exercise A is, and thus functions mainly as an indexical sign since it points to the presence of something else: the smaller blue block above (*5.4 Extending Skills*). The colour of the letter is yet again an indexical sign because it creates an additional reference back to the textbox, which

is also blue. So again, colour is used as an indexical tool to indicate how the different parts of this exercise connect to one another. The additional function of the A is symbolic.

The exercise prompt (the sentence – *Study the graph on the opposite page*) tells the student to pay attention to the figure (line graph) on page 43 titled *Transition to a renewable energy supply (projection)*. After reading the prompt, the student's attention is directed to the line graph. The prompt "points" the student to the line graph, showing how the indexical sign and the figure are linked. The prompt's main function is hence indexical, and the additional function is symbolic. Question 1 (*What does it show?*) is mainly indexical since it points the student to the lines on the line graph (Figure 1) and suggests that these lines on the graph must be studied more closely for information. The additional function of question 1 is symbolic.

Although the line graph is indexical and symbolic, it mainly functions as an iconic sign since it bears a partial similarity to the object it represents. The line graph is composed of a multitude of different coloured lines. The lines on the line graph are all separate representations of quantities of energy consumption of various renewable energy resources. To be exact, each line on the graph represents an actual amount of energy used over a specific period of time. Since the lines bear a partial similarity to the object they represent (actual amounts of energy usage), these lines' main function is indexical. The additional function of the coloured lines is indexical.

The numerical values' main function is symbolic because to understand what information is conveyed by these, there must be an understanding of the meaning they carry in mathematics and statistics. Therefore, there is an underlying agreement in terms of how to "read" these numbers within a mathematical context. Understanding that the instruction in exercise A 2 *(What does it show?)* links the line graph to the written text shows how the indexical sign (the written instruction) links to the visual component of this exercise.

This section of the analysed data sample (analysis above) I concluded that the main functions were indexical iconic, and symbolic (see Figure 50 below).

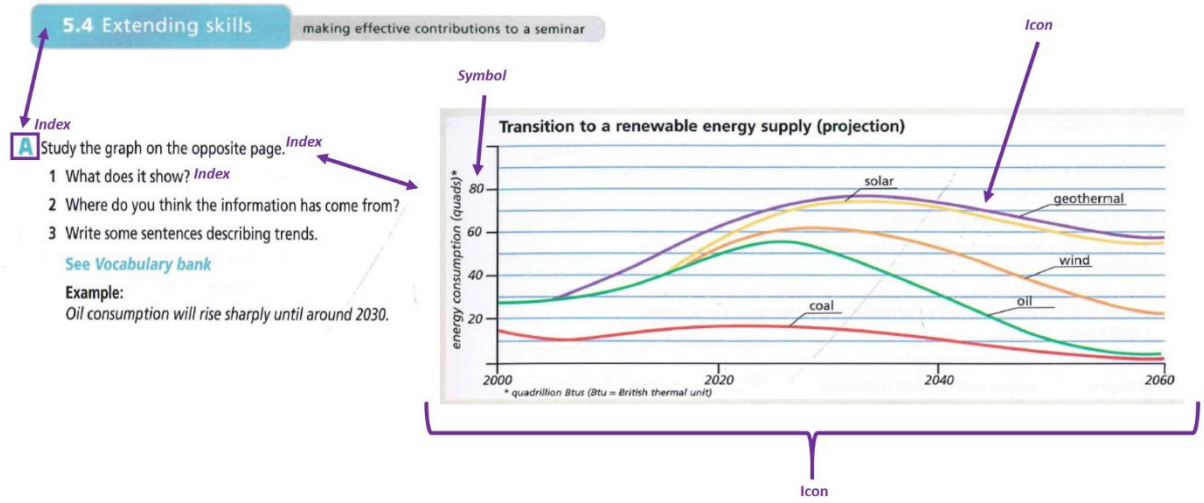


Figure 50: Sign functions present in data sub-section 12

Sub-section 13

Figure 51 shows the next sample section that was analysed was exercise *E* on page 42 and the information blocks on page 43. Exercise instruction number 1 will be studied.

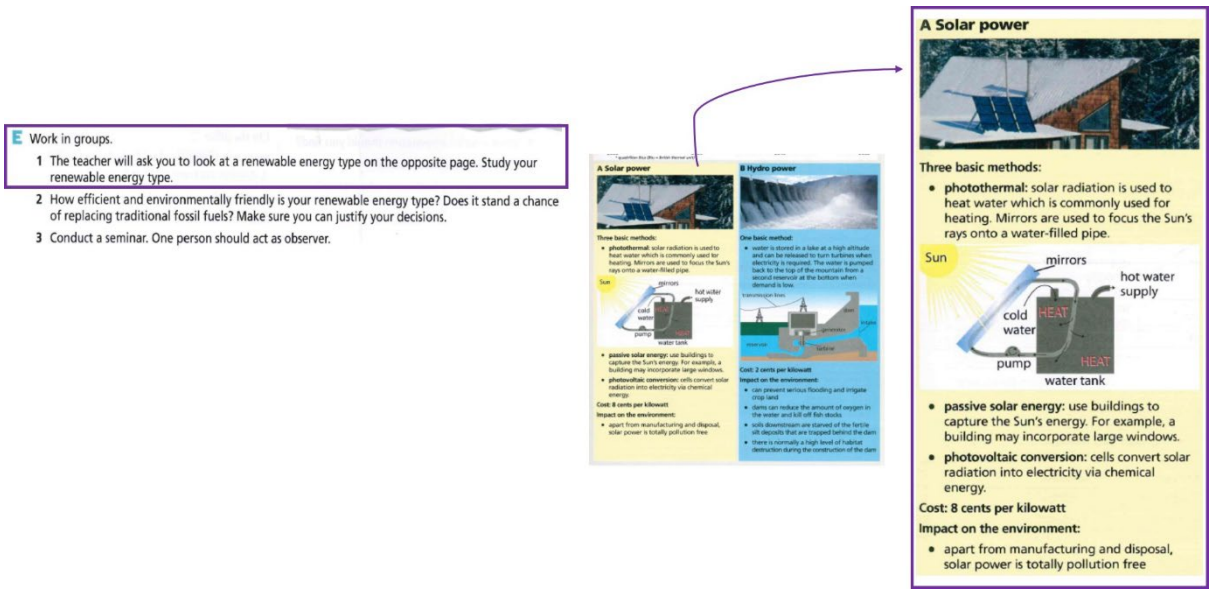


Figure 51: Sub-section 11

The bigger blue letter, E, indicates to the student that this is where this sub-section of exercise begins. Similar to letter A from the previous data sample section, the blue letter, E, is an indication of where this exercise begins and where the previous exercise (B) ends. Similarly, just like A, it also refers to the blue block above instructing the student as to what type of exercise E is, making E's function indexical. The additional function of the letter E is symbolic.

The exercise prompt (the sentence - *Look at the pictures on the opposite page*) tells the student to now pay attention to the pictures on page 39. After reading the prompt, the student will know to look at the pictures on page 39. The prompt "points" the student to the pictures on the opposite page. In other words, the prompt, which functions mainly as an indexical sign, links the written material to the photographic material on the next page. The additional function of the prompt is symbolic.

The first instruction of exercise E (*1. The teacher will ask you to look at a renewable energy type on the opposite page. Study your renewable energy type.)* asks the student to look at the yellow and blue blocks on page 43, *pick one of the blocks and study the information given*. The instruction directs the student's attention to the blocks of information on the next page, so the argument can be made that the main function of the instruction is indexical. The additional function is symbolic.

Each of the two blocks seems to give information about a specific energy type. Each block contains a photograph, a sketch, and some written information. Understanding that the instruction in exercise A 1 links to the blocks on the opposite page shows how the indexical sign (the written instruction) links to the visual images on the opposite page.

The yellow block will be studied as an example. The picture is of the roof of a house, and on the roof, there are three solar panels. The picture's main function is indexical since it refers to something else: to the actual object (solar panels) present in the real world. One can further argue that the picture is also a symbolic sign. The additional function of the picture is symbolic. The yellow block further has a sketch depicting how a solar panel is used to create energy. The sketch's main function is indexical since it "points" to a real process of generating energy with real solar panels; it also points the student to the written information in the yellow block. There is a short description above the sketch explaining how mirrors are used to heat water using sunlight. Reading the description and studying the sketch, the student will be able to better understand how the sun's heat is used to heat up water. Understanding that there is a link

between the written text and the sketch shows how these signs (written text that is indexical) link to the sketch (here also indexical).

From the above analysis of this sub-section of the data sample, it was evident that the main sign function was indexical (see Figure 52 below).

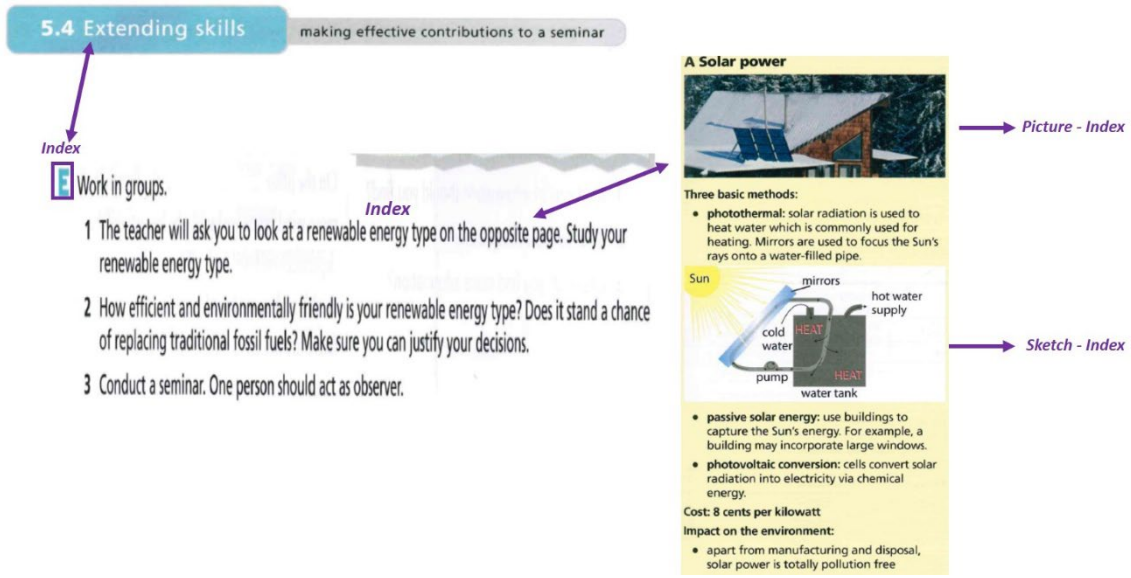


Figure 52: Illustration 2: Sign functions present in sub-section 13

4. What affordances do the semiotic resources and sign types offer?

The numbered instructions under each sub-section of the exercise help the student to understand in which order the content must be read and completed.

Colour plays a vital role in the cohesion of the text. The use of a variety of coloured text and visual imagery focuses the attention of the student on specific parts of the information on these pages. Furthermore, this allows the student to understand which parts of the information link together, which subsequently creates a whole message. The fact that blue is repeatedly used as a colour in textboxes and in the text shows how information in the text boxes and the information under each of the subsequent coloured capital letters (the blue A, B, C etc.) are linked. It also helps with the structure of the text and the scaffolding process.

Visual imagery allows the student to grasp the similarities between images on the page and the things these images represent in real life. The open spaces on the pages help with the

organisation of the information and also create a boundary of some sort. Again, this helps with scaffolding since they divide the information into smaller sections. The iconic signs in the data sample give additional information to the student that the written text by itself would not necessarily have been able to do (or this would be with more difficulty since the text alone would then have to be very detailed and somewhat lengthy). The student is thus able to connect the pictures (icons) to the written text and, in combination, gain more detailed information; this would not have been possible if only one of the two resources were available.

The indexical signs help the student to navigate the content. They guide the student through the content and create a link between different pieces of content so that the student is able to see how each separate part connects to form a whole. The indexical signs also direct a student to take a particular action (*listen to……, study the topics in …….)*. To be precise, it helps the student to better understand how to scaffold the content on the page, which is especially helpful within an educational context like the one in which this text is used. Scaffolding assists students with the meaning-making process because it illustrates how smaller parts connect and form a bigger picture or a more complete meaning. It further helps to show in what order the information on the page should be looked at, so where to start, what to look at next etc.

In this section (Data Sample 5.3 and 5.4), sound, specifically audio recordings on a CD, is used as an additional semiotic resource for meaning-making. The audio recordings on the CDallow the student to obtain a real-life representation of the English language. These allow the student to hear how the language sounds and give them an example they can use as a model topractise their pronunciation and intonation of the language. The audio allows for interaction with the language that the written text is unable to do.

What is also important here to look at specifically is the potential and constraints of using these various signs in the meaning-making process. Using visuals gives a realistic, visual representation of the concept or idea being communicated, in this case, the concept of energy resources via the pictures of the infrastructure specific to the particular resources. Using pictures of a wind turbine to communicate the aforementioned concept allows the student to clearly visualise how this energy infrastructure looks since the visual resembles the infrastructure. Seeing the resemblances between the actual thing and the concept taught in the

book might be more difficult if there were only written descriptions, in English, of these and not the visuals. Although a written description can be detailed, it may not be helpful if the student is not fluentin English. And since part of the aim of this textbook is to enable second language English speakers to become more confident and fluent in English, a written description without the visual, however, thorough it is, may not be easy enough for someone to comprehend. Although, if the student of this text has no knowledge of energy resources and has not yet seen these infrastructures in real life, the visuals may still be problematic as a tool of meaning-making. Say, for example, the student of this text is a student who has never seen any of these infrastructures in real life. If the text is used in class as a teaching tool, the student will have ateacher or friends that may help him navigate through the pictures and give the student the additional, needed information to make the meaning. But say the student is alone, at home, forexample, with only the textbook and no other person or tool to help with the meaning-makingprocess, then having only pictures may again become problematic. This brings us to the argument mentioned earlier by Bezemer and Kress (2016) that using semiotic resources in combination to create meaning may give more information. Understanding the potential of visuals and the constraints of this particular semiotic resource has allowed for a better understanding of what the resource is capable of; and how it can combine with other resources to facilitate meaning-making.

A similar argument can be made for the audio recordings. Although the audio recordings allow the student to listen to English, which allows for real-life representation of how English sounds, this choice of semiotic resource relies on the assumption that the person listening already has a somewhat more advanced knowledge of the language. A person with very limited exposure to English will not necessarily be able to follow the audio recordings, especially since the recordings use very specific jargon. In addition to this, suppose the speaker or speakers on the recordings speak a dialect of English or speak English with a certain accent. In this case, it may be problematic for the student to follow if the student has no prior exposure to the specificaccent and or dialect. If this is the case, it may be difficult for the textbook user to understand and follow the audio recordings without any help, like a transcript, for example. Since this textbook was theoretically designed to help second language English speakers, dialects of English may presumably be difficult for them to understand, which would render the audio recordings useless as a resource for meaning-making.

So again, the argument can be made that understanding the constraints and potential of a specific sign will assist when that particular sign is chosen to use as a resource in a meaning-making process. And using signs in combination may aid in the meaning-making process.

5. How are the semiotic resources linked to a meaning-making whole?

The meaning-making process on this page starts at the top of page 41. The unit started on page 38 with the topic of *energy resources*. Where the previous pages focused on the vocabulary related to the topic and then moved to teach about energy resources using an audio component with the written text, page 41 – 43 allowed the student to repeat some of these skills in this unit (*5.4 Extending Skills*). Some of the exercises in this unit focus on vocabulary; some create meaning through a combination of written text and visual information, and some exercises clearly state that there are audio recordings (the CD that accompanies the textbook) that need to be listened to in order to complete some of the exercises on these pages. Thus, when looking at the nature of the exercises, an understanding is created that the concept of energy resources will be explained through an audio and written component, using related vocabulary and visuals, i.e., illustrations, pictures, graphs, and diagrams.

Meaning creation happens through resemiotisation. More than one semiotic resource is used in this process of meaning-making. In this case, it seems like it starts with the written text and then from there, it is re-produced into the other semiotic resources in the text. The student of the text must be able to connect the various semiotic resources used to create meaning. For example, in exercise B, the exercise prompt (written text) directs the student to the audio recording (Part 4). Thus, the meaning-making process starts with the written text. The student is directed to listen to the audio and then finds the answer to question number 2. Therefore, the moment the student listens to the audio and understands that to create meaning (i.e., to answer question number 2), the written instruction (question 2) should link to the audio, the meaning-making shifts from one semiotic resource to the next. Because these are different semiotic resources that are used in this meaning-making process, resemiotisation occurs. To illustrate further, question 2 asks the student to find the reason for the lecture to end. Listening to part 4 of the audio recording gives the reason for why the lecture had to stop. To create meaning from these two separate semiotic resources, one must understand the relation between the audio and the subsequent link to part 4 of the audio recording. Trying to answer question number 2

without listening to the audio recording would make it difficult to know what specifically should be done to find an answer to the question. It may also be difficult to understand why question 2 is even asked without listening to the audio recording. So, connecting the instruction in exercise B to Part 4's audio recording gives not only a reason for question 2 in the text, but it also, more importantly, explains what particular meaning must be made from part 4 of the audio. Peirce's sign process can illustrate this meaning-making process. Question number 2 in Exercise B is the *representamen* in the sign process. The audio recording - Part 4 – represents or stands in the place of question 2. The audio (Part 4) is hence the *object* in this process since it is represented by the list of topics from this exercise. Understanding that there is arelationship between these semiotic resources, the question and the auditory semiotic resourceand the subsequent understanding that the audio and the topics collectively create the meaningabout energy resources is the *interpretant* of the sign process (see Figure 53 below).

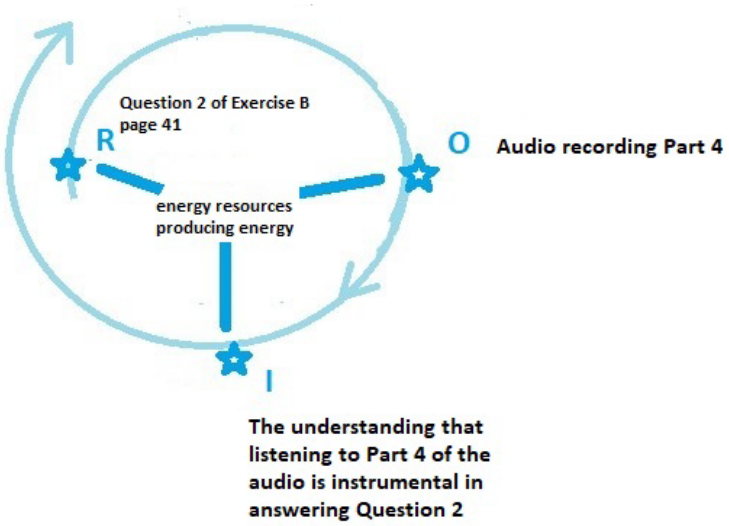


Figure 53: Constructing meaning in a single sign – Information on production energy resources

A similar meaning-making process occurs in exercise E on page 42. The meaning-making process starts with instruction number 1 (exercise E). The instruction directs the student to look at the visual information on the next page (page 43) and study it. Thus, the moment the student looks at the visual semiotic resources on page 43 and comprehends that to create meaning, the written instructions in Exercise E should link to the visual information, the meaning-making shifts from one semiotic resource to the next. And since these are different semiotic resources used in this meaning-making process, resemiotisation takes place. To illustrate further, block A on page 43 will be used as an example. The information in block A deals with a specific renewable energy resource, solar power. Studying the picture of the roof with the solar panels

on it may lead the student to conclude that the energy type that will be discussed in block A will be solar power. The student will only theoretically come to this conclusion if theinstruction (instruction nr 1, exercise E) is kept in mind. The instruction specifically mentionsrenewable energy types, which gives a clue as to what the visual in block A must relate to. Tounderstand what meaning should be created from the visual semiotic resource, one must understand the relation between the visual and its link to instruction number 1. Looking at the visual without keeping the instructions in Exercise E in mind would make it difficult to know what specifically should be done with the visual information in block A. It may also be difficultto understand why this particular visual is part of the text without reading the instructions in Exercise E. So, connecting the instructions in exercise E to the visual semiotic resources givesnot only a reason for the presence of the visual, but it also, more importantly, explains what particular meaning must be created using the visual. This meaning-making process can be illustrated by Peirce's sign process, Sign 8 below. Studying the visual (while keepinginstruction number 1 in mind), noticing the panels on the roof and then drawing the conclusionthat the panels are solar panels is the *representamen* in the sign process. The visual itself is the*object* in this sign process since it is represented by the conclusion the student draws from looking at the picture and reading instruction number 1 (the student concluding that the panelsare solar panels). Understanding that there is a relationship between these semiotic resources (the visual and instruction number 1) and that both of the resources collectively create the meaning (meaning here is information about energy resources) is the *interpretant* of the sign process (see Figure 54).

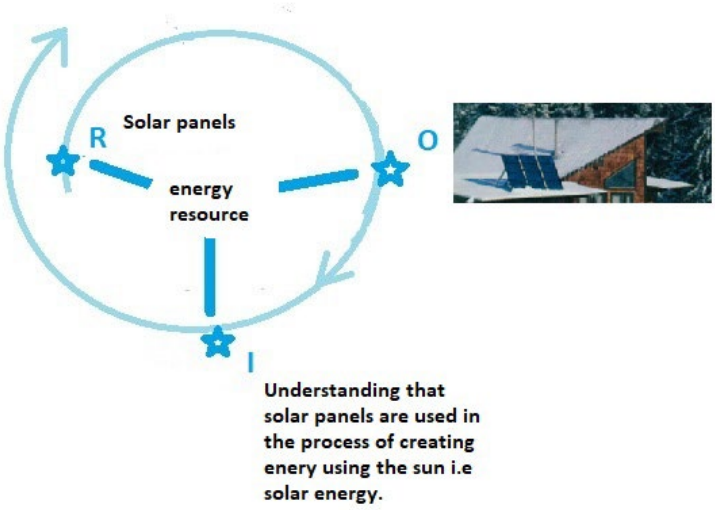


Figure 54: Constructing meaning in a single sign – Information on production energy resources

Even though these exercises create meaning as separate smaller units, another meaning-making process is happening on this page. This is created when these separate listening exercises are not looked at as separate processes of meaning-making only, but as parts that together form a "whole". For a student to understand that page 41 – 43 will have a variety of exercises with different resources which will be used to learn more energy and energy resources, the student will first have to construct meaning from the individual exercises on these pages, page 41 (exercises A – F) and pages 42 – 43 (exercises A – F). Each exercise is essentially a set of smaller sign processes (Figure 55).

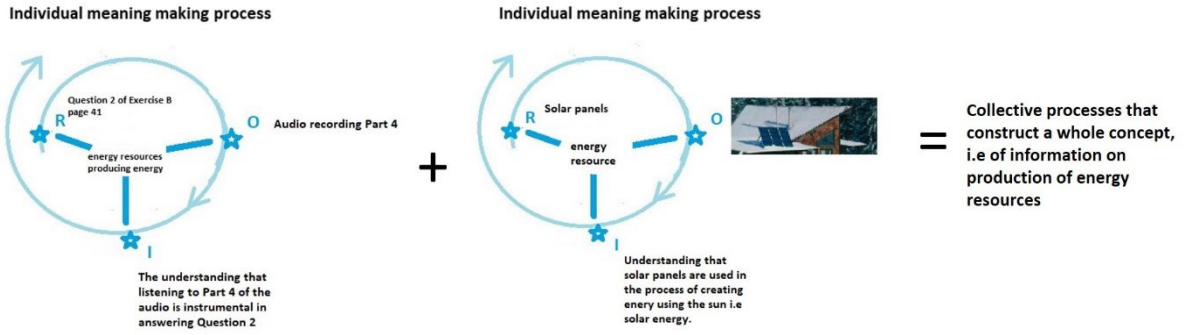


Figure 55: Collective meaning-making from a combination of signs – Information on energy resources

These smaller sign processes are separate meaning-making processes that collectively contribute to constructing the "whole" meaning. To obtain the "whole" meaning, you have to understand that each small meaning-making process also comes together as a combined and collective meaning-making process. The individual exercises form part of the resources the student has at their disposal to learn and understand the content of this part of Unit 5. The exercises are thus the *representamen* in the meaning-making process. The additional semiotic resources, i.e., listening parts (the audio recordings) and the visual information are the *object* of this sign process since they are represented by the exercises in this part of Unit 5. Seeing the relation between the exercises and the various semiotic resources and further understanding that the semiotic resources in combination with the written text are used to learn more about energy resources is the *interpretant* of this sign process. This can be illustrated by the sign process below (Figure 56).

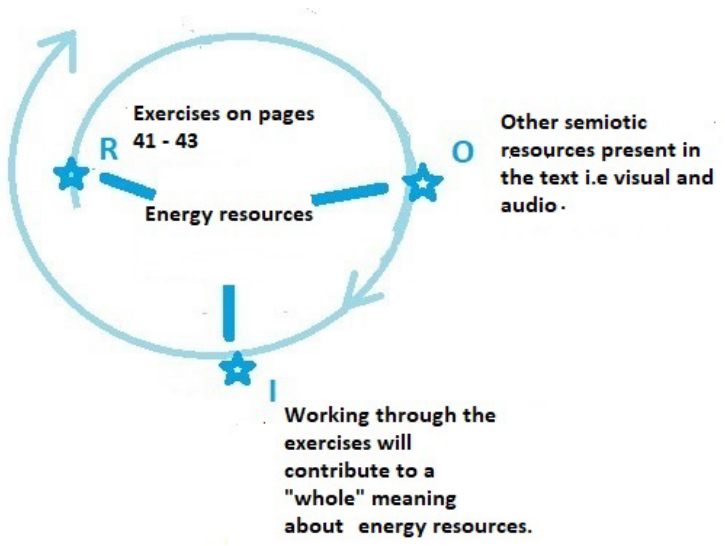


Figure 56: Constructing “whole” meaning from all exercises

Conclusion of Extending Skills

The texts are all in English; thus, students (in this case, students in the literacy classes at the University of the Free State) who use the textbook also get the opportunity to practise using English to construct meaning. They are required to write, read, and speak English while working through the exercises on page 41 - 43. Since English is the primary medium of instruction at the tertiary institute they attend, these types of exercises allow them to practise extracting main ideas and key details from an academic text, using the language they have to do their studies in.

Using various semiotic resources, one of which is auditory, the multimodal text constructs meaning, which communicates an understanding of the concept of energy resources. The exercises from page 41 – 43 use a variety of semiotic resources for meaning construction. In some exercises, the student should use a combination of written text and visual imagery to construct meaning, and with other exercises, the student is expected to use audio recordings to further engage with the concept of energy resources. By using a multimodal text, students are exposed to various modes, which according to the educational theory of multiliteracies, creates a more successful learning process. Additionally, the various semiotic resources used in this multimodal text illustrate meaning-making through resemiotisation. The meaning made from

one semiotic resource is resemiotised and used to produce a subsequent semiotic resource that carries the meaning forward.

The small singular meaning-making processes that gradually connect to form a larger meaning-making process is indicative of a scaffolding process. In an education context, this teaching method refers to an assortment of instructional techniques used by a teacher to move progressively toward a better understanding and, ultimately, independence in the learning process. With scaffolding, concepts are broken up into smaller parts or sections, which in theory makes for an easier learning process. Looking at this text and starting the meaning-making process with singular resources first and then connecting the resources to create a bigger meaning mimics the scaffolding process. This also plays a role in allowing the student of the text to see that each semiotic resource has a particular place and has a particular function in the meaning-making process.

Finally, after constructing meaning from the vocabulary section, the listening section and the extended skills section, a student will see that all three sections allowed learning about energy resources, and as a collective, all three sections construct a "bigger", more extensive meaning-making process of energy resources (see Figure 57 of the meaning-making process below).

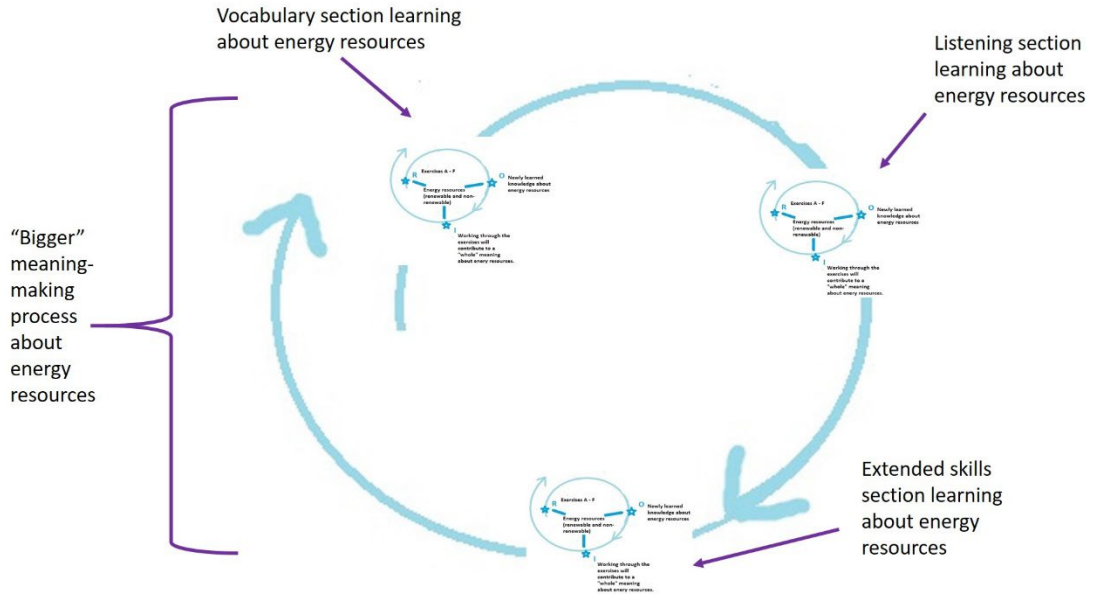
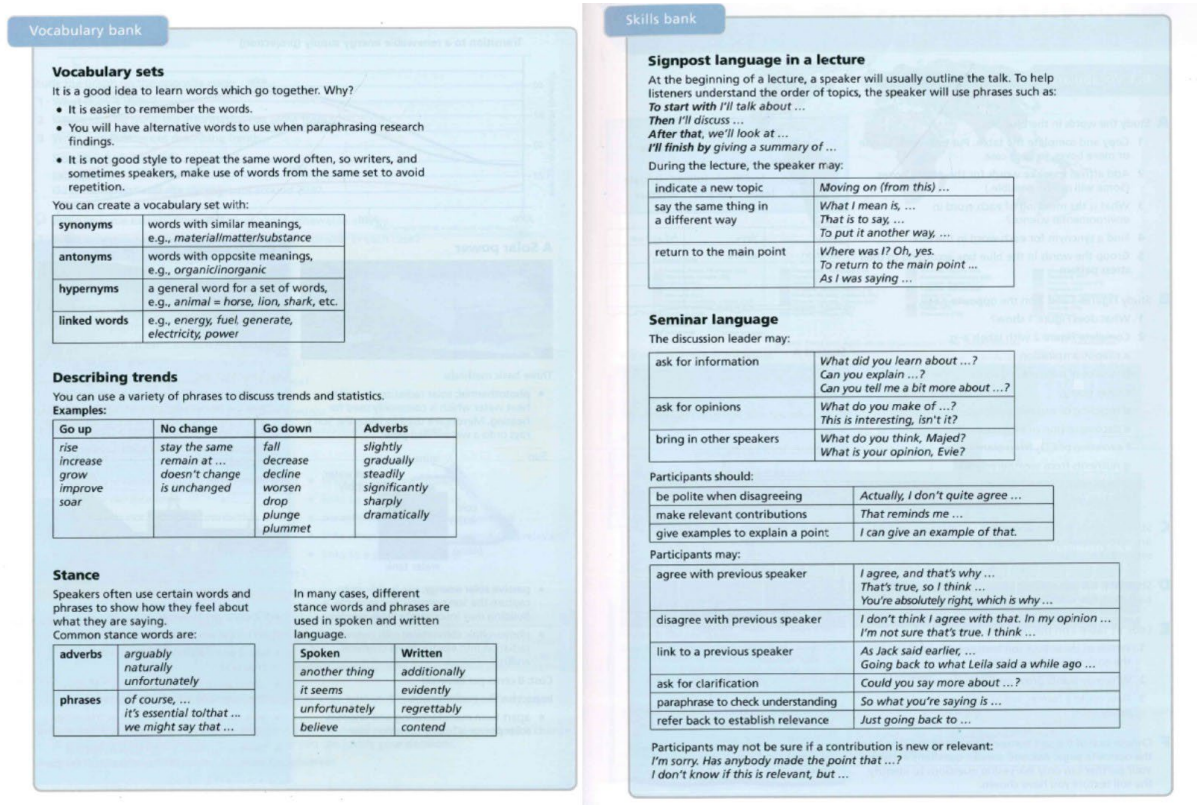


Figure 57: Collective construction of meaning-making from Vocabulary, Listening and Extended Skills

5.2.4 Data Sample: Vocabulary bank and Skills bank

The last section that was analysed is on pages 44 and 45 of the textbook. It is the vocabulary bank and skills bank (see Figure 58). There are no visual images on these two pages, but the written text is organized in a very particular way.



Vocabulary bank

Vocabulary sets

It is a good idea to learn words which go together. Why?

- It is easier to remember the words.
- You will have alternative words to use when paraphrasing research findings.
- It is not good style to repeat the same word often, so writers, and sometimes speakers, make use of words from the same set to avoid repetition.

You can create a vocabulary set with:

synonyms	words with similar meanings, e.g., *material/matter/substance*
antonyms	words with opposite meanings, e.g., *organic/inorganic*
hypernyms	a general word for a set of words, e.g., *animal = horse, lion, shark, etc.*
linked words	e.g., *energy, fuel, generate, electricity, power*

Describing trends

You can use a variety of phrases to discuss trends and statistics.
Examples:

Go up	No change	Go down	Adverbs
rise	*stay the same*	*fall*	*slightly*
increase	*remain at ...*	*decrease*	*gradually*
grow	*doesn't change*	*decline*	*steadily*
improve	*is unchanged*	*worsen*	*significantly*
soar		*drop*	*sharply*
		plunge	*dramatically*
		plummet	

Stance

Speakers often use certain words and phrases to show how they feel about what they are saying.
Common stance words are:

adverbs	*arguably*
	naturally
	unfortunately
phrases	*of course, ...*
	it's essential to/that ...
	we might say that ...

In many cases, different stance words and phrases are used in spoken and written language.

Spoken	Written
another thing	*additionally*
it seems	*evidently*
unfortunately	*regrettably*
believe	*contend*

Skills bank

Signpost language in a lecture

At the beginning of a lecture, a speaker will usually outline the talk. To help listeners understand the order of topics, the speaker will use phrases such as:
To start with *I'll talk about ...*
Then *I'll discuss ...*
After that, *we'll look at ...*
I'll finish by *giving a summary of ...*

During the lecture, the speaker may:

indicate a new topic	*Moving on (from this) ...*
say the same thing in a different way	*What I mean is, ...* *That is to say, ...* *To put it another way, ...*
return to the main point	*Where was I? Oh, yes.* *To return to the main point ...* *As I was saying ...*

Seminar language

The discussion leader may:

ask for information	*What did you learn about ...?* *Can you explain ...?* *Can you tell me a bit more about ...?*
ask for opinions	*What do you make of ...?* *This is interesting, isn't it?*
bring in other speakers	*What do you think, Majed?* *What is your opinion, Evie?*

Participants should:

be polite when disagreeing	*Actually, I don't quite agree ...*
make relevant contributions	*That reminds me ...*
give examples to explain a point	*I can give an example of that.*

Participants may:

agree with previous speaker	*I agree, and that's why ...* *That's true, so I think ...* *You're absolutely right, which is why ...*
disagree with previous speaker	*I don't think I agree with that. In my opinion ...* *I'm not sure that's true. I think ...*
link to a previous speaker	*As Jack said earlier, ...* *Going back to what Leila said a while ago ...*
ask for clarification	*Could you say more about ...?*
paraphrase to check understanding	*So what you're saying is ...*
refer back to establish relevance	*Just going back to ...*

Participants may not be sure if a contribution is new or relevant:
I'm sorry. Has anybody made the point that ...?
I don't know if this is relevant, but ...

Figure 58: Vocabulary Bank and Skills Bank

1. **What are the semiotic resources used for meaning-making?**

Page 44 consists of two blue blocks. A small dark blue block with white lettering at the top of the page, and then the rest of the page is a big light blue block with written information. The written information in the big blue block is printed in black. There are three places where some text in the block is much bigger than the rest of the text and printed in bold. This looks like headings to help organize and group the information in the big blue block.

Additionally, some of the written text in the big blue block is organized in four tables. Some of the text in the tables are printed in bold and seem to be subheadings of some sort. Page 45 looks precisely like page 44 in terms of layout. However, page 44 focuses on giving more vocabulary information, whereas page 45 focuses on something called "signpost" language. Signposts are words or phrases commonly used in formal speech and formal writing which

help connect clauses and sentences. In other words, they tell the student or listener what kind of information they can expect from a given text or, in the case of this unit, a recorded lecture.

2. **In which material modalities do these semiotic resources partake?**

The content is presented on two A4 pages. The pages are one-dimensional, flat pieces of paper. The pages form part of a comprehensive ESAP textbook. At first glance, the pages appear glossy and "sleek", and they are easy to handle. The pages are a bit frayed around the edges and have some minor creases in one or two corners. On closer inspection, the pamphlet stitching on the inside of the book's spine is slightly visible; it is still intact and keeps the pages in place.

In addition, it makes it easy to turn the pages. The content on the pages is printed in ink. Some parts of the pages have no printed content, and on some of these spaces, there are notes and marks made with pen and/or pencil.

3. **With what logic do the signs, icon, index, or symbol function?**

Even though a meaning overlap is inherent to this sign system, as stated earlier, the descriptions and analyses were conducted from my own point of view. I will identify *main function(s)* and *additional function(s)* based on the context in which this text is used, educational context, and the scaffolding process (as discussed earlier in chapter 4). However, as I also said earlier, other interpretations are possible.

In this data sample, the written text's (language – English) main function is indexical. The text is categorised as indexical since some parts of the language in the text are used to guide or point the student to a particular piece of information. The written text thus acts as direct instructions, cues, prompts and hints (Hartman, 2002), which are all part of the scaffolding process. This aids the meaning-making process and allows students to complete tasks and achieve outcomes and goals. The additional function of the written text is symbolic since all language is symbolic.

Sub-section 14

The first sample that was studied was the first table of information on page 44 and the bold heading and information above it (Figure 59 below).

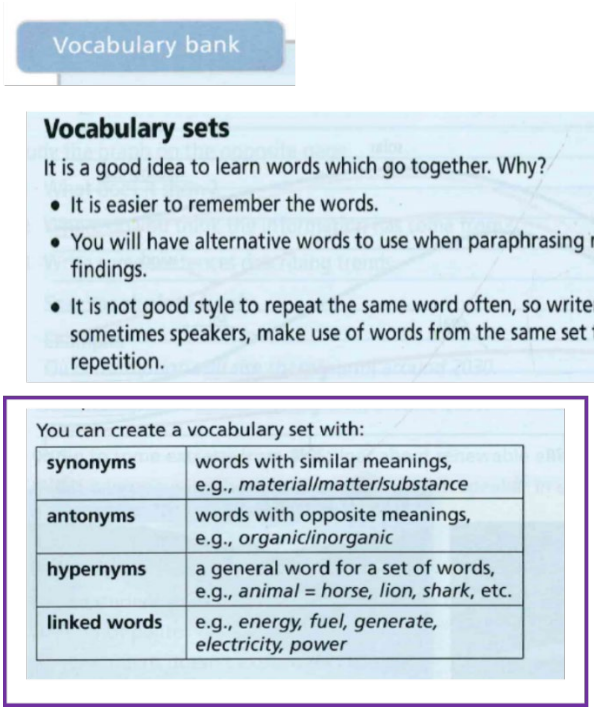


Figure 59: Sub-section 12

There is a heading at the top of page 44; the small blue block is *Vocabulary bank*. Directly underneath this, there is another heading, printed in bold *Vocabulary sets.* The bold heading functions mainly as an indexical sign. It is indexical since it points the student back to the heading at the top of the page to indicate that this section of the unit deals with vocabulary only. The additional function of the heading is symbolic. A couple of bullet points underneath this heading explain the benefit of learning words in sets. Underneath all of this, there is a table with two columns. There is a sentence just above the table stating: *You can create vocabulary sets with.* This sentence's main function is indexical since it "points" the student back to the bold heading at the top of the page *Vocabulary Sets.* The sentence directs the student to the table, giving additional information about vocabulary sets. The additional function of the sentence is symbolic. In the right-hand side column of the table, there are words printed in bold. For each bold word, there is an adjacent description in the left-hand column of the table. The words on the right are mainly indexical since they direct the student to the descriptions on the left. The additional function of the words is symbolic.

Therefore, the conclusion was made that for this section of the analysed data sample (analysis above) that the main sign function was indexical (see Figure 60 below).

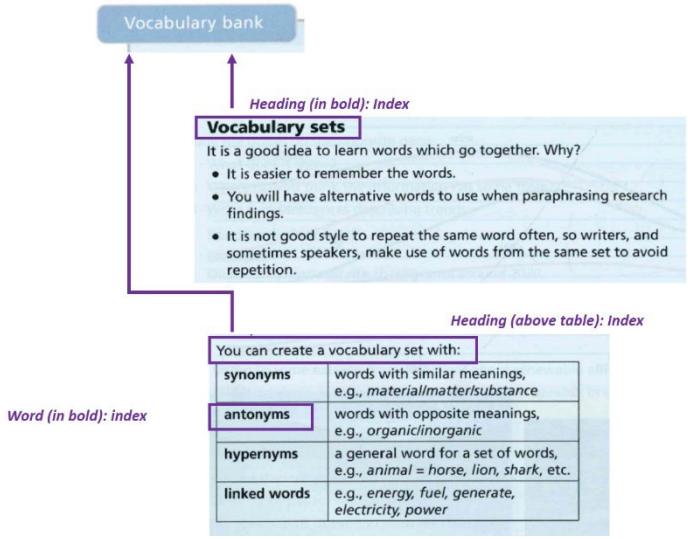


Figure 60: Sign functions present in sub-section 14

Sub-section 15

The next data sample section that was discussed was the table in the middle of page 44, the section titled *Describing Trends* (Figure 61 below).

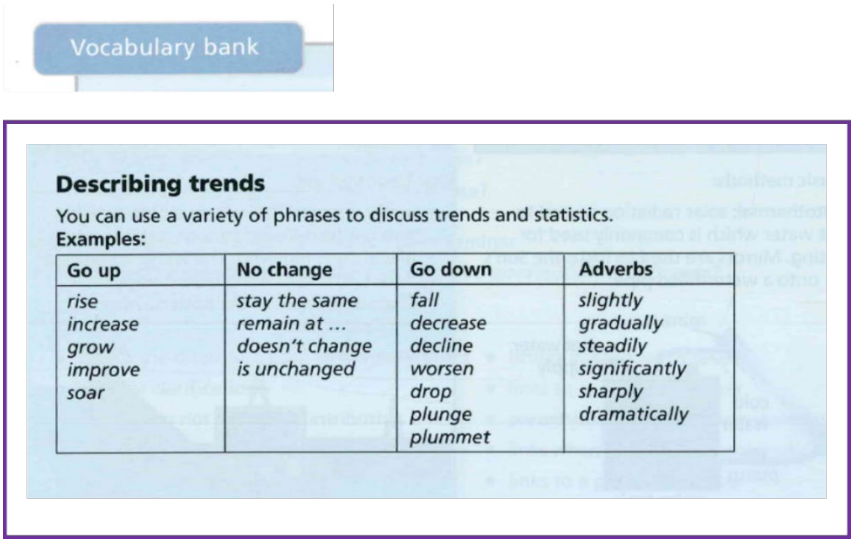


Figure 61: Sub-section 13

The table in the middle of the page consists of four columns and two rows. It also has a heading *Describing Trends*. The bold heading (*Describing Trends*) is mainly an indexical sign. It is indexical since it points the student back to the heading at the top of the page to indicate that this section of the unit deals with vocabulary only. The additional function of the heading is

symbolic. Then, just underneath this bold heading, there is a sentence stating: *You can use a variety of phrases to discuss trends and statistics.* This sentence also mainly functions as indexical since it "points" the student to the information in the table right underneath this sentence. After reading this sentence, the student will theoretically understand that the table will give additional information about trends and how to write about them. The additional function of the sentence is symbolic. The table consists of four columns. Each column has a word or phrase (in bold) in the first row. And then, under each bold printed word or phrase, there are several words in a second row. The bold words and phrases in the first row's function are mainly indexical since they direct the student to the list of words in the second row underneath each bold word. The additional function of the words is symbolic.

From the above analysis of this sub-section of the data sample, it is evident that the main sign function was indexical (see Figure 62).

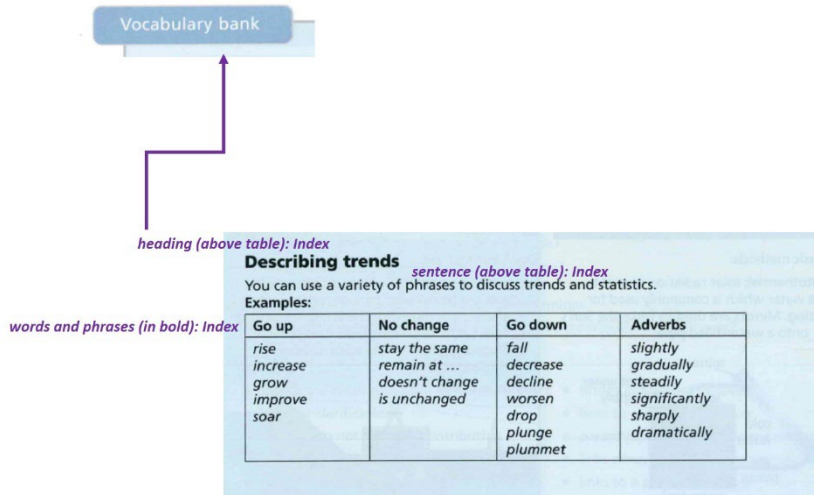
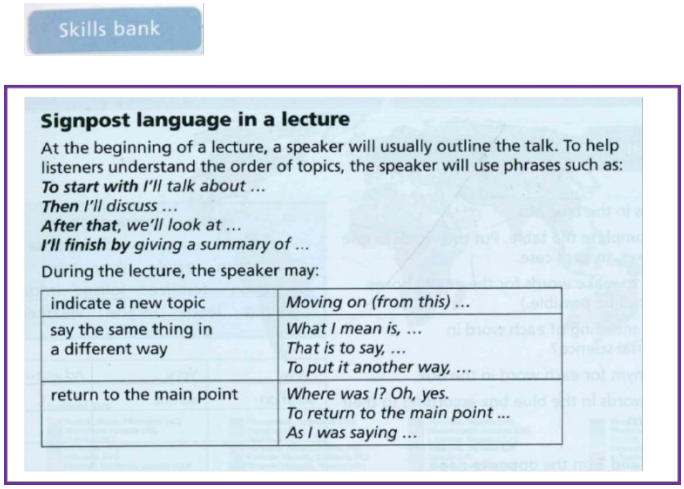


Figure 62: Sign functions present in sub-section 15

Sub-section 16

The first table on page 45 and written information in the bold heading above it (Figure 63) was the next data sample that was studied.


Skills bank

Signpost language in a lecture

At the beginning of a lecture, a speaker will usually outline the talk. To help listeners understand the order of topics, the speaker will use phrases such as:

***To start with** I'll talk about ...*
***Then** I'll discuss ...*
***After that**, we'll look at ...*
***I'll finish by** giving a summary of ...*

During the lecture, the speaker may:

indicate a new topic	*Moving on (from this) ...*
say the same thing in a different way	*What I mean is, ...* *That is to say, ...* *To put it another way, ...*
return to the main point	*Where was I? Oh, yes.* *To return to the main point ...* *As I was saying ...*

Figure 63: Sub-section 16

The table has a heading *Signpost language in a lecture.* The bold heading (*Signpost language in a lecture)* is an indexical sign. Its main function is indexical since it points the student back to the heading at the top of the page to indicate that this section of the unit deals with skills. The additional function of the heading is symbolic. Just underneath this heading, there is an explanation of what signpost language is. After this explanation, there is a table with two columns and three rows. In the first column in each row is a phrase; the rows in the second column also have phrases in it, but the second column's phrases seem to further explain the phrases in the first column. To be specific, the first column phrases are all statements that are further clarified by the information in the second column. The phrases in column one are also mainly indexical since these refer the student to the explanations in the second column. The additional function of the phrases is symbolic.

When looking at this section of the analysed data sample (analysis above), the conclusion was made that the main sign function was indexical (see Figure 64).

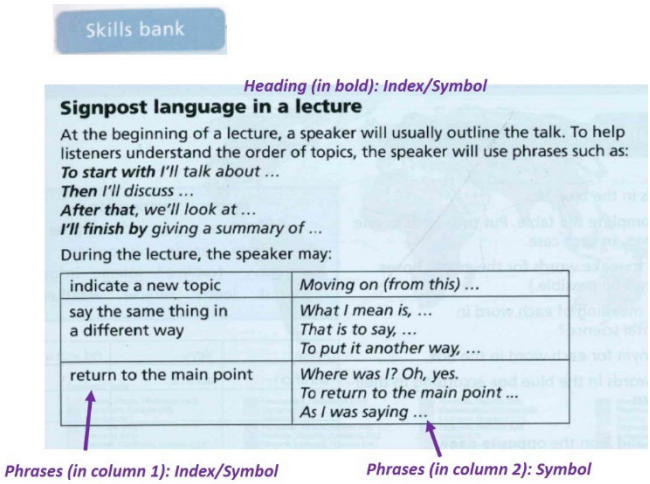


Figure 64: Sign functions present in sub-section 16

4. What affordances do the semiotic resources and sign types offer?

The indexical signs help to navigate the content. These guide the student through the content and create a link between the different pieces of content so that the student can see how each separate part connects to form the whole. The indexical signs also direct a student to focus on a particular part of the information on these pages. In other words, they help the student to understand what they are expected to do with the content on the page.

5. How are the semiotic resources linked into a meaning-making whole?

These are the last two pages on the unit of *energy resources*. Page 44 gives students additional information on vocabulary, which is a prominent part of the unit. Page 45 explains signpost language, but unlike vocabulary, which was previously discussed and practised throughout the unit, signpost language is new information. The assumption with the last two pages (44 and 45) is to conclude the unit and sum up what the student has learned. This information is pertinent in guiding student learning with the next unit in the textbook. In this case, it seems to do both (summing up the present unit and connecting to the next unit). It touches on the notion of vocabulary again, which was something the student had already dealt with in the unit in various exercises.

Furthermore, the vocabulary bank on page 44 is like an additional resource the student is able to consult while continuing with the rest of the units in the textbook – a page the student can go back to find some information to help answer future questions or assignments. The skills

bank on page 45 gives the student an outline of how information is ordered in a lecture by giving the student words and phrases that indicate a specific "point" in a lecture. To be clear, the signpost language is something important that students must pick up on during lectures to follow what is being said.

Conclusion to Vocabulary bank and Skills bank

The texts are all in English; thus, students (in this case, students in the literacy classes at the University of the Free State) who use the textbook also gain the opportunity to practise using English as a medium of instruction to construct meaning. They must write, read, and speak English while working through the exercises on page 44 and 45. Since English is the primary medium of instruction at the tertiary institute they attend, these types of exercises allow them to practise extracting main ideas and key details from an academic text; expressing information and opinions clearly in a written mode; and critically thinking about how to analyse, evaluate and apply the meaning they made from the exercises. These are skills specifically listed as outcomes for the Academic Literacy classes in which these books are used.

Using the semiotic resources on page 44 and 45, a student learns more about the concept of signpost language and how to use specific vocabulary. Furthermore, the small singular meaning-making processes that gradually connect to form a bigger meaning-making process is indicative of a scaffolding process. In an education context, this teaching method refers to an assortment of instructional techniques a teacher uses to move progressively toward a better understanding and, ultimately, independence in the learning process. With scaffolding, concepts are broken up into smaller parts or sections, which in theory creates an easier learning process. Looking at this text and starting the meaning-making process with singular resources first and then connecting the resources to create a bigger meaning mimics the scaffolding process. This also plays a part in allowing the student of the text to see that each semiotic resource has a particular place and plays a particular role in the meaning-making process.

Finally, after constructing meaning from all four sections (vocabulary, listening, extended skills and vocabulary bank and skills bank), a student will see the sections as a whole allowed learning about **types** of energy resources, and as a collective, all sections construct a more complete meaning of energy resources (see Figure 65 of the meaning-making process below).

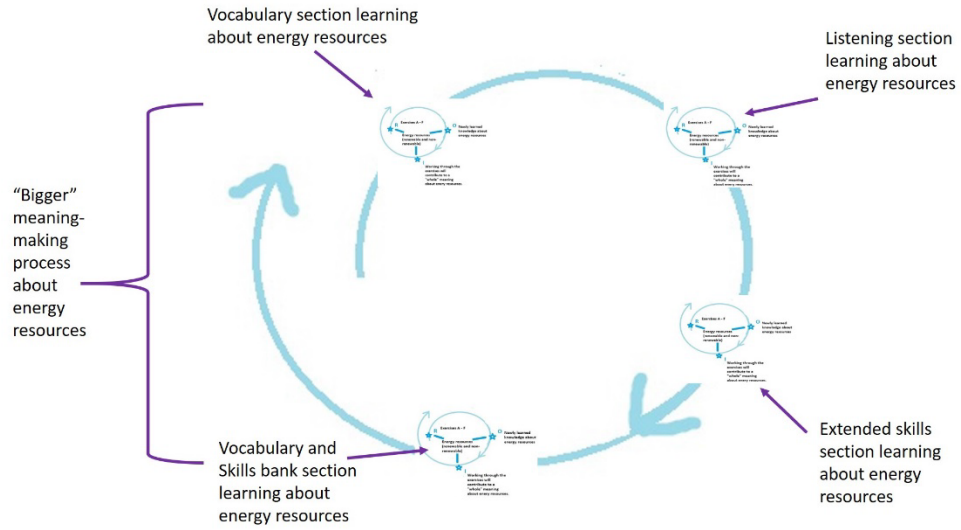


Figure 65: Collective construction of meaning-making from the whole Unit 5

5.3 Discussion of Analysis

The primary research question this study sought to answer was what relationship, if any, exists between the written text in a textbook and the other semiotic resources used for communication? The text that was analysed was a multimodal text. The text was comprised of a variety of semiotic resources. The main semiotic resources identified through the analysis was written text, visuals, audio, colour and shape. The written text was the predominantly used semiotic resource in the data sample. Colour and shape were present throughout the data sample, while the visuals and the audio were only used selectively in certain parts of the data sample.

After conducting the analysis, the conclusion was made that there is indeed a relationship between the written text and the other resources in the analysed text. Additionally, and equally important, the analysis also showed that it is the relationship between the semiotic resources that made it possible for meaning-making to occur, that all carried individual meaning and in combination with other semiotic resources also created collective meaning-making processes.

Looking at semiotic resources in the analysed text and subsequently allocating sign functions to all of them helped to create an understanding of the role each semiotic resource played in its smaller individual meaning-making process and in the "bigger", more extensive meaning-making processes that happened in the text. Using Peirce's sign classification, the data were

further classified into the categories of *index*, *symbol* and *icon*. The signs and sign functions that present in the analysed texts were the following:

The written text was the exercise prompts and the exercise instructions. Both of these functioned as indexical signs. The visuals were categorised as photographs, drawings and graphs. The photographs were either iconic and/or symbolic. The drawings were indexical and/or symbolic, and the graphs functioned as indexical and/or symbolic. The auditory parts of the text were the audio recordings, which were all indexical. Lastly, shapes were used as a semiotic resource. These were specifically the box/square/rectangle shapes placed around certain parts of the text. These also functioned as indexical (See Figure 66 below).

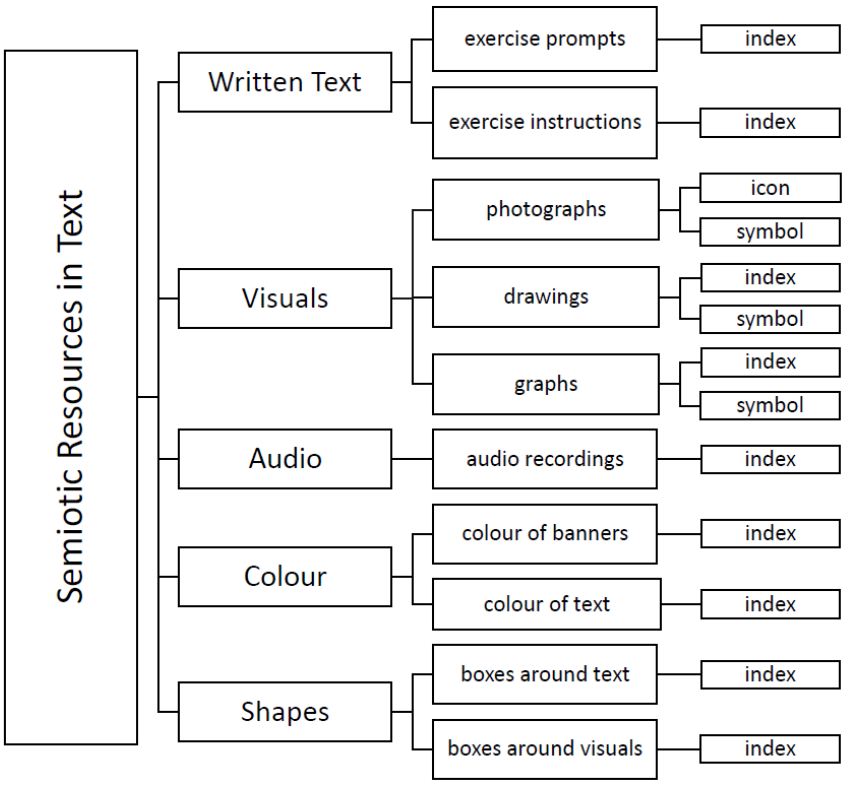


Figure 66: Signs/sign functions present in the data sample

The functions of the indexical signs were used to direct the student. Phrases like *look at…*, *listen to…*, and *study the…* all help guide the student through the text and indicate the order in which information in the text should be studied. The function of the symbols and icons was to help the student to learn new content and to activate background knowledge. For example, the

bars in the bar graph (sub-section 4 of the data) are symbolic. Studying the bars and subsequently the graph and understanding what information the bars led to new information about energy usage. When the student looks at the picture of the wind turbine (subsection 1 of the data), and if the student recognises that the photograph is that of a wind turbine, that could theoretically lead to the student recalling all the information he already has about the wind turbine, wind power, energy etc. An additional function of the iconic signs was to help link some of the visual information to something tangible in real life. Again, as an example, look at the photograph of the roof (sub-section 13). The photograph is of a roof with solar panels. The solar panels in the picture would resemble actual solar panels found in real life.

As stated earlier, the five questions that were used to analyse the data made it possible to first identify the individual semiotic resources of the text; secondly, to see how these individual semiotic resources all carry meaning; thirdly, to see how the individual resources connect to each other in order to collectively form meaning, and lastly to show how meaning is resemiotised from one semiotic resource to the next. Finally, the five questions also enabled me to see how the smaller individual meaning-making process connected to more extensive collective meaning-making processes; and how these collective meaning-making processes, in turn, again contributed to a subsequent learning process.

The analysis was conducted through a bottom-up approach. The analysis began by studying the smaller, individual semiotic resources and then progressed to analyse how the individual resources connect, forming a collective meaning which ultimately created a complete or "whole" message. However, it is also possible to have looked at it from a top-down approach. This would mean starting with the complete "whole" message and then breaking the collective meaning-making processes down into the individual semiotic resources. The researcher chose the bottom-up approach simply because it aligns with the scaffolding process used in education, where singular resources are looked at first and individually and then connected to the "whole". Theoretically, this is how the analysed text would be taught in a classroom. The student would have to start separating individual exercises to create meaning from each individually before connecting each exercise to the general topic of the whole text.

The second part of the research was a question about the relation between semiotic resources and text type. I wondered if a specific field of study would use particular semiotic resources. To answer this, a comparison will be made between the analysed data sample and a text from a different subject field. This will be discussed in the next section.

5.4 Comparison of semiotic resources across different subject fields

The second part of the research question asked if there is a possibility that there might be a relation between text type and semiotic resource used for meaning-making. In other words, the reason for the comparison was to see if a specific subject field preferred a specific semiotic resource for meaning-making. To answer the question, I compared the analysed text to another text from a different subject field. The analysed text was from a textbook used in Natural Sciences; the comparison text is from a textbook used in the Humanities. After studying and comparing the two texts, the following was observed (see the discussion that follows below). For clarity, the analysed text will be referred to as AT and the comparison text as CT for the discussion.

Both the AT and the CT use similar semiotic resources to make meaning. Both texts use language (written text) as the predominant semiotic resource for meaning-making. Both texts have colour, visuals and audio as additional semiotic resources (See Figure 68 below). Both texts use colour to sort and link the different parts of the text. The AT used the colour blue, and the comparison text used green. Like the AT, the CT has a main heading and small sub-headings, all of which are green. Also, just like in the AT, the headings of the CT indicate where the sub-sections begin and end. Both the AT and the CT have visuals, and in both texts, the visuals link to the written parts to make meaning. Both the AT and the CT have an audio component, and in both texts, the audio links to written parts in the text. Thus, in both texts, there is a meaning-making process taking place between written text and visuals and written text and audio. The two figures below respectively show each text and the semiotic resource it used for meaning-making. Figure 67 (below) shows the semiotic resources the analysed text used for meaning-making.

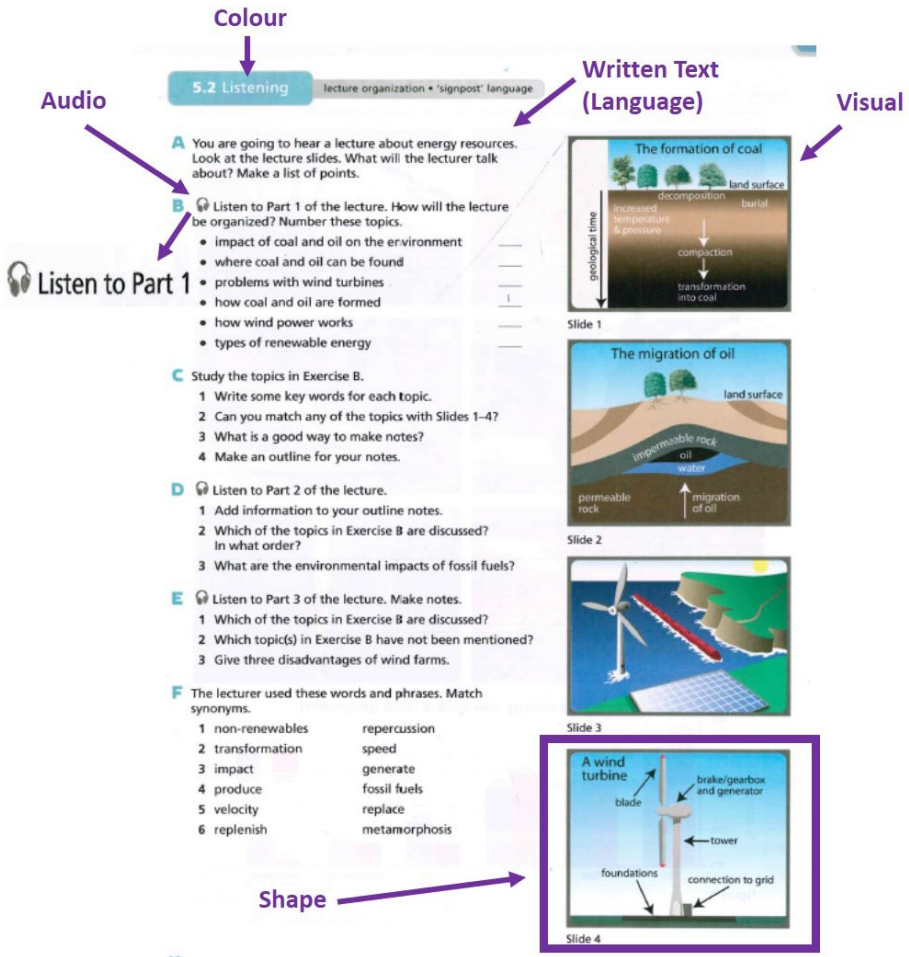


Figure 67: Semiotic resources used for meaning-making in the AT

The CT used the same semiotic resources as the AT to create meaning. It used written text as a predominant semiotic resource (just like the AT did), and it also used visuals, audio, shape and colour for meaning-making. The figure below shows the different semiotic resources found in the CT (see Figure 68).

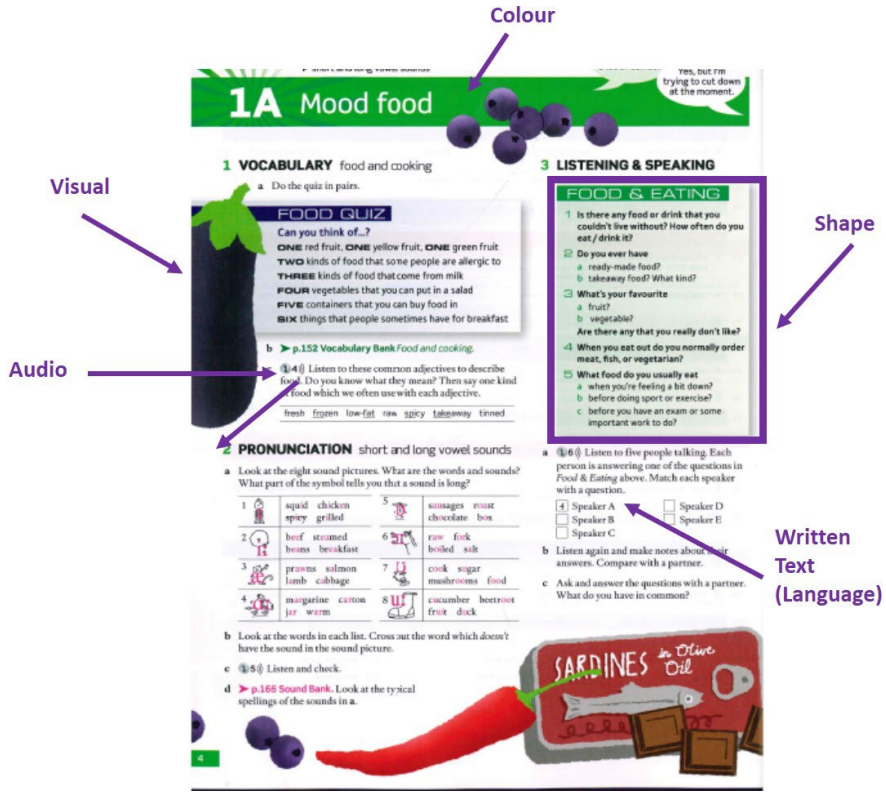


Figure 68: Semiotic resources used for meaning-making in the CT

Figure 69 is a side-by-side comparison of the AT and the CT to show each semiotic resource found the texts that formed parts of the meaning-making. The AT is from a textbook used in a science field, and the CT form a textbook used in the field of humanities. As seen from looking at both texts, it seems like each field use the same semiotic resources in the meaning-making process.

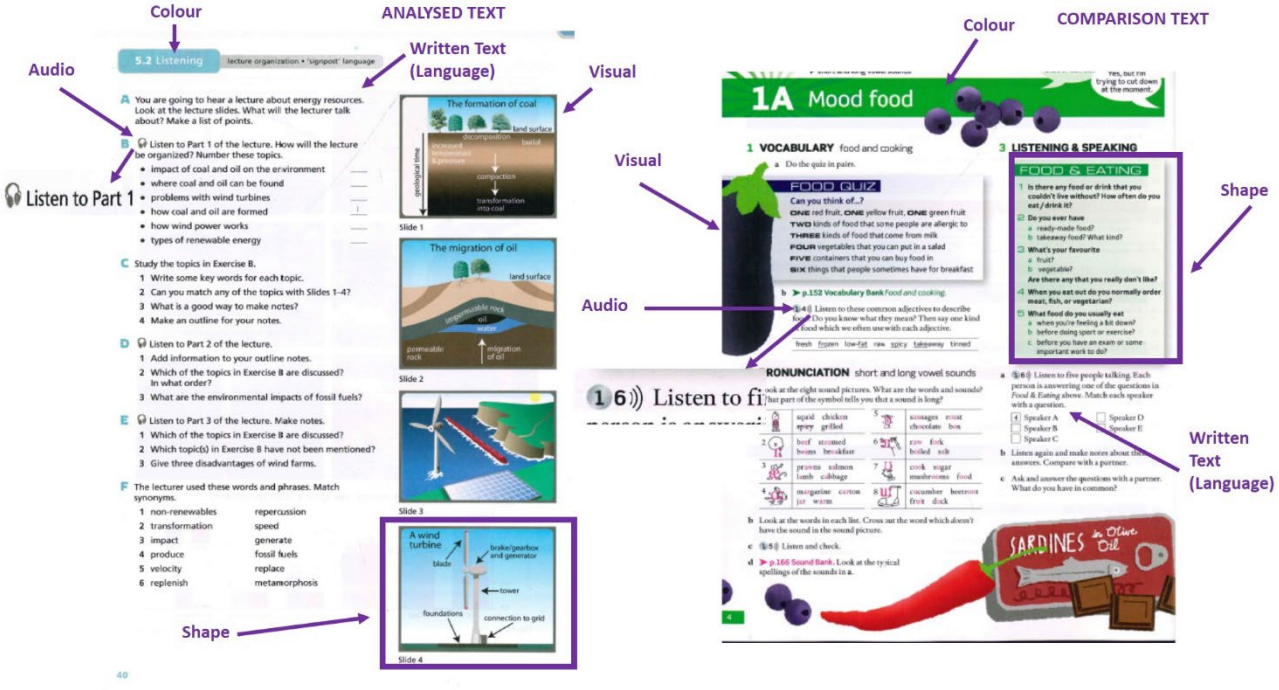


Figure 69 Side-to-side comparison of AT and CT

Furthermore, using Peirce categories of sign, both texts have indexical, symbolic and iconic sign functions. Figure 70 (below) shows that the AT has indexical, iconic and symbolic signs as part of the meaning-making process.

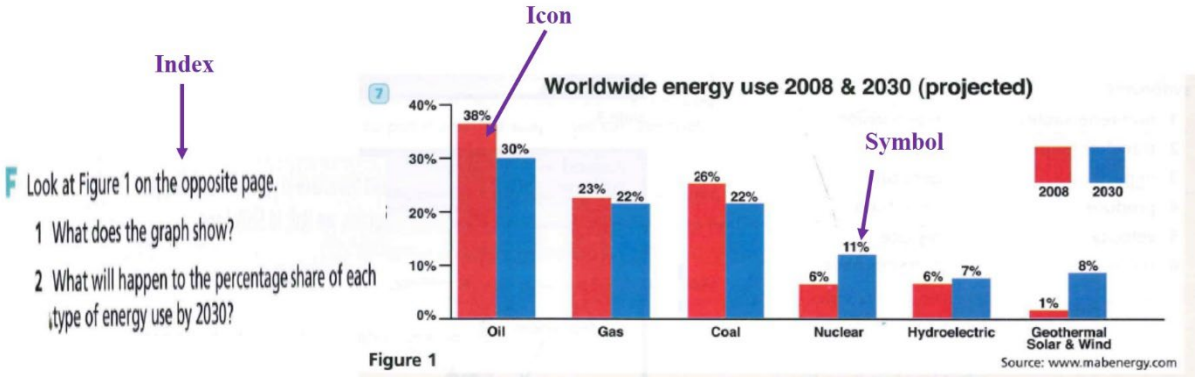


Figure 70: Signs present in the AT

When looking at the text example of the CT, you can see that the CT also use indexical, iconic as well as symbolic signs as part of the meaning-making process (see Figure 71 below).

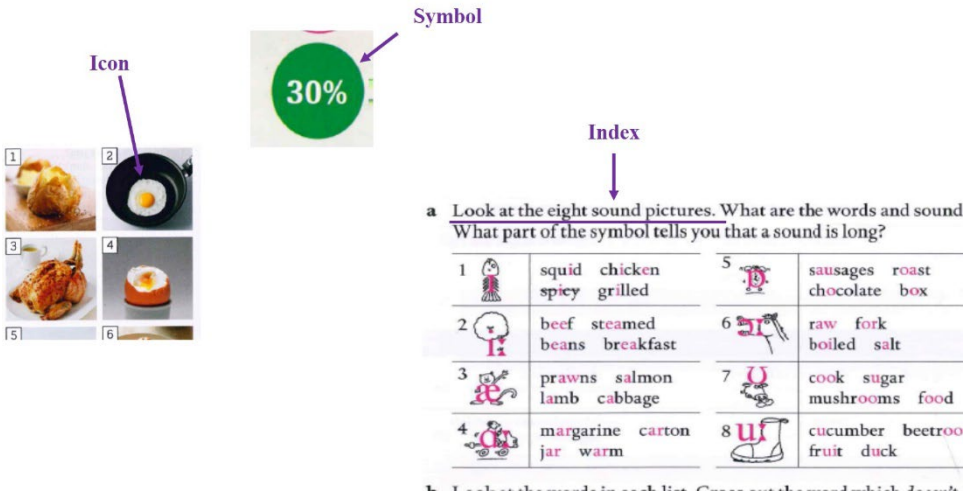


Figure 71: Signs present in the CT

Looking at the information discussed above, I concluded that both texts use prompts and question instructions to link the written part of the text (language) to the other semiotic resources like visuals or audio recordings. Additionally, both texts also use visuals as indexes and icons. In the AT, the visuals' main function was indexical, and the additional function was iconic and/or symbolic, which is similar to the CT. Since the visual resources link to the written parts of the text, they are also used as a point of reference back to the written text, which then makes them mainly indexical. However, sometimes just as in the AT, these also function as icons and or symbols. It does not seem like either one of the texts had a specific semiotic resource that was used for meaning-making that wasn't found in both of the texts. There might have been a slight difference in the frequency in terms of usage. For example, the CT had more visuals than the AT.

However, there were a few differences between the AT end the CT. These are the most discernable differences between the texts:

1) The content of the AT is all in one place, in Unit 5. The content of the CT is not all in one place. Some of the content is further back in the book, and the student is directed to the content by indexical language. The chapter in the CT is called mood food, and

the topic of the chapter is food. The chapter started on page 4 and ended on page 10. However, there are a few places in the chapter where there are instructions to go to a page further back in the book. Figure 72 (below) shows the instruction where the student is directed to page 152. Page 152 is a list of vocabulary words that all relate to the chapter's topic in the CT, food. Furthermore, page 152 also has a green heading which further links it to the food chapter, yet the information is not in the chapter itself.

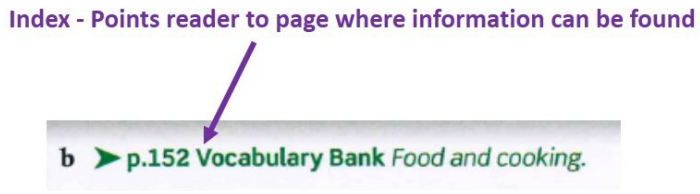


Figure 72: Indexical language in comparison text

2) As mentioned earlier, both texts have visuals as semiotic resources. But, where the AT's visual resources all link to some other semiotic resource on the page, it seems like in the comparison, there are visual resources that have no discernable link to any other semiotic resource or information found on the page. I will use Figure 73 as an explanation. On the top left-hand corner of the page of the CT, there is a picture of an aubergine. Nowhere in the written text in the chapter or the audio recording for this chapter does it mention an aubergine. The page of vocabulary (page 152) further back in the book has the word *aubergine* in it, but there is no language that serves as a link to the word (*aubergine)* on page 152 and the picture on page 4. The same is true for the picture at the bottom right-hand corner of the page. It is a picture of a tin of sardines, and again there is no mention of sardines in either the written component or the audio component of the text.
3) Additionally, unlike the aubergine, the sardines are not even mentioned on the vocabulary page (page 152) at the back of the book. This was not observed in the AT. All the visual resources are linked to some other resource in the AT, either through indexical language like prompts or audio recordings (see Figure 73).

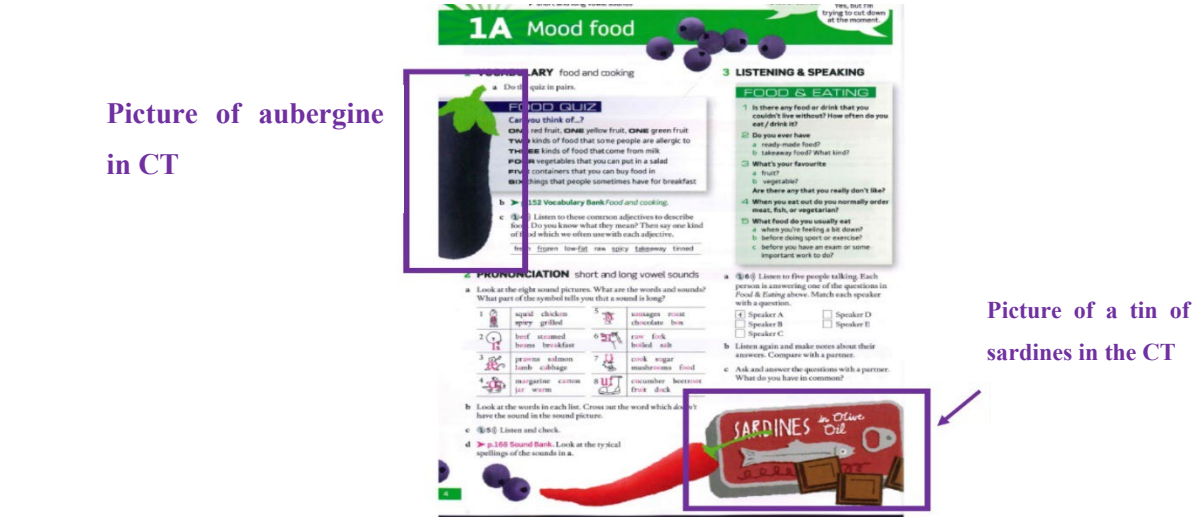


Figure 73: Visual resources in CT with no link to the content

4) Another difference is that a lot of the content in the AT were sorted into blocks, while in the CT, there were some pieces of information that were sorted into blocks as well as circles (Figure 74 below).

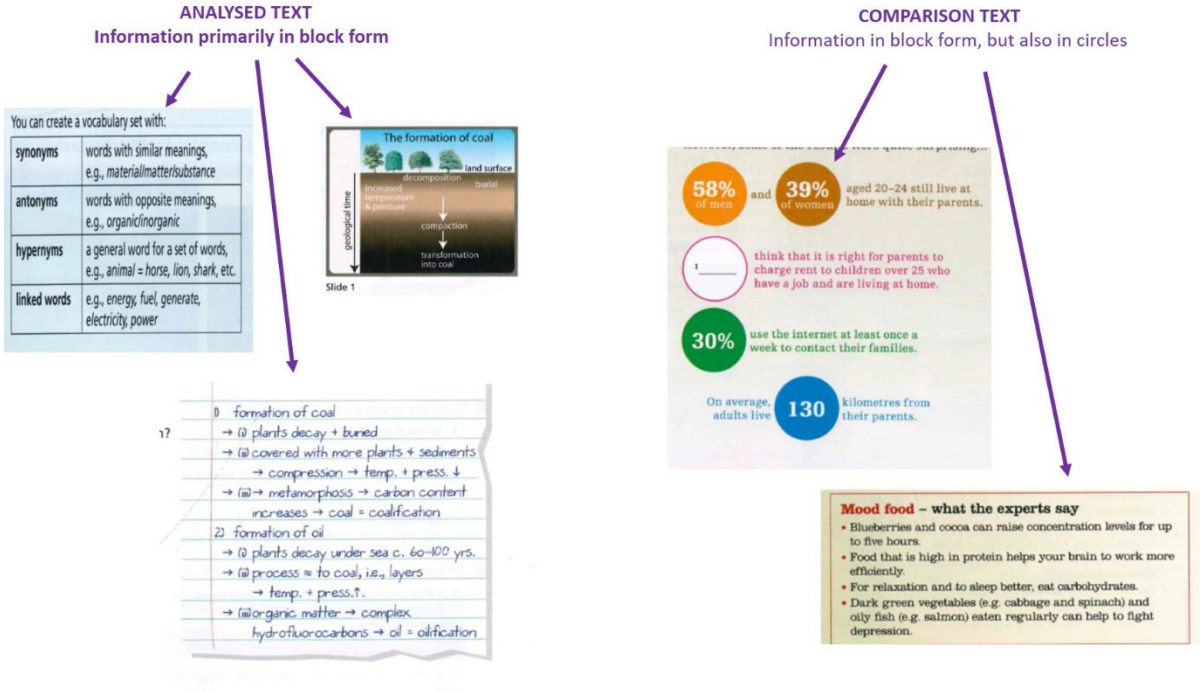


Figure 74: Sorted content in AT vs CT

5) One more noticeable difference in resources present between the CT and the AT is that the CT had the International Phonetic Alphabet (IPA) as a semiotic resource used for meaning-making, which the AT did not have (see Figure 75).

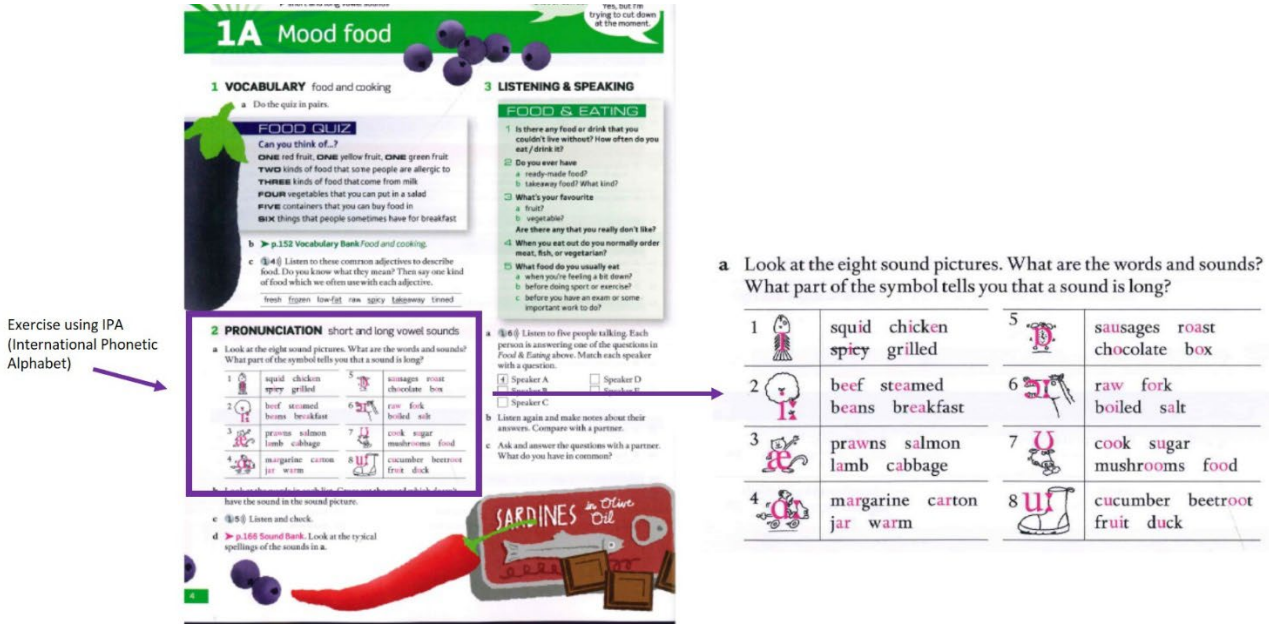


Figure 75: Comparison Text with IPA as a semiotic resource

6) Finally, the AT, on the other, uses graphs, like bar graphs and line graphs, as meaning-making resources, which are not used for meaning-making in the CT (See Figure 76 below).

Graphs - only part of analysed text

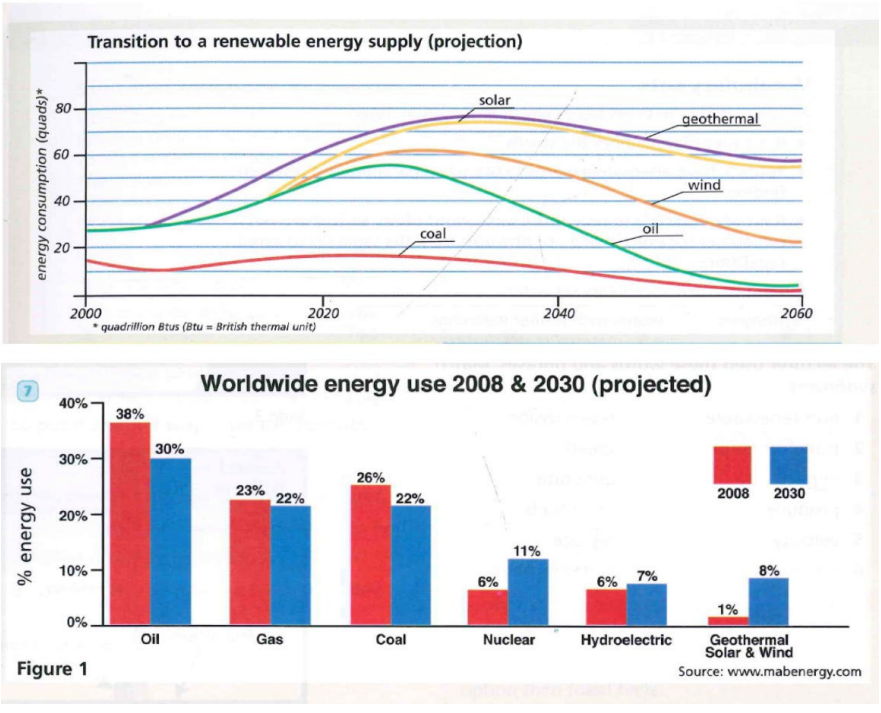


Figure 76: Graphs only found in the Analysed Text

In conclusion, the answer to the second part of the research question is that there is no noticeable relation between text type and semiotic resource used for meaning-making. Both texts have similar semiotic resources, except in the case of the graphs and IPA. The meaning-making processes in both texts are similar. Both texts have individual signs processes that carry their own meaning. Both texts sign processes use more than one semiotic resource to make signs, and both texts seem to have written text as the predominant semiotic resource in the sign-making process, as seen in the examples below (Figure 77).

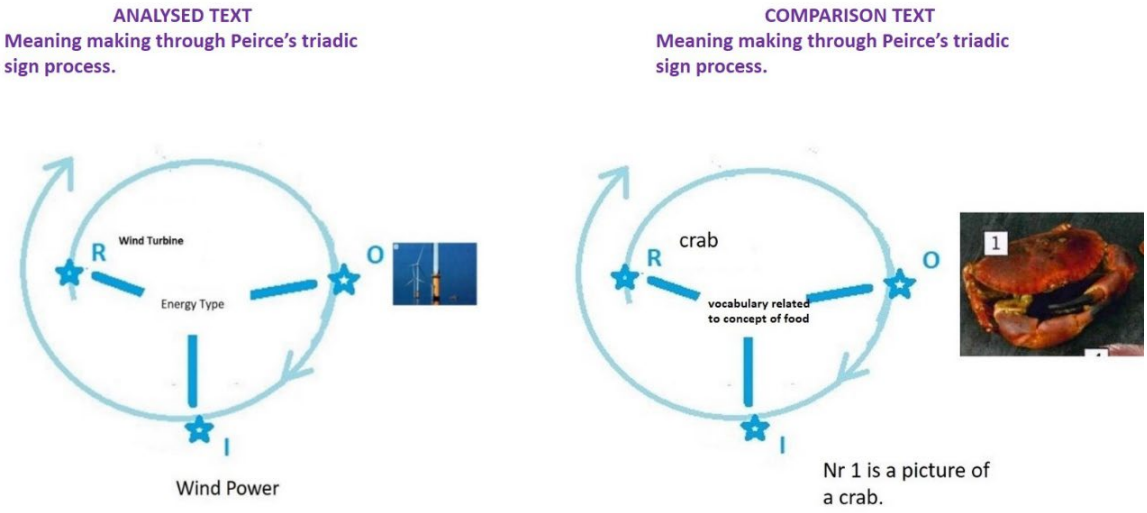


Figure 77: Analysed text sign process vs comparison text sign process

Both texts also have a similar collective meaning-making process, where the individual sign process collectively contributes to the main topics of the separate texts (see Figure 78).

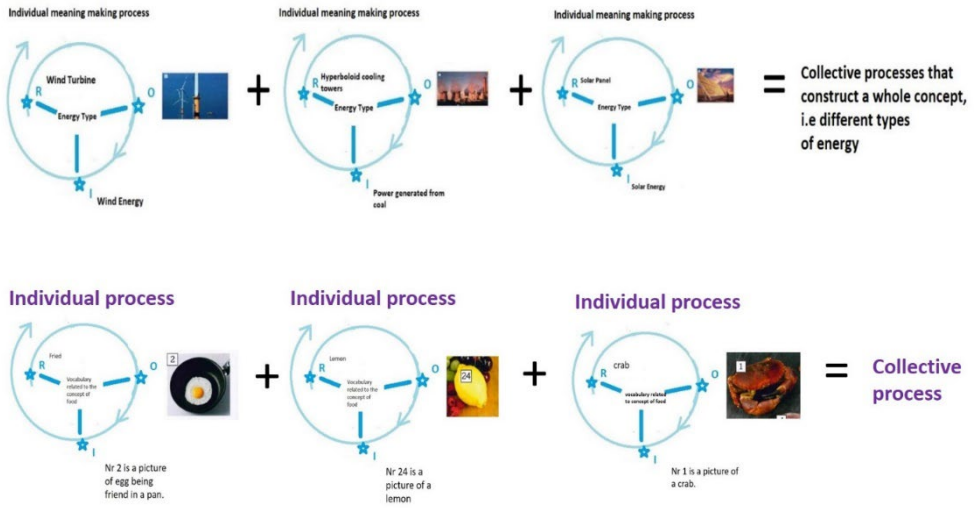


Figure 78: Similar collective meaning-making process

5.5 Conclusion

The analysis and the comparison of the two texts prove that there is a definite relationship between the written text and the other semiotic resources used for communication. It demonstrates that even though language still plays an important role in meaning-making, other semiotic resources can be combined with language to create meaning and aid in a learning process. Aside from language as semiotic resources, the other semiotic resources found in both the analysed text and comparison text were colours, shapes, visuals (like pictures of drawings) and audio. Besides a few minor differences, the research showed that regardless of subject matter, the same semiotic resources were used in the meaning-making processes of both texts. This means that when working with a multimodal text (or learning from a multimodal text), we must keep in mind that the meaning would not just be in the language but that all the semiotic resources in the text carry meaning.

The argument this research is trying to make is that regardless of the individual meaning each semiotic resource carries, it is the relationship these resources have with each other that illustrates the more significant meaning-making processes that are happening in multimodal texts. To understand this meaning-making process, I further argue that it is useful to look at multimodal texts as a translation process, specifically an intersemiotic translation process. Looking at these texts as translations where meaning-making happens through resemiotisation ensures that each semiotic resource will be recognized as an entity of meaning, with the potential to reproduce said meaning into a subsequent semiotic resource. Additionally, thinking of multimodal texts as intersemiotic translations also enable the student (or creator of said text) to remember that *all* semiotic resources are functional and that more than language can be used to create meaning. And more importantly, connecting these various semiotic resources, and organizing them in a logical fashion, will ensure that purposeful meaning-making and purposeful communication happen.

Our social world is a multitude of semiotic resources, from gestures to images and from sound to the physical objects in our environment. All of the above mentioned are used in combination with language to make and convey meaning. Therefore, we should step away from the notion of language as the only resource available to humans for communication. Since our social world is becoming more multimodal, it makes sense that our educational spaces should start to

mirror this. Educational theories like multiliteracies (see Chapter 3) already emphasize that learning is a more purposeful process if the learning environment is authentic to the learner social world, the world outside of school. Thus, if this environment is filled with many semiotic resources used for meaning-making and communication, the school environment should use those same resources for teaching and learning. Thus, in order to use each semiotic resource to its fullest potential to create a discourse that serves the purpose of education, it is helpful to look at this from a translation point of view. Translation is a recreation of meaning; intersemiotic translation (see Chapter 2) is the process of recreated or reproduced meaning that occurs between semiotic resources, where some resources specifically may not be language. Understanding that meaning is not just in the language parts of an educational text allows a student to pay attention to the other semiotic resources on the page that may have been ignored before. Looking at each semiotic resource and keeping in mind that there is a meaning recreation or reproduction that connects all the resources in the text allows for the more extensive meaning-making processes to happen. It gives more insight into the "whole" message since no semiotic resource in the text is seen as isolated or unable to function, and in an educational context being able to see the "bigger" picture is where the learning happens. Furthermore, studying multimodal texts through the scope of intersemiotic translation allows for a better understanding of how the various resources, as a whole, create meaning and form coherent multimodal communication. Understanding the meaning-making potential of semiotic resources and the part each resource plays in the meaning-making process enables the use and creation of "better" learning resources with more purpose.

Chapter 6: CONCLUSION and RECOMMENDATIONS

6.1 Introduction

The aim of this research was to conduct a descriptive content analysis of an academic literacy textbook that communicates predominantly via multimodal texts. The research problem that this study focused on was to find out if there is a connection or relationship between the various semiotic resources used in multimodal texts. The primary research question this study sought to answer was what is the relationship, if there is one, that exists between the written text in a textbook and the other semiotic resources present in multimodal communication? Although the primary objective of this research was to investigate various semiotic resources and the role each plays in a meaning-making process, the research also briefly looked at how these various semiotic resources compared across different subject fields. This was done to see whether specific semiotic resources are used for meaning-making in specific subject fields. To answer the research question, the thesis studied the role intersemiotic translation played in creating multimodal communication. The analysis focused on finding answers for the following questions: What semiotic resources were used when creating multimodal texts, and what is the relation, if any, between text type and semiotic resource? The former was answered by analysing a data sample, and the latter by comparingthe texts of two different textbooks.

6.2 Overview of the study

In Chapter 1, an outline of the study was given, and the research question was presented that formed the backbone of this study. The research question guided the study and provided the directive that shaped the outcome of the study. Chapter 2 discussed the theoretical frameworks, semiotics, multimodality, intersemiotic translation and resemiotisation. Chapter 3 gave an overview of multiliteracies, ESL and the unit for Academic Language and Literacy Development at the University of the Free State, while chapter 4 discussed research methodology. The data analysis and data comparison were made in chapter 5, and the research concluded with recommendations in chapter 6.

6.3 Research question

The primary research question this study aimed to answer was what relationship, if any, exists between the written text in the textbook and the other semiotic resources used for communication? Additionally, the research also looked at how semiotic resources compare across different subject fields.

6.4 Research design and methodology

Qualitative research was conducted to find an answer to the research question. Through descriptive and comparative analysis, the research analysed two multimodal texts. The researcher decided to combine resemiotisation with the Peircean trichotomy of icon, index, and symbol. Resemiotisation (see Chapter 2) asks how meaning is conceptualized when there is a shift between different semiotic resources. In other words, with resemiotisation, one is able to "see" how meaning is re-produced from one semiotic resource to another. Conceptualising this shift between semiotic resources can be better illustrated by using Peirce's icon, index, and symbol. Peirce's theory of signs (see Chapter 2) is about relationships. It is about showing the connection between text and sign in multimodal communication. When looking at a multimodal text, there is an assumption that the various smaller semiotic resources should link to one another to create a whole message. Thus, with resemiotisation, one is able to observe the meaning shift between semiotic resources; but in combining this with the sign categories of icon, index and symbol, one is further able to see where each resource fits in the meaning-making process. To try and illustrate this, the analysis used the following five questions:

1. *What are the semiotic resources used for meaning-making?*
2. *In which material modalities do these semiotic resources partake?*
3. *With what logic do the signs, icon, index, or symbol function?*
4. *What affordances do the semiotic resources and sign types offer?*
5. *How are the semiotic resources linked into a meaning-making whole?*

6.5 Data description

The analysed texts were multimodal and taken from two educational textbooks. These two textbooks were specifically chosen not just because of the various semiotic resources present in the texts but also because I had the opportunity to teach both the literacy courses which used these texts as course material. I am thus familiar with the content of each of these textbooks

and thought that the texts made an interesting and insightful multimodal and intersemiotic translation study.

6.6 Research findings

The first text was analysed using the five aforementioned questions to find if there was a meaningful relationship between the semiotic resources in the text. After doing the analysis, the following conclusions were made: 1) There was a multitude of semiotic resources that was used in the meaning- 2) There is a definite relationship between the various semiotic resources that were used for meaning-making. 3) Each semiotic resource carried meaning on its own, but the various resources connected or linked to collectively create meaning as well. 4) Various meaning-making processes were observed in the analysed text, and each semiotic resource carried an individual meaning; however, once the link between semiotic resources was realised, the meaning from one resource was resemiotised into a subsequent semiotic resource. This was the start of the "collective" meaning-making process whereby communication not just happens through the singular resources but also through the understanding that there is meaning in combining the resources as well. 5) The analysis furthershowed that it is in this relationship of interconnectedness between resources where the "whole" message lies and that the meaning-making process would be incomplete if the resources were not studied in relation to each other. 6) The analysis also looked at the potential of the various semiotic resources to be used as meaning-making entities. In other words, the analysis also showed that sometimes there is potential for a given semiotic resource to be used in a meaning-making process, and sometimes there are constraints that make a semiotic resource more difficult to use as part of a meaning-making process. This, however, is contextual and depends on various factors that the meaning "creator" should take into consideration when choosing resources for a meaning-making process. 7) Meaning in a multimodal text happens through all the semiotic resources in the text. To think of one as more important in terms of carrying meaning may constrain the meaning-making process. Each semiotic resource has meaning, and each should be seen as fundamental to the meaning-making process. The comparative analysis was between thefirst text and an additional text from a different subject field. The comparison showed that, for the most part, there was no distinct relation between semiotic resources and text type. The two texts used mostly similar resources for meaning-making.

6.7 Significance of the study

This research provided much insight into understanding the interaction between semiotic resources and language and how multimodal texts communicate meaning. This research also makes the argument that by looking at the processes of multimodal communication through the scope of intersemiotic translation, a different understanding of multimodal communication emerges. Looking at multimodality and multimodal communication through the lens of intersemiotic translation relates to a better understanding of these communication processes. This ultimately gives more insight into how semiotic resources interact and how the interaction is instrumental in the creation of meaning. Applying this knowledge to texts designed to serve a particular purpose, like texts in educational textbooks (especially if a framework and pedagogy like that of multiliteracies are also considered), will allow for these types of texts to become learning resources with more purpose.

6.8 Limitations

The limitations of this research are the following: Firstly, the data sample was small. Only two textbooks were used, and only one chapter of each book. Examining more than two textbooks could allow for the possibility of more semiotic resources to be found in texts, which subsequently could be analysed to give an even more comprehensive look into the relationship between semiotic resources in the meaning-making process. Secondly, comparing only two texts also narrows the possibility of proving a relation between semiotic resources and text type. Comparing more subject fields to one another may show that certain subject matter prefers specific semiotic resources for meaning-making. Finally, the texts were studied and analysed from the researcher's point of view. Analysing the meaning-making process from this point of view may differ from the point of view of the text designer. It may also differ from the way a student or teacher would look at the text and how they would connect the resources to create meaning. Other outcomes and analyses are thus possible.

6.9 Further studies

The analysis was led from only the point of view of the researcher. The analysed texts are created for a very specific purpose. It may be useful to analyse these texts from the point of view of the text designer, who may have specific reasons for the design and choice of resource.

In addition, it may prove insightful to examine these texts from the user's point of view by looking at how a teacher or a student would approach the text as a teaching and learning resource. Their point of view would be different from the researcher and could possibly provide a difference in the use and connection of semiotic resources.

That being said, I have a few recommendations based on what I 've found after analysing and comparing the two texts. Firstly, although a multimodal text is not a translation, is it useful to look at it from a translation point of view, especially in terms of the target audience or the targeted reader. The messages created through texts like these might have a specific target group of people or readers that the text was created for. It may be good to have a clear understanding of the target reader since this may help to choose the semiotic resources that will be best suited for the meaning-making process. For example, when choosing images, it should be important to remember that the images should be something familiar to the reader, especially if it is a text like this one where the reader is supposed to learn and/or better their second language. The written text (i.e. language) will already be challenging, and there is a chance that the written text (i.e. the language) may be challenging for the reader to follow and understand. Thus, if the images are not something in the reader's "lifeworld", it will be that much more difficult to follow and understand the meaning-making process. Secondly, simply using a variety of semiotic resources in a meaning-making process does not necessarily make the process easier. If there are too many of a particular semiotic resource, or if there are too many different semiotic resources used in the meaning-process, it may make the whole process more cumbersome. The analysis showed that understanding the relationship between the semiotic resources knowing how the resources link to one another is important for the meaning-making process. If there is an "overload" of semiotic resources, it may be difficult for the reader to connect them or to understand their underlying relationship. The arrangement of the resources may facilitate meaning-making, but it may hinder meaning-making if the arrangement of the resources is difficult to follow. This brings me to the next point, use all the resources purposefully. In other words, do not add additional semiotic resources if meaning can be made with the ones that are already there. If semiotic resources are added but have no purpose, their presence may be confusing, and since they do not necessarily add to the meaning-making process, it may also just hinder communication to take place.

However, to do any of this, it will be beneficial, as stated earlier, to study texts like these from the point of view of the reader/student or designer of texts like the ones looked at in this study.

REFERENCES

Aguiar, D., Atã, P. & Queiroz, J. 2015. Intersemiotic Translation and Transformational Creativity. *Punctum*, *International Journal of Semiotics*, 1(2):11-21.

Aiello, G. 2006. Theoretical Advances in Critical Visual Analysis: Perception, Ideology, Mythologies, and Social Semiotics. *Journal of Visual Literacy*, 26(2):89-102.

Aktulum, K. 2017. What is Intersemiotics? A Short Definition and Some Examples. *International Journal of Social Science and Humanity*, 7(1):33-36.

Alber, R. 2014. *6 Scaffolding Strategies to Use With Your Students*. https://www.edutopia.org/blog/scaffolding-lessons-six-strategies-rebecca-albe Date of Access: 01 Nov. 2021.

Anstey, M. & Bull, G. 2006. *Teaching And Learning Multiliteracies: Changing Times, Changing Literacies*. Newark: International Reading Association.

Archer, A. 2010. Multimodal texts in higher education and the implications for writing pedagogy. *English in Education.* 44 (3): 201-213.

Atkin, A. 2010. *Pierce's Theory of Signs*. http://plato.stanford.edu/entries/peirce-semiotics/ Date of Access: 22 Mar 2019.

Bal, M. 1994. *On meaning-making: Essays in Semiotics*. Sonoma: Polebridge Press.

Bezemer, J. 2012. 16 February. *What is multimodality? | MODE: multimodal methodologies*. [Blog Post]. https://mode.ioe.ac.uk/2012/02/16/what-is-multimodality/ Date of Access: 09 Jul. 2019.

Bezemer, J. & Cowan, K. 2021. Exploring Reading in Social Semiotics: Theory and Methods. *Education, 3-13*. 49(1):107-118.

Bezemer, J. & Kress, G. 2016. *Multimodality, Learning and Communication: A social semiotic frame*. London: Routledge.

Bock, Z. 2016. Multimodality, creativity and children's meaning-making: Drawings, writings, imaginings. *Linguistics Plus.* 49: 1 - 21.

Bruner, R. 2001. *Repetition is the First Principle of All Learning.* https://www.researchgate.net/publication/228318502_Repetition_is_the_First_Principle_of_All_Learning Date of Access: 10 Oct. 2021.

Catford, J. C. 1965. *A Linguistic Theory of Translation: An Essay in Applied Linguistics*. Oxford: Oxford University Press.

Center for Teaching and Learning. 2020. *Academic Literacy Courses.* https://www.ufs.ac.za/ctl/home-page/alld/academic-literacy-courses Date of Access: 23 Jan. 2021.

Chandler, D. 1999. *Semiotics for beginners*. http://visual-memory.co.uk/daniel/Documents/S4B/ Date of Access: 09 Apr. 2019.

Chapman, M., Ostwald, M.J. & Tucker, C. 2004. *Semiotics Interpretation and Political Resistance in Architecture.* Paper delivered at the 38th lnternational Conference of Architectural Science Association ANZAScA "Contexts of Architecture", Launceston. https://ogma.newcastle.edu.au/vital/access/manager/Repository/uon:4049 Date of Access: 23 Feb 2019.

Chimasko, T. & Shin, D.S. 2017. Multimodal Resemiotization and Authorial Agency in an L2 Writing Classroom. *Written Communication*, 34(4):387-413.

Cope, B. & Kalantzis, M. 2009. "Multiliteracies" : New Literacies, New Learning. *Pedagogies: An International Journal*, 4(3):164-195.

Cope, B. & Kalantzis, M., eds. 2000. *Multiliteracies, Literacy Learning and the Design of Social Futures.* New York: Routledge.

Corbin, J. & Strauss, A. 2008. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. 3rd edition. Thousand Oaks: SAGE.

Cross, J.L. 2017. Enigma: Aspects of Multimodal Inter-Semiotic Translation. *HERMES - Journal of Language and Communication in Business*, 55:91–103.

Curtin, B. 2009. *Semiotics and Visual Representation.* https://www.arch.chula.ac.th/journal/files/article/lJjpgMx2iiSun103202.pdf Date of Access: 16 Jan. 2018.

De Saussure, F. 1959. *Course in General Linguistics*, Translated from the French by Wade Baskin, edited by C. Bally & A. Sechehaye. New York: Philosophical Library.

Delu, Z. 2010. Social Semiotics as Appliable Semiotics. *Chinese Semiotic Studies*, 4(2):153-184.

Denzin, N.K. 1989. Interpretive Interactionism. Newbury Park: SAGE

Denzin, N.K. & Lincoln, Y.S., eds. 2002. *The Qualitative Inquiry Reader*. Thousand Oaks: SAGE.

Desjardins, R. 2008. Inter-Semiotic Translation within the Space of the Multimodal Text. *TranscUlturAl: A Journal of Translation and Cultural Studies*, 1(1):48-58.

Dicerto, S. 2017. *Multimodal Pragmatics And Translation: A New Model for Source Text Analysis*. Switzerland: Springer International.

Ding, E. 2016. Rethinking the Peircean trichotomy of icon, index, and symbol. *Semiotica*, 2016 (213):165-175.

Donato, R. 1994. Collective Scaffolding in Second Language Learning. In: Lantolf, J.P. & Appel, G., eds. *Vygotskian Approaches to Second Language Research*. Norwood: Ablex Publishing Corporation. pp. 33-57.

Donnellon, A., Gray, B. & Bougon, M.G. 1986. Communication, Meaning, and Organized Action. *Administrative Science Quarterly*, 31(1):43-55.

DIRAP (Directorate for Institutional Research and Academic Planning). 2021. *Monitoring and Institutional Research (MIR)*. https://www.ufs.ac.za/supportservices/departments/directorate-for-institutional-research-and-academic-planning-(dirap)-home/who-we-are/monitoring-and-institutional-research-(mir) Date of Access: 12 Oct. 2021.

Elgin, C.Z. 2011. Index and icon revisited. In: Colapietro, V.M. & Olshewsky T.M., eds. *Peirce's Doctrine of Signs: Theory, Applications, and Connections*. Berlin: De Gruyter Mouton. pp. 181-193.

Ellenström, L., ed. 2010. *Media Borders, Multimodality and Intermediality*. 2010th ed. London: Palgrave Macmillan UK.

ESLdirectory. 2021. *What is an ESL Program?* https://www.esldirectory.com/learning-english/what-is-esl/ Date of Access: 12 June 2021.

Fei, V.L. 2004. Problematising "Semiotic" Resource. In: Ventola, E., Charles, C. & Kaltenbacher, M., eds. *Perspectives on Multimodality*. Amsterdam: John Benjamins Publishing. pp. 51-65.

Fernández-Fontecha, A., O'Halloran, K., Tan, S. & Wignell, P. 2018. A multimodal approach to visual thinking: the scientific sketchnote. *Visual Communication*, 18(1):5-29.

Flick, U. 2014. *An Introduction to Qualitative Research*. 5th ed. London: SAGE.

Freeman, R. 2009. What is 'translation"? *Evidence and Policy*, 5(4):429-447.

Friedman, A. 2019. Digitizing Peircean semiotics to analyze students' peer-review comments: classroom use of an application in open-source R. *Social Semiotics*, 29(5): 684-697.

Galal, S. 2021. *Distribution of languages spoken inside and outside of households South Africa 2018*. https://www.statista.com/statistics/1114302/distribution-of-languages-spoken-inside-and-outside-of-households-in-south-africa/#statisticContainer Date of Access: 08 Feb 2022.

Ganapathy, M. 2016. The Effects of Using Multimodal Approaches in Meaning-Making of 21st Century Literacy Texts Among ESL Students in a Private School in Malaysia. *Australian International Academic Centre*, 7(2):2203-4714.

Gubrium, J.F. & Holstein, J.A. 1997. *The new language of qualitative method*. New York: Oxford University Press.

Halliday, M.A.K. 1978. *Language as Social Semiotic : The Social Interpretation of Language and Meaning*. Baltimore: University Park Press.

Halwani, N. 2017. Visual Aids and Multimedia in Second Language Acquisition. *English Language Teaching*, 10(6):53-59.

Harbeck, J. 2011. Index, icon, symbol: a tale of abduction. *Indexer*, 29(4):157-160.

Hartman, H. 1997. *Human learning and instruction*. Department of Education. New York: City College of City University of New York. (Textbook, Human Learning and Instruction undergraduate course).

Hull, G.A. & Nelson, M.E. 2005. Locating the Semiotic Power of Multimodality. *Written Communication*, 22(2):224-261.

Iedema, R. 2003. Multimodality, resemiotization: extending the analysis of discourse as multi-semiotic practice. *Visual Communication*, 2(1):29-57.

Iyer, R. & Luke, C. 2010. Multimodal, Multiliteracies: Texts and Literacies for the 21st Century. In: Pullen, D. & Cole, D., eds. *Multiliteracies and Technology Enhanced Education: Social Practice and the Global Classroom.* Hershey: Information Science Reference. pp. 18-34.

Jackson, R.L., Drummond, D.K. & Camara, S. 2007. What is qualitative research? *Qualitative Research Reports in Communication*, 8(1):21-28.

Jakobson, R. 1959. On Linguistic Aspects of Translation. In: Venuti, L., ed. 2004. *The Translation Studies Reader* 2nd ed. New York: Routledge. pp. 138-143.

Janks, H. 2014. Globalisation, Diversity, and Education: A South African Perspective. *The Educational Forum*. 78 (1): 8-25.

Jeff Bezemer. 2012, 15 March. *What is Multimodality*. [YouTube video]. https://www.youtube.com/watch?v=nt5wPIhhDDU&t=9s Date of Access: 27 May. 2018.

Jewitt, C., ed. 2009. *The Routledge Handbook of Multimodal Analysis*. London: Routledge.

Jewitt, C. 2012, 02 May. *Multimodal Methods for Researching Digital Data and Environments* [Podcast]. https://backdoorbroadcasting.net/2012/05/carey-jewitt-multimodal-methods-for-researching-digital-data-and-environments/ Date of Access: 11 Jul. 2020.

Jiang, L. 2017. The affordances of digital multimodal composing for EFL learning. *ELT Journal*, 71(4):413–423.

Johansen, J.D. 2016. The Distinction Between Icon, Index, And Symbol In The Study Of Literature. In: Herzfeld, M. & Melazzo, L., eds. *Semiotic Theory and Practice, Volume 1+2.* Berlin: De Gruyter Mouton. pp. 497-505.

Joseph Macwan, H. 2015. Using visual aids as authentic material in ESL classrooms. *Research Journal of English Language and Literature*, 3(1):91-96.

Kaplan, E. 2019. *6 Essential Strategies for Teaching English Language Learners*. https://www.edutopia.org/article/6-essential-strategies-teaching-english-language-learners Date of Access: 28 Nov. 2021.

Kayi-Aydar, H. 2013. Scaffolding language learning in an academic ESL classroom. *ELT Journal*, 67(3):324-355.

Kleinman, E. & Dwyer, F. 1999. Analysis of computerized visual skills: Relationships to intellectual skill and achievement. *International Journal of Instructional Media*, 26(1):53-69.

Klein, H.K. & Myers, M.D. 1999. A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly*, 23(1):67-93.

Kress, G. 1993. Against arbitrariness: The social production of the sign as a foundational issue in critical discourse analysis. *Discourse & Society*, 4(2):169-191.

Kress, G. 1996. *Before Writing: Rethinking the Paths to Literacy*. London: Routledge.

Kress, G. 2010. *Multimodality, A Social Semiotic Approach to Contemporary Communication*. Oxon: Routledge.

Kress, G. & Van Leeuwen, T. 2001. *Multimodal Discourse: The Modes and Media of Contemporary Communication*. London: Hodder Arnold.

Kourdis, E. & Yoka, C. 2012. *Intericonicity as intersemiotic translation in a globalized culture*. Paper delivered at 11th World Congress of the International Association for Semiotic Studies (IASS/AIS) Nanjing. http://ikee.lib.auth.gr/record/265113/files/Intericonicity_as_intersemiotic_translation_in_a_globalized_culture-libre.pdf Date of Access: 18 Mar. 2019.

Lamberti, P. 1999. *From word to word: a multiliteracies approach to language, literacy and communication for curriculum 2005.* Johannesburg: University of the Witwatersrand. (Thesis – Masters of Arts). https://wiredspace.wits.ac.za/bitstream/handle/10539/14633/Lamberti%20P%201999-001.pdf?sequence=1&isAllowed=y Date of Access: 16 Feb. 2021.

Latham-Koenig, C. & Oxenden, C. 2013. English File Intermediate Student's Book. Oxford: Oxford University Press.

Lee, R. 2009. English for Environmental Science. Reading: Garnett.

Lemke, J. 2006. Toward Critical Multimedia Literacy: Technology, Research and Politics. In: Mckenna, M.C., Labbo, L.D., Kieffer, R.D. & Reinking, D., eds. *International Handbook of Literacy and Technology.* Vol 2. Mahwah: Lawrence Erlbaum Associates Publishers. pp. 3 - 15.

Lotherington, H. & Jenson, J. 2011. Teaching Multimodal and Digital Literacy in L2 Settings: New Literacies, New Basics, New Pedagogies. *Annual Review of Applied Linguistics*, 31:226-246.

Magnusson, P. & Godhe, A.L. 2019. Multimodality in Language Education – Implications for Teaching. *Designs for Learning*, 11(1):127-137.

Mathew, N.G., Alidmat, A.O.H. 2013. A Study on the Usefulness of Audio-Visual Aids in EFL Classroom: Implications for Effective Instruction. *International Journal of Higher Education*, 2(2): 86-92.

Marais, K. 2019. *A (Bio)Semiotic Theory of Translation: The Emergence of Social-Cultural Reality*. New York: Routledge.

Mavers, D. & Machin, D. n.d. *Glossary of Multimodal Terms/Social Semiotics* [Blog post]. *https://multimodalityglossary.wordpress.com/social-semiotics/* Date of Access 01 Oct. 2021.

Maxwell, J.A. 2013. Qualitative Research Design: An Interactive Approach: An Interactive Approach. 3rd ed. Los Angeles: SAGE.

McMurtie, R.J. 2020. Aesthetics in the high-rise apartment complex: a social semiotic perspective. *Social Semiotics*, 30(1):65-88.

Mehawesh, M.I. 2014. The Socio-Semiotic Theory of Language and Translation: An overview. *International Journal of Languages and Literatures*, 2(2):251-269.

Mills, K.A 2006. Discovering design possibilities through a pedagogy of multiliteracies. *Journal of Learning Design*, 1(3):61-72.

Mills, K.A. 2009. Multiliteracies: Interrogating competing discourses. *Language and Education*, 23(2):103-116.

Mills, K.A. 2010. A Review of the "'Digital Turn'" in the New Literacy Studies. *Review of Educational Research*, 80(2):246-271.

Munday, J. 2012. *Introducing Translation Studies: Theories and Applications.* 4th ed. Oxon: Routledge.

Nehaniv, C. L. 2000. *The Making of Meaning in Societies: Semiotic & Information - Theoretic Background to the Evolution of Communication*. Paper delivered at the Proceedings of the AISB'00 Symposium on Starting from Society - the Application of Social Analogies to Computational Systems, Birmingham. https://uhra.herts.ac.uk/bitstream/handle/2299/7634/900819.pdf?sequence=1&isAllowed=y Date of Access: 06 May 2019.

O'Halloran, K.L. 2011. Multimodal Discourse Analysis. In: Hyland, K. & Paltridge, B., eds. *Companion to Discourse.* London: Continuum. pp. 120-138.

O'Halloran, K.L., Tan, S. & Wignell, P. 2016. Intersemiotic Translation as Resemiotisation: A Multimodal Perspective. *Signata*, (7):199-229.

Oostendorp, M. 2017. 'As an undergrad, I don't have the right to an opinion': Reconstructing Students as Creative Meaning-makers in the Applied English Language Classroom. *RELC Journal.* 48(2): 278–285.

O'Sullivan, C.M. 2013. Multimodality as Challenge and Resource for Translation. Translating Multimodalities. *JoSTrans: The Journal of Specialised Translation* 20: 2-14. https://jostrans.org/issue20/art_osullivan.php Date of Access: 11 Feb. 2018.

Osman, A. 2017. *Definition of Translation.* https://translationjournal.net/October-2017/definition-of-translation.html Date of Access: 10 Feb. 2019.

Pally, M. 1997. Critical Thinking in ESL: An argument for Sustained Content. *Journal of Second Language Writing*, 6(3):293-311.

Peirce, C.S. 1994. The Collected Papers of Charles Sanders Peirce. s.l.: s.n.

Pérez-González, L. 2020. Multimodality. In: Baker, M. & Saldanha, G., eds. *Routledge Encyclopedia of Translation Studies.* 3rd ed. New York: Routledge. pp. 346 - 351.

Petrilli, S., ed. 2003. *Translation*. Amsterdam: Rodopi.

Petrilli, S. & Ponzio, A. 2005. *Semiotics Unbounded Interpretive Routes through the Open Network of Signs*. Toronto: University of Toronto Press.

PharmaKon, all things drugs brains & technology. 2012. *Pharmaceutical symbols around the world*. https://pharmakondotme.wordpress.com/2012/04/30/pharmaceutical-symbols-around-the-world/ Date of Access: 15 Sep. 2019.

Piamsai, C. 2020. The Effect of Scaffolding on Non-proficient EFL Learners' Performance in an Academic Writing Class. *Language Education and Acquisition Research Network Journal*, 13(2):288-305.

Queiroz, J. & Atã, P. 2019. Intersemiotic Translation, Cognitive Artefact, and Creativity. *Adaptation*, 12(3):298-314.

Rasouli, L. 2008. Semiotics and Translation. *Threshold*, 2(2):22-33.

Reid, G., Snead, R., Pettiway, K., Simoneaux, B. 2016. Multimodal communication in the university: Surveying faculty across disciplines. *Across the Disciplines,* 13(1): 1 – 29.

Renukadevi, D. 2014. The Role of Listening in Language Acquisition; the Challenges & Strategies in Teaching Listening. *International Journal of Education and Information Studies,* 4 (1): 59 – 63.

Rost, M. 1994. *Introducing Listening.* London: Penguin.

Roswell, J. 2006. *Family Literacy Experience, Creating Reading and Writing Opportunities that Support Classroom Learning.* Canada: Pembroke.

Rutberg, S. & Bouikidis, C.D. 2018. Focusing on the Fundamentals: A Simplistic Differentiation Between Qualitative and Quantitative Research. *Nephrology nursing Journal*, 45(2):209-212.

Sebeok, T.A. 2001. *Signs: An Introduction to Semiotics*. 2nd ed. University of Toronto Press.

Sebeok, T. & Danesi, M. 2000. *The Forms of Meaning: Modeling Systems Theory and Semiotic Analysis*. Berlin: De Gruyter Mouton.

Seifert, D. 2016. *Top 5 Reasons Why Vocabulary Matters - InferCabulary*. https://infercabulary.com/top-5-reasons-why-vocabulary-matters/ Date of Access: 12 Jul. 2021.

Short, T. 2004. The Development of Peirce's Theory of Signs. In: Misak, C. ed. *The Cambridge Companion to Peirce*. Cambridge: Cambridge University Press. pp. 214 - 238.

Shuttleworth, M. & Cowie, M. 1997. *Dictionary of Translation Studies*. New York: St Jerome Publishing.

Shuttershock. 2014. 19 March. *A closeup to a sign outside a pharmacy in Paris* [photograph] https://www.shutterstock.com/image-photo/paris-france-19th-march-2014-closeup-285485168 Date of Access: 09 Jan. 2018.

Singh, C. K. S., Gopal, R., Tek, O. E., Masa Singh, T. S., Mostafa, N. A., & Ambar Singh R. K. (2020). ESL teachers' strategies to foster higher-order thinking skills to teach writing. *Malaysian Journal of Learning and Instruction*, 17(2):195-226.

Smolin, L.I. & Lawless, K. 2010. Using Multiliteracies to Facilitate Culturally Relevant Pedagogy in the Classroom. In: Cole, D.R & Pullen, D. L., eds. *Multiliteracies in Motion.* New York: Routledge. pp. 173-189.

Stecconi, U. 2006. *The Foundation of a General Theory of Translation*. Ann Arbor: University of London (Dissertation – PhD). https://www.proquest.com/pqdtglobal/docview/2351309424/D66F77D68EB24604PQ/6?accountid=17207 Date of Access: 26 November 2020.

Stecconi, U. 2009. Semiotics. In: Baker, M. & Saldanha, G., eds. *Routledge Encyclopedia of Translation Studies*, 2nd ed. London: Routledge. pp. 260-263.

Steyn, P. 2000. Teaching Issues: Rethinking Resources: Multimodal Pedagogies in the ESL Classroom. *TESOL Quarterly*. 34 (2): 333-336.

Steyn, P., Newfield, D. 2006. Multiliteracies and Multimodality IN English in Education in Africa: Mapping the Terrain. *English Studies in Africa.* 49(1): 1-21.

Strauss, A. & Corbin, J. 1990. *Basics of Qualitative Research.* London: Sage.

The New London Group. 1996. A Pedagogy of Multiliteracies: Designing Social Futures. *Harvard Educational Reviews*, 66(1):60–93.

Torop, P. 2003. Intersemiosis and Intersemiotic Translation. In: Petrilli, S., ed. *Translation.* Amsterdam: Rodopi. pp. 271-282.

Torresi, I. 2008. Advertising: A Case for Intersemiotic Translation. *Meta Translators' Journal*, 53(1):62-75.

Tymoczko, M. 2009. Why Translators Should Want to Internationalize Translation Studies. *The Translator*, 15(2):401-421.

Van Leeuwen, T. 2005. *Introducing Social Semiotics*. London: Routledge.

Walqui, A. 2006. Scaffolding Instruction for English Language Learners: A Conceptual Framework. *International Journal of Bilingual Education and Bilingualism,* (9)2:159-180.

Wijetunge, M., Jayasinghe, V.U & Weerarathne, J.T. 2016. Using Scaffolding to Enhance ESL Speaking Motivation at Undergraduate Level. Paper delivered at 9th International Research Conference-KDU, Rathmalana. https://www.researchgate.net/publication/334113047_Using_Scaffolding_to_Enhance_ESL_Speaking_Motivation_at_Undergraduate_Level Date of Access: 19 Feb. 2021.

Yıldırım, S., Yıldırım, Ö. (2016). The importance of listening in language learning and listening comprehension problems experienced by language learners: A literature review. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi*, 16 (4), 2094-2110.

ADDENDUM A: Text 1: *English for Environmental Science in Higher Education* pages 38 – 45, *Transcripts of audio* pages 116 – 119

5 ENERGY RESOURCES

5.1 Vocabulary

word sets: synonyms, antonyms, etc. • describing trends

A Look at the pictures on the opposite page.

1 Name the types of energy production.
2 Which types are most commonly used today?
3 Will this situation stay the same in the future?

B Study the words in box a.

1 Find pairs of words with similar meanings.
2 What part of speech is each word?

a

by means of change connection consequence consumption contemporary convert effect energy exploit global linkage modern power provide supply usage use (v) via worldwide

C Study the Hadford University handout on this page. Find pairs of blue words with similar meanings.

D Study the words in box b.

1 Find pairs of opposites.
2 Add more words to make a set.
3 Give a name or phrase to each word set.

b

advantage cheap clean drawback expensive finite hazardous inefficient modern out of favour polluting popular productive renewable safe traditional

E Work with a partner.

1 Choose an energy production method on the opposite page. Describe its characteristics. Use words from box b.
2 Your partner should guess which method you are talking about.

F Look at Figure 1 on the opposite page.

1 What does the graph show?
2 What will happen to the percentage share of each type of energy use by 2030?

HADFORD *University*

Faculty: Environmental Science

Lecture: Introduction to energy resources

Without energy, it would be very difficult for modern society to function and for modern industry to operate its machines. There are four basic kinds of energy we can use:

1 *The Earth's internal heat* – this is often exploited as geothermal power.
2 *Solar activity* – this provides energy for the wind and water cycle. It is converted into biomass via photosynthesis and it then generates heat and light.
3 *The pull of the Moon and Sun* – the gravitational effect causes tides.
4 *Nuclear power* – energy released from atoms.

All types of energy consumption have an effect on our natural environment. For example, there is a direct linkage between the burning of fossil fuels and increasing global temperatures. In addition, sulphur dioxide, which is a by-product of burning coal, contributes to acid rain which damages our natural surroundings. Therefore, it has become important for countries around the world to make hard decisions, and to develop less harmful types of energy production to confront the growing environmental problems which we face.

38

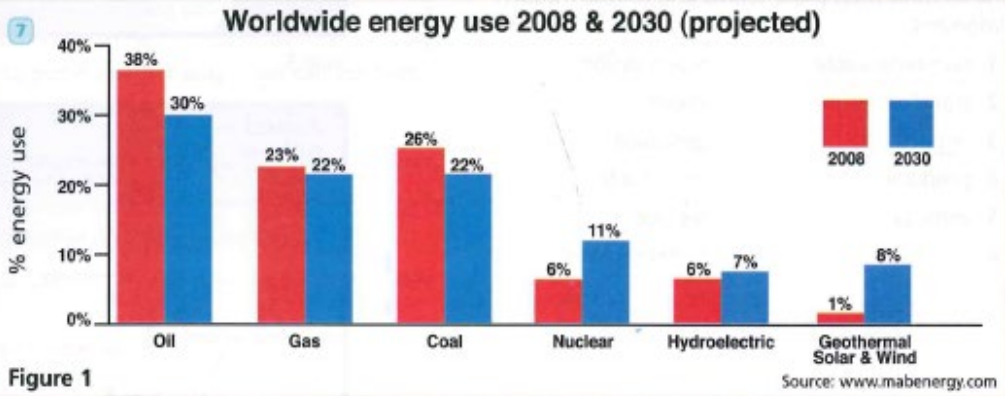


Figure 1

Source: www.mabenergy.com

5.2 Listening

lecture organization • 'signpost' language

A You are going to hear a lecture about energy resources. Look at the lecture slides. What will the lecturer talk about? Make a list of points.

B Listen to Part 1 of the lecture. How will the lecture be organized? Number these topics.

- impact of coal and oil on the environment ____
- where coal and oil can be found ____
- problems with wind turbines ____
- how coal and oil are formed 1
- how wind power works ____
- types of renewable energy ____

C Study the topics in Exercise B.

1 Write some key words for each topic.
2 Can you match any of the topics with Slides 1–4?
3 What is a good way to make notes?
4 Make an outline for your notes.

D Listen to Part 2 of the lecture.

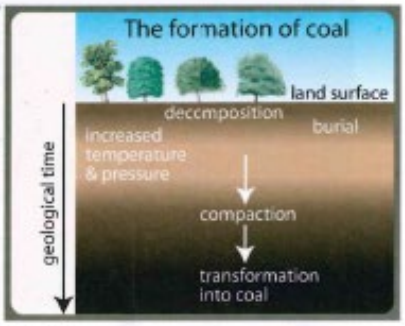
1 Add information to your outline notes.
2 Which of the topics in Exercise B are discussed? In what order?
3 What are the environmental impacts of fossil fuels?

E Listen to Part 3 of the lecture. Make notes.

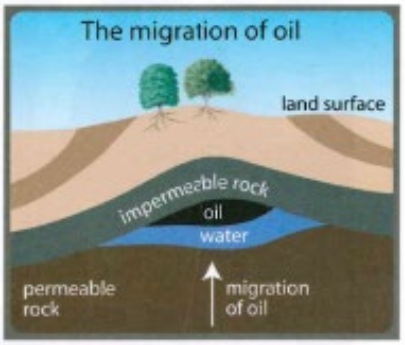
1 Which of the topics in Exercise B are discussed?
2 Which topic(s) in Exercise B have not been mentioned?
3 Give three disadvantages of wind farms.

F The lecturer used these words and phrases. Match synonyms.

1 non-renewables	repercussion
2 transformation	speed
3 impact	generate
4 produce	fossil fuels
5 velocity	replace
6 replenish	metamorphosis

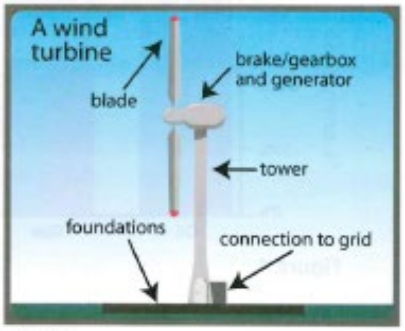


Slide 1



Slide 2

Slide 3



Slide 4

5.3 Extending skills

note-taking symbols • stress within words • lecture language

A Look at the student notes on the right. They are from the lecture in Lesson 5.2.

1 What do the symbols and abbreviations mean?
2 The notes contain some mistakes. Find and correct them.
3 Make the corrected notes into a flowchart.

1) formation of coal
→ (i) plants decay + buried
→ (ii) covered with more plants + sediments
→ compression → temp. + press. ↓
→ (iii) → metamorphosis → carbon content increases → coal = coalification
2) formation of oil
→ (i) plants decay under sea c. 60–100 yrs.
→ (ii) process ≈ to coal, i.e., layers
→ temp. + press.↑.
→ (iii) organic matter → complex hydrofluorocarbons → oil = oilification

B 🎧 Listen to the final part of the lecture (Part 4).

1 Summarize the lecturer's conclusion in your own words.
2 Why does the lecture have to stop?
3 What is the research task?

C 🎧 Listen to some stressed syllables. Identify the word below in each case. Number each word.

Example: You hear: 1 *sem* /sem/
You write:

assignment	___	fossil	___	renewables	___
carbon	___	overview	___	resources	___
decomposition	___	phytoplankton	___	seminar	1
energy	___	pollution	___	solar	___

D Study the extract from the lecture on the right.

1 Think of one word for each space.
2 🎧 Listen and check your ideas.
3 Match words or phrases from the blue box below with a different word or phrase from the lecture that has the same meaning.
4 Think of other words or phrases with similar meanings.

Of _____, wind power has been used for centuries, mainly for processing grain and irrigating farm land. But these days, it's increasingly used to generate electricity. In Slide 4 you can see how this process works. … _____, an average annual wind speed of over 5 cubic metres per second is desirable if a wind farm is to be economical. So, *it* _____ *that* the sites chosen to locate wind farms have a good wind resource. _____, even when wind farms are located in windy places, it has been estimated that they only operate for a third of the time. … *On the other* _____, it's clear that the more wind farms we build, the less we will be dependent on fossil fuels. *What I* _____ *is*, although *some people* _____ wind farms are not environmentally friendly, _____ they're still a less polluting option than fossil fuels.

according to some people fundamentally
however in fact obviously regrettably
to put it another way we can see that

E Discuss the research task set by the lecturer.

1 What kind of information should you find?
2 What do you already know?
3 Where can you find more information?

5.4 Extending skills

making effective contributions to a seminar

A Study the graph on the opposite page.

1 What does it show?

2 Where do you think the information has come from?

3 Write some sentences describing trends.

See *Vocabulary bank*

Example:
Oil consumption will rise sharply until around 2030.

B Listen to some extracts from a seminar about renewable energy.

1 What is wrong with the contribution of the last speaker in each case? Choose from the following:

- it is irrelevant
- the student interrupts
- the student doesn't contribute anything to the discussion
- it is not polite
- the student doesn't explain the relevance

2 What exactly does the student say, in each case?

3 What should the student say or do, in each case?

C Listen to some more extracts from the same seminar.

1 How does the second speaker make an effective contribution in each case? Choose from the following:

He/she:

- brings the discussion back to the main point
- asks for clarification
- links when not sure the contribution is new
- gives specific examples to explain a point
- disagrees politely with a previous speaker
- brings in another speaker
- links to a previous speaker
- paraphrases to check understanding
- links when not sure the contribution is relevant
- links to a previous speaker

2 What exactly does the student say, in each case?

3 What other ways do you know of saying the same things?

D Make a table of **Do's** (helpful ways) and **Don'ts** (unhelpful ways) of contributing to seminar discussions.

Do's	Don'ts
ask politely for information	demand information from other students

E Work in groups.

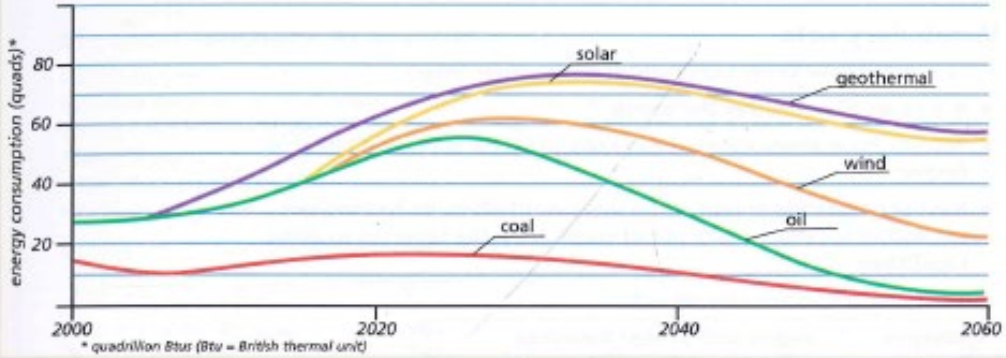
1 The teacher will ask you to look at a renewable energy type on the opposite page. Study your renewable energy type.

2 How efficient and environmentally friendly is your renewable energy type? Does it stand a chance of replacing traditional fossil fuels? Make sure you can justify your decisions.

3 Conduct a seminar. One person should act as observer.

F Report on your discussion and present your conclusions, giving reasons.

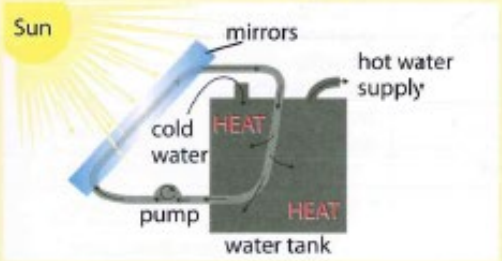
Transition to a renewable energy supply (projection)



A Solar power

Three basic methods:

- **photothermal:** solar radiation is used to heat water which is commonly used for heating. Mirrors are used to focus the Sun's rays onto a water-filled pipe.



- **passive solar energy:** use buildings to capture the Sun's energy. For example, a building may incorporate large windows.
- **photovoltaic conversion:** cells convert solar radiation into electricity via chemical energy.

Cost: 8 cents per kilowatt

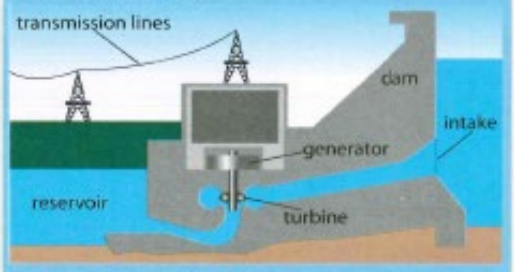
Impact on the environment:

- apart from manufacturing and disposal, solar power is totally pollution free

B Hydro power

One basic method:

- water is stored in a lake at a high altitude and can be released to turn turbines when electricity is required. The water is pumped back to the top of the mountain from a second reservoir at the bottom when demand is low.



Cost: 2 cents per kilowatt

Impact on the environment:

- can prevent serious flooding and irrigate crop land
- dams can reduce the amount of oxygen in the water and kill off fish stocks
- soils downstream are starved of the fertile silt deposits that are trapped behind the dam
- there is normally a high level of habitat destruction during the construction of the dam

Vocabulary bank

Vocabulary sets

It is a good idea to learn words which go together. Why?

- It is easier to remember the words.
- You will have alternative words to use when paraphrasing research findings.
- It is not good style to repeat the same word often, so writers, and sometimes speakers, make use of words from the same set to avoid repetition.

You can create a vocabulary set with:

synonyms	words with similar meanings, e.g., *material/matter/substance*
antonyms	words with opposite meanings, e.g., *organic/inorganic*
hypernyms	a general word for a set of words, e.g., *animal = horse, lion, shark*, etc.
linked words	e.g., *energy, fuel, generate, electricity, power*

Describing trends

You can use a variety of phrases to discuss trends and statistics.
Examples:

Go up	No change	Go down	Adverbs
rise *increase* *grow* *improve* *soar*	*stay the same* *remain at ...* *doesn't change* *is unchanged*	*fall* *decrease* *decline* *worsen* *drop* *plunge* *plummet*	*slightly* *gradually* *steadily* *significantly* *sharply* *dramatically*

Stance

Speakers often use certain words and phrases to show how they feel about what they are saying.
Common stance words are:

adverbs	*arguably* *naturally* *unfortunately*
phrases	*of course, ...* *it's essential to/that ...* *we might say that ...*

In many cases, different stance words and phrases are used in spoken and written language.

Spoken	Written
another thing	*additionally*
it seems	*evidently*
unfortunately	*regrettably*
believe	*contend*

Skills bank

Signpost language in a lecture

At the beginning of a lecture, a speaker will usually outline the talk. To help listeners understand the order of topics, the speaker will use phrases such as:
To start with *I'll talk about ...*
Then *I'll discuss ...*
After that, *we'll look at ...*
I'll finish by *giving a summary of ...*

During the lecture, the speaker may:

indicate a new topic	*Moving on (from this) ...*
say the same thing in a different way	*What I mean is, ...* *That is to say, ...* *To put it another way, ...*
return to the main point	*Where was I? Oh, yes.* *To return to the main point ...* *As I was saying ...*

Seminar language

The discussion leader may:

ask for information	*What did you learn about ...?* *Can you explain ...?* *Can you tell me a bit more about ...?*
ask for opinions	*What do you make of ...?* *This is interesting, isn't it?*
bring in other speakers	*What do you think, Majed?* *What is your opinion, Evie?*

Participants should:

be polite when disagreeing	*Actually, I don't quite agree ...*
make relevant contributions	*That reminds me ...*
give examples to explain a point	*I can give an example of that.*

Participants may:

agree with previous speaker	*I agree, and that's why ...* *That's true, so I think ...* *You're absolutely right, which is why ...*
disagree with previous speaker	*I don't think I agree with that. In my opinion ...* *I'm not sure that's true. I think ...*
link to a previous speaker	*As Jack said earlier, ...* *Going back to what Leila said a while ago ...*
ask for clarification	*Could you say more about ...?*
paraphrase to check understanding	*So what you're saying is ...*
refer back to establish relevance	*Just going back to ...*

Participants may not be sure if a contribution is new or relevant:
I'm sorry. Has anybody made the point that ...?
I don't know if this is relevant, but ...

Unit 3, Lesson 4, Exercise D 1.20

Part 3

However, it's not all doom and gloom. In 1987, over 30 countries signed the Montreal Protocol, in which the signatories agreed to cut CFC use by 50% by the year 2000. This protocol was further extended two years later, when over 80 countries agreed to stop using CFCs completely by the year 2000. Also, in 1991, a fund was set up to help developing countries change over to non-CFC technologies and it has met with some success. Hopefully, new technologies will continue to provide safer alternatives to CFCs, HCFCs and other gases that harm the atmosphere. One current example is the increase in use of coolants in air conditioning units which break down into relatively harmless compounds before they can reach the stratosphere. However, there is still some use of ozone-depleting gases, such as methyl bromide in some pesticides, and some countries who haven't signed the Montreal Protocol are still using CFCs. Because of this, and because of the long lifespan of the CFCs that are already in the stratosphere, it's estimated that it will take several lifetimes for the ozone layer to recover.

Unit 3, Lesson 4, Exercise E 1.21

Part 4

So we have seen that ozone occurs in two layers of the atmosphere, one layer naturally occurring and one man-made. We have also seen that there are significant dangers associated with depletion of the ozone shield.

In many respects, actions taken by governments on the ozone layer have been a great success. This shows how scientific knowledge can be used for the common good of people and the plants and animals we share the Earth with. It also proves that rapid action can be taken to stop the destruction of our natural environment. However, we now face an even bigger challenge in global warming. There is a growing consensus among scientists that anthropogenic greenhouse gases are creating an alarming increase in global temperatures. This will be the main focus of our next lecture.

Unit 5, Lesson 2, Exercise B 1.22

Part 1

Good morning, everyone. This morning we're going to begin the topic of energy resources. In this first talk, I'm just going to give you an overview of the two basic types of energy resources, namely renewables and non-renewables. One can define renewable energy sources as natural resources, such as sunlight and wind, which are naturally replaced or replenished. Non-renewables, on the other hand, are those resources that are finite in nature, such as coal or gas. Why are they finite? Because they were made millions of years ago and will eventually be exhausted. Other aspects of the topic, such as nuclear energy, will be dealt with in the next few lectures. Also, in your seminars and assignments you'll be able to cover all the important points in more detail. So ... er ... let's see – yes – to start with, we first need to consider *non-renewable* sources, in particular how coal and oil are formed, and then where they can be found. After that, I'll talk about their impact on the natural environment. I'll then talk about different *renewable* energy types. Finally, I'll focus on wind power. I'll describe how it works, and then finish off by discussing some problems with this particular form of renewable energy.

Unit 5, Lesson 2, Exercise D 1.23

Part 2

So, let's now consider two of the main non-renewables used today – coal and oil. These are often called fossil fuels. Let's see why. Originally, the energy in coal and oil came from the Sun. It was converted into biomass via photosynthesis. So coal is actually, er ... a sedimentary rock that has developed from the transformation of organic plant matter over hundreds of millions of years. Slide 1 illustrates this process. You can see that at the beginning of the process, plant material is buried, and it decays. This layer is then covered with additional plant matter – that's sometimes called litter – and eventually by sediments which are deposits of various sorts. This leads to the compaction – the pressing down – of the material which in turn results in high temperatures and pressure, and that leads to a metamorphosis of the material – that means a change – where the carbon content increases until coal is formed. This process is called coalification.

Moving on, let's now consider oil. It was made under the seas and oceans from the decomposition of microscopic life called phytoplankton. This happened around 60 to 100 million years ago. The process is similar to coalification, with layer upon layer of decaying phytoplankton again creating high temperatures and pressure. The organic

matter is transformed into complex hydrocarbons. These are the main compound that creates oil. This process is called maturation. In Slide 2 you can see how the oil moves to the surface after the maturation phase. The oil first migrates from a source rock stratum to a reservoir rock stratum. Here it is contained by an impermeable rock layer often called a cap rock.

What of the environmental repercussions of these two fossil fuels? In recent decades, scientific research has shown that the burning of fossil fuels releases a whole range of greenhouse gases into the atmosphere that are contributing to increased global temperatures. Another negative impact is that coal- and oil-fired power stations are often constructed next to rivers, because large amounts of water are needed for cooling. After cooling, the water is released back into the body of water at a higher temperature than the surroundings, and this, of course, causes changes to the local ecosystem. This is known as thermal pollution. Finally, we are all aware of the damage that oil spills have caused in recent years to our marine and coastal environments. It's obvious, then, that fossil fuels have major impacts on the environment. So, are renewables the answer?

Unit 5, Lesson 2, Exercise E 1.24

Part 3

In recent decades, developments in technology have made it possible for renewable energy production to become economically competitive with traditional fossil fuels. Also, of course, the price of oil has risen on the international markets. What are the main renewable types?

There are many renewable sources of energy, including photothermal energy, passive solar energy, biofuels, photovoltaic conversion, wind power, wave power and tidal power. In fact, in my own neighbourhood several houses have recently installed photothermal systems where solar radiation is used to heat water. Unfortunately, we're still only talking about a very small minority, mainly because of the ridiculous planning laws in this country ... er ... where was I? Oh yes, so as we can see there are numerous ways we can generate energy from natural resources, energy which is naturally replenished. So let's now look at one example – wind power – and examine its potential.

Of course, wind power has been used for centuries, mainly for processing grain and irrigating farm land. But these days, it's increasingly used to generate electricity. In Slide 4 you can see how this process works. Electricity is produced by blades which turn a gear mechanism that is attached to a generator. The power generated is, of course, dependent on the amount of wind velocity. Unfortunately, an average annual wind speed of over 5 cubic metres per second is desirable if a wind farm is to be economical. So, it follows that the sites chosen to locate wind farms have a good wind resource. Actually, even when wind farms are located in windy places, it has been estimated that they only operate for a third of the time. There are other problems with power generation from wind. Firstly, some people feel that the large windmills look ugly and take up a large area. Secondly, they make a lot of noise. Thirdly, some people say they are harmful to wildlife – birds can be killed by the blades, and fish stocks can be affected if the turbines are sited at sea. On the other hand, it's clear that the more wind farms we build, the less we will be dependent on fossil fuels. What I mean is, although some people say wind farms are not environmentally friendly, basically they're still a less polluting option than fossil fuels.

Unit 5, Lesson 3, Exercise B 1.25

Part 4

So, we can see that there are no easy answers to producing energy in a sustainable manner. The burning of fossil fuels is clearly linked to global warming, but the replacement of them by renewables faces many problems. To put it another way, far more effort is required of both the public and private sectors to develop renewable energy sources. However ... oh, dear ... sadly, I see that we've run out of time. This means that I'll have to ask *you* to do some research. I'd like you to find out more information about renewable energy, including biofuels, wave power, waste to energy and tidal power, and see if you can find any information about future projections of their use. We'll discuss what you've found out next time I see you.

Unit 5, Lesson 3, Exercise C 1.26

1 'seminar
2 'solar
3 a'ssignment
4 'fossil
5 'energy

6 re'newable

7 phyto'plankton

8 'carbon

9 decompo'sition

10 'overview

11 po'llution

12 re'sources

Unit 5, Lesson 3, Exercise D 1.27

Of course, wind power has been used for centuries, mainly for processing grain and irrigating farm land. But these days, it's increasingly used to generate electricity. In Slide 4 you can see how this process works. ... Unfortunately, an average annual wind speed of over 5 cubic metres per second is desirable if a wind farm is to be economical. So, it follows that the sites chosen to locate wind farms have a good wind resource. Actually, even when wind farms are located in windy places, it has been estimated that they only operate for a third of the time. ... On the other hand, it's clear that the more wind farms we build, the less we will be cependent on fossil fuels. What I mean is, although some people say wind farms are not environmentally friendly, basically they're still a less polluting option than fossil fuels.

Unit 5, Lesson 4, Exercise B 1.28

Extract 1

LECTURER: Right, Leila and Majed, what more did you find out about wind power?

LEILA: Well, first of all, we did some online research on the noise pollution caused by wind farms.

MAJED: I spent such a long time on the Internet yesterday.

Extract 2

LECTURER: And what else did you do?

LEILA: We also went to the library to do some research on the effects wind turbines have on wildlife. The librarian was quite helpful.

MAJED: That's rubbish. She obviously didn't want to talk to us.

Extract 3

LECTURER: Leila, can you give us an explanation of your graph?

LEILA: Well, yes, it has a vertical and a horizontal axis. The vertical axis shows projected world energy consumption and the horizontal axis is a time line from 2000 until 2060. And as you can see, we've put different types of traditional and renewable energy types on it.

LECTURER: What do the rest of you make of this? Evie, what about you?

EVIE: Well, erm ... I'm not sure really.

Extract 4

LECTURER: Majed, can you explain how you decided on which renewable energy types to place in the graph?

MAJED: Well, yes, it's based on what are projected to be the main renewables in use by 2060.

JACK: If they are fully committed.

Extract 5

LECTURER: Who do you mean by 'they', Jack?

JACK: I mean the countries who have signed the Kyoto agreement to reduce their carbon emissions ...

EVIE: Actually, some big polluters haven't signed.

Unit 5, Lesson 4, Exercise C 1.29

Extract 6

LECTURER: Let's go back to this graph for the moment. First of all, tell us about the time scale you chose.

LEILA: Well, we know that those countries who have signed up to Kyoto have decided to reduce their carbon footprints by 80% by 2060. Haven't they, Majed?

MAJED: Absolutely. This date is an important benchmark when considering the projected transition to sustainable energy supplies. So that's why we chose it.

Extract 7

MAJED: If we look at the graph again we can see that solar energy can potentially supply enormous amounts of energy.

JACK: Sorry, I don't follow. Could you possibly explain why you say 'potentially'?

MAJED: Well, basically this graph is only a

projection. If this transition is to occur, both governments and the private sector will have to start investing now.

Extract 8

EVIE: I don't understand the meaning of the term 'geothermal' in the graph.

LEILA: Well, geothermal means energy that is produced from the heat inside the Earth. For example, in parts of Iceland they extract hot water from an aquifer layer and use it to heat buildings.

Extract 9

MAJED: Also, geothermal power converts hot water into steam to generate electricity.

JACK: If I understand you correctly, you're saying that geothermal power uses energy generated within the Earth's core?

MAJED: Yes, that's right.

Extract 10

LECTURER: This is all very interesting, isn't it?

EVIE: Yes, but if we just go back to Majed's and Leila's findings, they have shown a possible future where most of our energy needs will come from renewables, if countries fully commit themselves.

LEILA: Correct!

Extract 11

JACK: I think the whole idea is silly. I mean, how can the developing world afford all of these new green technologies when they're struggling to feed themselves?

MAJED: I'm not sure that's true. I think that the cost of replacing traditional fossil fuels with renewable energy is falling every year. And let's not forget that the price of oil and gas has soared in recent decades.

Extract 12

LECTURER: So what do you think is the most important point about these projections?

EVIE: Well, as Leila said earlier, the projections help us to see the relative contributions of renewable energy supplies in the near future.

Extract 13

LECTURER: Any other ideas?

JACK: I'm sorry. Has anybody made the point that the graph doesn't give any data comparing take-up rates in the developing world and the developed world?

LECTURER: No, actually. Leila, could you explain why you omitted this? It's an important subject area.

Extract 14

LECTURER: So how else could we help developing countries build up their renewable energy supplies?

EVIE: I don't know if this is relevant, but the Soros Foundation has given large grants to universities in the developing world to research renewable technologies which are appropriate to their needs.

LECTURER: Yes, that's interesting. Perhaps that's another way to help.

Unit 7, Lesson 2, Exercise B 1.30

Part 1

Good morning, everyone. What I'm going to talk about today is how we can properly deal with waste: that is, how rubbish can be disposed of in an efficient and ethical manner without harming the environment. Until recently, most waste has been either buried in landfill sites or simply burnt; in environmental terms, both of these two methods are highly polluting. So in recent decades, governments and individuals have looked towards recycling as an alternative way of processing waste. One can define recycling as the collection and separation of waste and its eventual reuse. Some types of recycling reuse the material for the same product; for example, in the case of aluminium cans, they can be recast into new ones. The other type of recycling turns the processed material into something completely new; for example, old car tyres becoming a rubberized road surface.

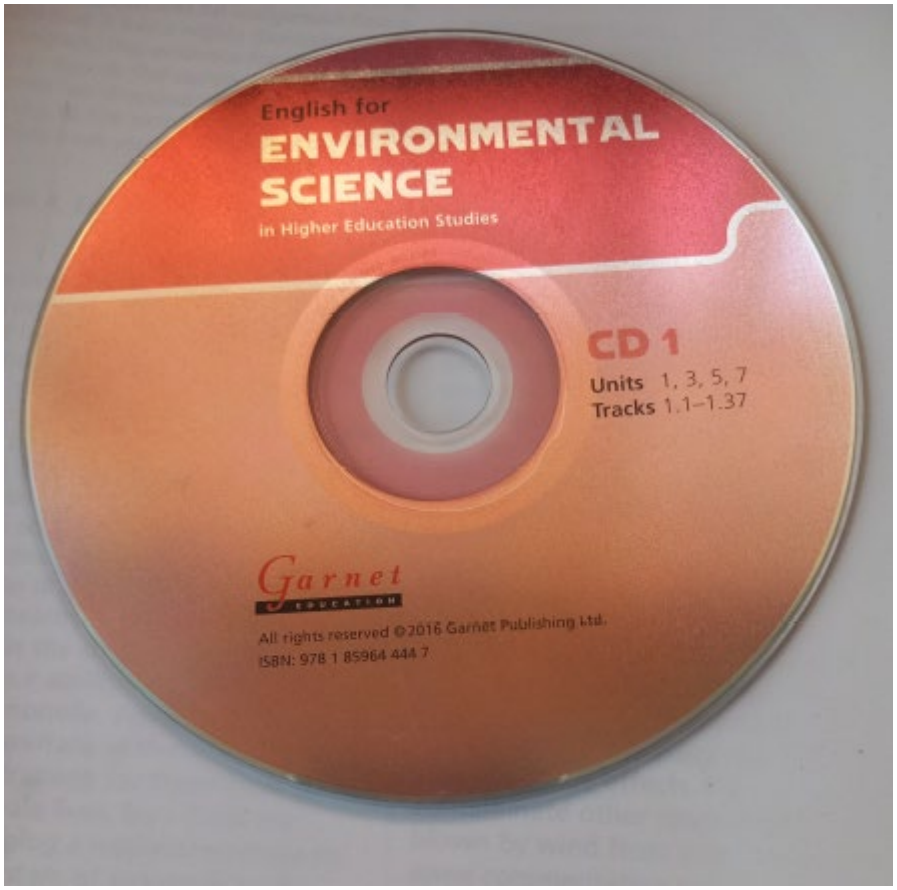
Anyway, we'll look at specific examples of recycling processes and products later on, I mean, another time. Today, we'll start by focusing on general types of recycling processes and how waste can be collected for recycling. Then we'll look at the relative advantages and disadvantages associated with current recycling programmes, and finally we'll look at the importance of individual members of society taking some responsibility for recycling and reducing their waste.

Unit 7, Lesson 2, Exercise D 1.31

Part 2

As we have seen in an earlier session, the amount of waste produced in our modern consumerist economies increases year by year. In environmental

Compact Disk: *English for Environmental Science in Higher Education*



ADDENDUM B: Text 2: *English File Intermediate Student's Book* pages 4 - 11, 132 – 133, 152 *Transcripts of audio page* 122

G present simple and continuous, action and non-action verbs
V food and cooking
P short and long vowel sounds

Do you drink a lot of coffee?

Yes, but I'm trying to cut down at the moment.

1A Mood food

1 VOCABULARY food and cooking

a Do the quiz in pairs.

FOOD QUIZ

Can you think of...?

ONE red fruit, **ONE** yellow fruit, **ONE** green fruit
TWO kinds of food that some people are allergic to
THREE kinds of food that come from milk
FOUR vegetables that you can put in a salad
FIVE containers that you can buy food in
SIX things that people sometimes have for breakfast

b ➤ p.152 Vocabulary Bank *Food and cooking.*

c 1 4)) Listen to these common adjectives to describe food. Do you know what they mean? Then say one kind of food which we often use with each adjective.

fresh frozen low-fat raw spicy takeaway tinned

2 PRONUNCIATION short and long vowel sounds

a Look at the eight sound pictures. What are the words and sounds? What part of the symbol tells you that a sound is long?

1 /ɪ/	squid chicken spicy grilled	5 /ɒ/	sausages roast chocolate box
2 /iː/	beef steamed beans breakfast	6 /ɔː/	raw fork boiled salt
3 /æ/	prawns salmon lamb cabbage	7 /ʊ/	cook sugar mushrooms food
4 /ɑː/	margarine carton jar warm	8 /uː/	cucumber beetroot fruit duck

b Look at the words in each list. Cross out the word which *doesn't* have the sound in the sound picture.

c 1 5)) Listen and check.

d ➤ p.166 Sound Bank. Look at the typical spellings of the sounds in a.

3 LISTENING & SPEAKING

FOOD & EATING

1 **Is there any food or drink that you couldn't live without? How often do you eat / drink it?**
2 **Do you ever have**
  a ready-made food?
  b takeaway food? What kind?
3 **What's your favourite**
  a fruit?
  b vegetable?
  Are there any that you really don't like?
4 **When you eat out do you normally order meat, fish, or vegetarian?**
5 **What food do you usually eat**
  a when you're feeling a bit down?
  b before doing sport or exercise?
  c before you have an exam or some important work to do?

a 1 6)) Listen to five people talking. Each person is answering one of the questions in *Food & Eating* above. Match each speaker with a question.

- [4] Speaker A
- [ ] Speaker B
- [ ] Speaker C
- [ ] Speaker D
- [ ] Speaker E

b Listen again and make notes about their answers. Compare with a partner.

c Ask and answer the questions with a partner. What do you have in common?

4 READING

a Are the foods in the list **carbohydrates** or **proteins**? With a partner, think of four more kinds of food for each category.

cake chicken pasta salmon

b With a partner, answer the questions below with either **carbohydrates** or **proteins**.

What kind of food do you think it is better to eat…?

- for lunch if you have an important exam or meeting
- for breakfast
- for your evening meal
- if you are feeling stressed

c Look at the title of the article. What do you think it means? Read the article once to find out, and to check your answers to **b**.

d Read the article again. Then with a partner, say in your own words why the following people are mentioned. Give as much information as you can.

1 Dr Paul Clayton
2 people on diets
3 schoolchildren
4 Paul and Terry
5 nightclub owners in Bournemouth

e Find adjectives in the article for the verbs and nouns in the list. What's the difference between the two adjectives made from *stress*?

stress (*noun*) (x2) relax (*verb*) wake (*verb*) sleep (*verb*) power (*noun*) violence (*noun*) oil (*noun*)

f Ask and answer the questions with a partner.

1 What time of day do you normally eat protein and carbohydrates? How do they make you feel?
2 How often do you eat chocolate? Does it make you feel happier?
3 After reading the article, is there anything you would change about your eating habits?

Mood food

We live in a stressful world, and daily life can sometimes make us feel tired, stressed, or depressed. Some people go to the doctor's for help, others try alternative therapies, but the place to find a cure could be somewhere completely different: in the kitchen.

Dr Paul Clayton, a food expert from Middlesex University, says 'The brain is affected by what you eat and drink, just like every other part of your body. Certain types of food contain substances which affect how you think and feel.'

For example, food which is high in carbohydrates can make us feel more relaxed. It also makes us feel happy. Research has shown that people on diets often begin to feel a little depressed after two weeks because they are eating fewer carbohydrates.

On the other hand, food which is rich in protein makes us feel awake and focused. Research has shown that schoolchildren who eat a high-protein breakfast often do better at school than children whose breakfast is lower in protein. Also, eating the right kind of meal at lunchtime can make a difference if you have an exam in the afternoon or a business meeting where you need to make some quick decisions. In an experiment for a BBC TV programme two chess players, both former British champions, had different meals before playing each other. Paul had a plate of prosciutto and salad (full of protein from the red meat), and his opponent Terry had pasta with a creamy sauce (full of carbohydrate). In the chess match Terry felt sleepy, and took much longer than Paul to make decisions about what moves to make. The experiment was repeated several times with the same result.

Another powerful mood food could become a secret weapon in the fight against crime. In Bournemouth in the south of England, where late-night violence can be a problem, some nightclub owners have come up with a solution. They give their clients free chocolate at the end of the night. The results have been dramatic, with a 60% reduction in violent incidents.

Why does chocolate make people less aggressive? First, it causes the brain to release feel-good chemicals called endorphins. It also contains a lot of sugar, which gives you energy, and can help stop late-night tiredness turning into aggression. These two things, together with a delicious taste, make chocolate a powerful mood changer.

Mood food – what the experts say

- Blueberries and cocoa can raise concentration levels for up to five hours.
- Food that is high in protein helps your brain to work more efficiently.
- For relaxation and to sleep better, eat carbohydrates.
- Dark green vegetables (e.g. cabbage and spinach) and oily fish (e.g. salmon) eaten regularly can help to fight depression.

Adapted from a British newspaper

5 LISTENING & SPEAKING

a Ask and answer the questions with a partner.

RESTAURANTS

1 How often do you eat out?
2 What's your favourite...?
  a kind of food (French, Italian, etc.)
  b restaurant dish
3 How important are these things to you in a restaurant? Number them 1–4 (1 = the most important).
  ☐ the food
  ☐ the service
  ☐ the atmosphere
  ☐ the price
4 Have you ever tried English food? What did you think of it?

b 1.7 Read the text about Steve Anderson. Then listen to **Part 1** of an interview with him, and number the photos in the order he mentions them.

c Listen again. Why does he mention each thing?

d 1.8 Now listen to **Part 2** and answer the questions.

1 What does he say is the best and worst thing about running a restaurant?
2 What's the main difference between British and Spanish customers?
3 What kind of customers does he find difficult?
4 How does he think eating habits in Spain are changing?

e What about you? Answer the questions with a partner.

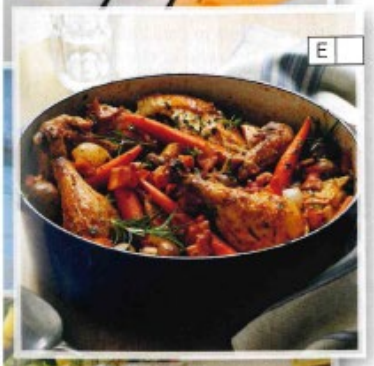
1 What was your favourite food when you were a child?
2 Is there anything that you like / don't like cooking?
3 In your country, when people eat out would they normally tell the chef what they really think about the food?
4 Do you know anyone who is a 'difficult customer' in restaurants?

STEVE ANDERSON has always had a passion for food. He was first taught to cook by his mother, who is half Burmese. After studying physics at university, he got a holiday job helping on a cookery course in Italy, where he met several famous chefs. One of them, Alastair Little, later employed him as a trainee chef. Two years later he moved to Valencia in Spain and opened a restaurant, *Seu Xerea*, now one of the most popular restaurants in town.

B

C

D



E

F

6 GRAMMAR

present simple and continuous, action and non-action verbs

a 1 9 Listen again to some of the things Steve said. Circle the form of the verb he uses.

1 This week for example *I cook / I'm cooking* nearly every day. We *usually close / are usually closing* on Sundays and Mondays, but this Monday is a public holiday.
2 The British always *say / are saying* that everything is lovely.
3 Actually, I think *I prefer / I am preferring* that honesty, because it helps us to know what people like.
4 Unfortunately, I think *they get / they're getting* worse. People *eat / are eating* more unhealthily.

b With a partner, say why you think he has chosen each form.

c ➤ p.132 Grammar Bank 1A. Learn more about the present simple and the present continuous, and practise them.

d Make questions to ask your partner with the present simple or continuous. Ask for more information.

On a typical day
- What / usually have for breakfast?
- / drink Coke or fizzy drinks? How many glasses / drink a day?
- Where / usually have lunch?
- What / usually have for lunch during the week?
- / ever cook? What / make?
- / prefer eating at home or eating out?

At the moment / nowadays
- / need to buy any food today?
- / want anything to eat right now? What?
- / take vitamins or food supplements at the moment?
- / try to cut down on anything at the moment?
- / the diet in your country / get better or worse?

7 SPEAKING

WHAT DO YOU THINK?

1 Men are better cooks than women.
2 Both boys and girls should learn to cook at school.
3 Cheap restaurants usually serve bad food.
4 On a night out with friends, where and what you eat isn't important.
5 Not all fast food is unhealthy.
6 Every country thinks that their cuisine is the best in the world.

a 1 13 Listen to two people discussing sentence 1. Who do you agree with more, the man or the woman? Why?

b 1 14 Listen to the phrases in the **Useful language** box. Copy the intonation.

Useful language: Giving your opinion (1)

I agree.	I'm not sure.	For example...
I don't agree.	(I think) it depends	In my opinion...

c In small groups, say what you think about sentences 2–6. Try to use the **Useful language** phrases.

G future forms: present continuous, *going to*, *will* / *won't*
V family, adjectives of personality
P sentence stress, word stress, adjective endings

Are you seeing your grandparents this weekend?

No, I'm going to stay at home. I'll probably see them next weekend.

1B Family life

1 VOCABULARY & SPEAKING
family

a Look at some photos showing family members. What's happening in each one? What do you think the relationship is between the people?

b With a partner, explain the difference between each pair.

1 a father and a parent
2 a mother and a stepmother
3 a brother and a brother-in-law
4 a grandfather and a great-grandfather
5 a nephew and a niece
6 a child and an only child
7 your immediate family and your extended family

c The BBC recently did a survey of 21st-century families in the UK. Read *Changing – for the better?* and try to guess what the missing percentages are. Choose from the list.

17%	26%	60%	75%	85%

d 1.15 Listen and check. Do any of the statistics surprise you? Which ones do you think would be very different if the survey was carried out in your country?

e Work in small groups. Say what you think and give reasons.

Do you think that...?

- families should have a meal together every day
- children should leave home as soon as they can afford to
- parents should charge their children rent if they live at home and have a job
- parents should be 'friends' with their children on social networking sites, e.g. *Facebook*
- elderly parents should live with their children when they are too old to live alone

Useful language:
Giving your opinion (2)
We often use *should* + verb to say what we think is the right thing or a good thing (to do), e.g.
I think families ***should have*** *dinner together every day because...*
I don't think parents ***should be*** *friends with their children on Facebook because...*

Changing – for the better?

Family life is changing in the UK – but not in the way we might think. When the BBC did a survey of families in Britain, they expected to find that family relationships were suffering because of the decline in traditional family structures.

However, some of the results were quite surprising...

58% of men and **39%** of women aged 20–24 still live at home with their parents.

1 _____ think that it is right for parents to charge rent to children over 25 who have a job and are living at home.

30% use the internet at least once a week to contact their families.

On average, adults live **130** kilometres from their parents.

2 GRAMMAR future forms

a (1 16) Listen to three dialogues between different family members. Who is talking to who (e.g. brother to sister)? What are they talking about?

b Listen again and match two sentences with each dialogue (1–3).

A ☐ Shall I make you a cup of tea?
B ☐ You'll drive too fast.
C ☐ I'm not going to go to university yet.
D ☐ I'm staying the night there.
E ☐ I'll drive really slowly.
F ☐ It's going to be cold tonight.

c With a partner, decide which sentence (A–F) is…

☐ a plan or intention ☐☐ a prediction ☐ an offer
☐ an arrangement ☐ a promise

d ➤ p.133 Grammar Bank 1B. Learn more about future forms and practise them.

3 PRONUNCIATION sentence stress

Sentence stress
An important aspect of speaking English is stressing the words in a sentence which carry the information, and not stressing the other ones. This will help you to communicate better and to speak with good rhythm.

a (1 21) Listen to the rhythm in these three dialogues.

1 A Are you **coming home** for **dinner tonight**?
B **No**. I'm **going out** with my **friends**.
2 A **What** are you **going** to **do** in the **summer**?
B We're **going** to **rent** a **house** with my **sister** and her **husband**.
3 A Do you **think** they'll **have children soon**?
B I **don't think** so. **Not** for a **few years anyway**.

b Practise them with a partner. Copy the rhythm.

c Ask and answer the questions below. Give as much information as possible.

ARE YOU…?
- having dinner with your family tonight
- or is anyone in your family getting married soon
- doing something with a family member this week
- visiting a relative this weekend

ARE YOU GOING TO…?
- have a new nephew or niece soon
- have a big family get-together soon
- go on holiday with your family this year
- buy a present for a member of your family this month

DO YOU THINK…?
- the number of people getting divorced will go up or down in the future
- the birth rate will go up or down in your country
- anyone in your family will live to be 90 or more
- you will move away from (or back to) the area where your family live

95% of people say that they have a close family.

2 _____ of people have a meal with their immediate family every day.

3 _____ say that their families never argue.

4 _____ have family members who they don't speak to any more.

5 _____ think that families should look after grandparents.

75% of people are happiest with their families.

17% are happiest with friends.

4 (1 22) SONG *Our House* ♫

5 READING

a Which do you think has more advantages, being an only child, or having brothers and sisters? Why?

b Work in pairs. **A** read *The younger brother*, **B** read *The only child*.

c Tell your partner about 1 and 2 below. Whose childhood sounds happier?

1 other family members who are mentioned
2 how the writer's experience as a child affects him / her now

d Look at the highlighted words in the two texts. Try to work out their meaning from the context. Then match them with definitions 1–12.

1 _____ *adj* ill
2 _____ it's no surprise that
3 _____ *noun* competition between two people
4 _____ *noun* the time when you were a child
5 _____ *noun* a meeting of people, e.g. family
6 _____ *noun* people who are fully grown
7 _____ *adj* knowing about or being conscious of sth
8 _____ *noun* a school where children can live during the year
9 _____ *verb* think that sb or sth is important
10 _____ *verb* divided sth between two or more people
11 _____ *verb* try to hurt sb else
12 _____ *noun* a group of friends

> **each other**
> When brothers and sisters get older they value **each other** more.
> Use *each other* to talk about an action between two people or groups of people, e.g. *I don't get on very well with my dad – we don't understand* **each other**.

e Talk to a partner. Do you have brothers and sisters, or are you an only child? Do you feel positive or negative about it?

Younger brother or only child?

HOW WAS IT FOR YOU?

THE YOUNGER BROTHER
NOVELIST TIM LOTT

Rivalry between brothers is normal, but there was a special reason for the tension between us. I was very ill when I was born, and spent three months in hospital with my mother. My brother did not see her at all during that time, as he went to stay with an aunt. When our mother returned home, it was with a sick newborn baby who took all the attention. No wonder he hated me (although if you ask Jeff, he will say that he didn't – we remember things differently).

My brother and I were completely different. We shared the same bedroom, but he was tidy, and I was really untidy. He was responsible, I was rebellious. He was sensible, I was emotional. I haven't got any positive memories of our childhood together, though there must have been good moments. Jeff says we used to play Cowboys and Indians but I only remember him trying to suffocate me under the bedcovers.

My relationship with Jeff has influenced my attitude towards my own four daughters. If the girls fight, I always think that the younger child is innocent. But the good news about brothers and sisters is that when they get older, they value each other more. Jeff is now one of my best friends, and I like and admire him greatly. For better or for worse, we share a whole history. It is the longest relationship in my life.

THE ONLY CHILD
JOURNALIST SARAH LEE

I went to boarding school when I was seven, and the hardest thing I found was making friends. Because I was an only child, I just didn't know how to do it. The thing is that when you're an only child you spend a lot of your time with adults and you're often the only child in a gathering of adults. Your parents go on living more or less the way they have always lived, only now you are there too.

I found being an only child interesting because it gave me a view of the world of adults that children in a big family might not get. And I know it has, at least partly, made me the kind of person I am – I never like being one of a group, for example. If I have to be in a group, I will always try to go off and do something on my own, or be with just one other person – I'm not comfortable with being one of a gang.

My parents are divorced now and my mother lives in the US and my father in the UK. I feel very responsible for them – I feel responsible for their happiness. I'm the closest relative in the world to each of them, and I am very aware of that.

Adapted from a British newspaper

6 VOCABULARY
adjectives of personality

a Without looking back at *The younger brother* text, can you remember who was *tidy, responsible, and sensible* and who was *untidy, rebellious, and emotional?* Do you know what the adjectives mean? Would you use any of them to describe yourself?

b ➤ p.153 Vocabulary Bank *Personality.*

c Write down the first three adjectives of personality that come into your head. Don't show them to your partner. Now go to ➤ **Communication** *Personality p.104.*

7 PRONUNCIATION
word stress, adjective endings

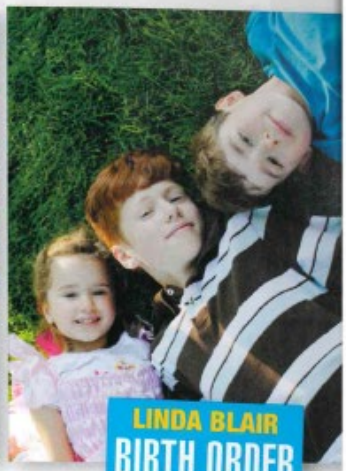
a 1 26 Underline the stressed syllable in these multi-syllable adjectives. Listen and check.

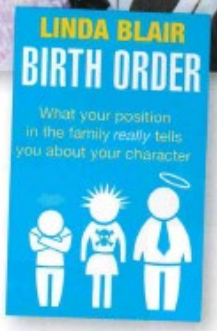
1 jea|lous an|xious am|bi|tious ge|ne|rous re|be|llious
2 so|cia|ble re|li|a|ble
3 re|spon|si|ble sen|si|ble
4 com|pe|ti|tive tal|ka|tive a|ggre|ssive sen|si|tive
5 un|friend|ly in|se|cure im|pa|tient i|mma|ture

b Listen again and answer the questions.

1 Is *-ous* pronounced /aʊs/ or /əs/?
2 Is *-able* pronounced /əbl/ or /eɪbl/?
3 Is *-ible* pronounced /əbl/ or /ɪbl/?
4 Is *-ive* pronounced /əv/ or /ɪv/?
5 Are *-ous* / *-able* / *-ible* / *-ive* stressed?
6 Are *un-* / *in-* / *im-* stressed?

8 LISTENING & SPEAKING





a What's your position in the family? Are you the oldest child, a middle child, the youngest child, or an only child?

b 1 27 Look at the cover of Linda Blair's book. Now listen to a journalist talking about it on a radio programme. Complete the chart by writing four more adjectives of personality in each column.

Oldest children	Middle children	Youngest children	Only children
sensible	relaxed	outgoing	self-confident

c Compare with a partner. Then listen to the four sections one by one. Check your answers. What reasons or examples does the journalist give?

d Look at the completed chart above. In pairs, say...

...if you think it is true for **you** – and if not, why not?

...if you think it is true for **other people** you know (your brothers and sisters, friends, etc.)

9 WRITING

➤ p.113 **Writing** *A description of a person.* Write a description of a friend you know well.

Listening

1 6

A I usually have meat or seafood. Usually prawns or something as a starter and then maybe lamb for the main course.

B I quite often have ready-made vegetable soups that you only have to heat up – in fact they're the only vegetables I ever eat! And I usually have a couple of frozen pizzas in the freezer for emergencies. I don't really order take-away when I'm on my own, but if I'm with friends in the evening, we sometimes order Chinese food for dinner.

C Eggs and Coke. I have eggs for breakfast at least twice a week and I drink a couple of cans of Coke every day.

D If I'm feeling down, chicken soup, with nice big pieces of chicken in it. It's warm and comforting. I usually have a banana before going to the gym. If I know I'm going to have a really long meeting, I usually have a coffee and a cake because I think it will keep me awake and give me energy.

E Fruit – cherries, strawberries, raspberries and apples. Vegetables – peppers, tomatoes, and cucumbers. The only thing I really don't like is beetroot. I can't even stand the smell of it.

1 7

Part 1

Interviewer What was your favourite food when you were a child?

Steve Well, I always liked unusual things, at least things that most English children at the time didn't like. For instance, when I was six or seven my favourite things were snails, oh and prawns with garlic.

Interviewer Funny things for a six-year-old English boy to like!

Steve Well, the thing is my parents liked travelling and eating out a lot, and I first tried snails in France, and the prawns, my first prawns I had at a Spanish restaurant in the town where we lived.

Interviewer So you were keen on Spanish food right from the start. Is that why you decided to come to Spain?

Steve Partly, but of course, I suppose like a lot of British people I wanted to see the sun! The other thing that attracted me when I got here were all the fantastic ingredients. I remember going into the market for the first time and saying 'Wow!'

Interviewer When you opened your restaurant, how did you want it to be different from typical Spanish restaurants?

Steve Well, when I came to Spain, all the good restaurants were very formal, very traditional. In London then, the fashion was for informal places where the waiters wore jeans, but the food was amazing. So I wanted a restaurant a bit like that. I also wanted a restaurant where you could try more international food, but made with some of these fantastic local ingredients. For example, Spain's got wonderful seafood, but usually here it's just grilled or fried. I started doing things in my restaurant like cooking Valencian mussels in Thai green curry paste.

Interviewer What do you most enjoy cooking?

Steve What I most enjoy cooking, I think, are those traditional dishes which use quite cheap ingredients, but they need very long and careful cooking, and then you turn it into something really special... like a really good casserole, for example.

Interviewer And is there anything you don't like cooking?

Steve Maybe desserts. You have to be very very precise when you're making desserts. And that's not the way I am.

1 8

Part 2

Interviewer What's the best thing about running a restaurant?

Steve I think the best thing is making people happy. That's why even after all this time I still enjoy it so much.

Interviewer And the worst thing?

Steve That's easy, it has to be the long hours. This week for example I'm cooking nearly every day. We usually close on Sundays and Mondays, but this Monday is a public holiday, when lots of people want to eat out, so we're open.

Interviewer Seu Xerea is in all the British restaurant guides now. Does that mean you get a lot of British customers?

Steve Yes, we get a lot of British people, especially at the weekends, but then we get people from other countries too.

Interviewer And are the British customers and the Spanish customers very different?

Steve Yes, I think they are. The British always say that everything is lovely, even if they've only eaten half of it. The Spanish, on the other hand, are absolutely honest about everything. They tell you what they like, they tell you what they don't like. I remember when I first opened, I had sushi on the menu, which was very unusual at that time, and I went into the dining room and I said to people, 'So what do you think of the sushi?' And the customers, who were all Spanish, said 'Oh, it was awful! It was raw fish!' Actually, I think I prefer that honesty, because it helps us to know what people like.

Interviewer What kind of customers do you find difficult?

Steve I think customers who want me to cook something in a way that I don't think is very good. Let's see, a person who asks for a really well-done steak, for instance. For me that's a difficult customer. You know, they'll say 'I want a really really well-done steak' so I give them a really really well-done steak and then they say 'It's tough'. And I think well, of course it's tough. It's well done! Well-done steak is always tough.

Interviewer People say that the Mediterranean diet is very healthy. Do you think people's eating habits in Spain are changing?

Steve Well, I think they are changing – unfortunately I think they're getting worse. People are eating more unhealthily.

Interviewer How do you notice that?

Steve I see it with, especially with younger friends. They often eat in fast food restaurants, they don't cook... and actually the younger ones come from a generation where their mothers don't cook either. That's what's happening now, and it's a real pity.

1 27

Interviewer This morning we're talking about family and family life and now Danielle Barnes is going to tell us about a book she has just read called *Birth Order* by Linda Blair. So what's the book about Danielle?

Danielle Well, it's all about how our position in the family influences the kind of person we are. I mean whether we're first born, a middle child, a youngest child or an only child. Linda Blair argues that our position in the family is possibly the strongest influence on our character and personality.

Interviewer So tell us more about this, Danielle. What about the oldest children in a family, the first-born?

Danielle Well first-born children often have to look after their younger brothers and sisters, so they're usually sensible and responsible as adults. They also tend to be ambitious and they make good leaders. Many US Presidents and British Prime Ministers, including for example Winston Churchill were oldest children.
On the negative side oldest children can be insecure and anxious. This is because when the second child was born they lost some of their parents' attention and maybe they felt rejected.

Interviewer That's all very interesting. What about the middle child?

Danielle Middle children are usually more relaxed than oldest children. That's probably because the parents are more relaxed themselves by the time the second child arrives. They're usually very sociable – the kind of people who get on with everybody and they're also usually sensitive to what other people need. Now this is because they grew up between older and younger brothers and sisters. For the same reason they are often quite good at sorting out arguments, and they're always sympathetic to the ones on the losing side, or in general to people who are having problems. On the other hand, middle children can sometimes be unambitious, and they can lack direction in life.

Interviewer And youngest children?

Danielle I was very interested in this part of the book as I'm a youngest child myself. It seems that youngest children are often very outgoing and charming. This is the way they try to get the attention of both their parents and their older brothers and sisters.
They are often more rebellious, and this is probably because it's easier for the youngest children to break the rules – by this time their parents are more relaxed about discipline.
On the negative side, youngest children can be immature, and disorganized, and they often depend too much on other people. This is because they have always been the baby of the family.

Interviewer Fascinating. And finally, what about only children?

Danielle Only children usually do very well at school because they have a lot of contact with adults. They get a lot of love and attention from their parents so they're typically self-confident. They're also independent, as they're used to being by themselves. And because they spend a lot of time with adults they're often very organized.

Interviewer I'm an only child myself and people always think that I must be spoilt. Is that true, according to Linda Blair?

Danielle Well, it's true that only children can sometimes be spoilt by their parents because they're given everything they ask for. Also, on the negative side, only children can be quite selfish, and they can also be impatient, especially when things go wrong. This is because they're not used to sorting out problems with other brothers and sisters.

1 28

Jenny My name's Jenny Zielinski. And New York is my city. I live here and I work for a magazine, *NewYork24seven*.

Rob My name's Rob Walker. I'm a writer on *NewYork24seven*. You can probably tell from my accent that I'm not actually from New York. I'm British, and I came over to the States a few months ago.

1A

present simple and continuous, action and non-action verbs

present simple: *I live, he works, etc.*

1 I **work** in a bank. She **studies** Russian. 1 10
We **don't have** any pets. Jack **doesn't wear** glasses.
Where **do** you **live**? **Does** your brother **have** a car?
2 She usually **has** cereal for breakfast.
I'm never late for work.
We only **eat out** about once a month.

1 We use the present simple for things that are always true or happen regularly.
- Remember the spelling rules for third person singular, e.g. *lives, studies, watches.*
- Use **ASI** (**A**uxiliary, **S**ubject, **I**nfinitive) or **QUASI** (**Q**uestion word, **A**uxiliary, **S**ubject, **I**nfinitive) to help you with word order in questions. *Do you know David? What time does the film start?*

2 We often use the present simple with adverbs of frequency, e.g. *usually, never,* or expressions of frequency, e.g. *every day, once a week.*
- Adverbs of frequency go before the main verb, and after *be.*
- Expressions of frequency usually go at the end of the sentence or verb phrase.

present continuous: *be* + verb + *-ing*

A Who **are** you **waiting** for? 1 11
B **I'm waiting** for a friend.
A **Is** your sister still **going out** with Adam?
B No, they broke up. She **isn't going out** with anyone at the moment.

- We use the present continuous (not the present simple) for actions in progress at the time of speaking, e.g. things that are happening now or around now. These are normally temporary, not habitual actions.
- Remember the spelling rules, e.g. ***living, studying, getting.***
- We also use the present continuous for future arrangements (see **1B**).

action and non-action verbs

A What **are** you **cooking**? 1 12
B **I'm making** pasta
A Great! I **love** pasta.
A What **are** you **looking** for?
B My car keys.
A I'll help you in a moment.
B But I **need** them now!

- Verbs which describe **actions**, e.g. *cook, make,* can be used in the present simple or continuous. ***I'm making*** *the lunch. I usually* ***make*** *the lunch at the weekend.*
- Verbs which describe **states** or **feelings** (not actions), e.g. *love, need, be,* are **non-action verbs.** They are not usually used in the present continuous, even if we mean 'now'.
- Common non-action verbs are *agree, be, believe, belong, depend, forget, hate, hear, know, like, love, matter, mean, need, prefer, realize, recognize, remember, seem, suppose.*

Verbs that can be both action and non-action
A few verbs have an action and a non-action meaning, e.g. *have* and *think.*
I have a cat now. = possession (non-action)
I can't talk now. I'm having lunch. = an action
I think this music's great. = opinion (non-action)
What are you thinking about? = an action

a Complete the sentences with the present simple or present continuous forms of the verbs in brackets.

We *don't go* to Chinese restaurants very often. (not go)
1 These days, most children _____ too many fizzy drinks. (have)
2 _____ you _____ any vitamins at the moment? (take)
3 Don't eat that spinach if you _____ it. (not like)
4 _____ your boyfriend _____ how to cook fish? (know)
5 We _____ takeaway pizzas during the week. (not get)
6 What _____ your mother _____? It smells great! (make)
7 You look sad. What _____ you _____ about? (think)
8 The diet in my country _____ worse. (get)
9 How often _____ you _____ seafood? (eat)
10 I _____ usually _____ fish. (not cook)

b Circle the correct form, present simple or continuous.

I don't believe / *I'm not believing* that you cooked this meal yourself.
1 Come on, let's order. The waiter *comes* / *is coming.*
2 Kate *doesn't want* / *isn't wanting* to have dinner now. She isn't hungry.
3 The head chef is ill, so he *doesn't work* / *isn't working* today.
4 The bill *seems* / *is seeming* very high to me.
5 We've had an argument, so we *don't speak* / *aren't speaking* to each other at the moment.
6 My mum *thinks* / *is thinking* my diet is awful these days.
7 *Do we need* / *Are we needing* to go shopping today?
8 Can I call you back? *I have* / *I'm having* lunch right now.
9 I didn't use to like oily fish, but now *I love* / *I'm loving* it!
10 What *do you cook* / *are you cooking*? It smells delicious!

◀ p.7

1B

GRAMMAR BANK

future forms

be going to + infinitive

future plans and intentions 1 17

My sister**'s going to adopt** a child.
Are you **going to buy** a new car or a second-hand one?
I**'m not going to go** to New York tomorrow. The meeting is cancelled.

predictions 1 18

Barcelona **are going to win**. They're playing really well.
Look at those black clouds. I think it**'s going to rain**.

- We use *going to* (NOT *will / won't*) when we have already decided to do something. NOT ~~*My sister will adopt a child.*~~
- We also use *going to* to make a prediction about the future, especially when you can see or have some evidence (e.g. black clouds).

present continuous: *be* + verb + *-ing*

future arrangements 1 19

Lorna and Jamie **are getting** married in October.
We**'re meeting** at 10.00 tomorrow in Jack's office.
Jane**'s leaving** on Friday and **coming back** next Tuesday.

- We often use the present continuous for future arrangements.
- There is very little difference between the present continuous and *going to* for future plans / arrangements, and often you can use either.
  - *going to* shows that you have made a decision. *We're going to get married next year.*
  - the present continuous emphasizes that you have made the arrangements. *We're getting married on October 12th.* (= we've booked the church, etc.)
- We often use the present continuous with verbs relating to travel arrangements, e.g. *go, come, arrive, leave*, etc. *I'm going to Paris tomorrow and coming back on Tuesday.*

will / shall + infinitive

instant decisions, promises, offers, predictions, future facts, suggestions 1 20

1 **I'll have** the steak. (instant decision)
I **won't tell** anybody where you are. (promise)
I'll carry that bag for you. (offer)
You**'ll love** New York! (prediction)
I'll be at home all afternoon. (future fact)
2 **Shall I help** you with your homework? (offer)
Shall we **eat** out tonight? (suggestion)

1 We use *will / won't* (NOT the present simple) for instant decisions, promises, offers, and suggestions. NOT ~~*I carry that bag for you.*~~
   - We can also use *will / won't* for predictions, e.g. *I think Barcelona will win*, and to talk about future facts, e.g. *The election will be on 1st March.*
2 We use *shall* (NOT *will*) with *I* and *we* for offers and suggestions when they are questions.

a Circle the correct form. Tick ✓ the sentence if both are possible.

My grandparents *are going to retire / will retire* next year. ✓

1 *Will we / Shall we* invite your parents for Sunday lunch?
2 *I'm going to make / I'll make* a cake for your mum's birthday, if you want.
3 *I'm not having / I'm not going to have* dinner with my family tonight.
4 The exam *will be / is being* on the last Friday of term.
5 You can trust me. *I'm not telling / I won't tell* anyone what you told me.
6 My cousin *is arriving / will arrive* at 5.30 p.m.
7 I think the birth rate *will go down / shall go down* in my country in the next few years.
8 *I'm not going to go / I won't go* to my brother-in-law's party next weekend.
9 *Shall I / Will I* help you with the washing-up?

b Complete **B**'s replies with a correct future form.

A What's your stepmother going to do about her car?
B She*'s going to buy* a second-hand one. (buy)
1 **A** I'm going to miss you.
B Don't worry. I promise I _____ every day. (write)
2 **A** What are Alan's plans for the future?
B He _____ a degree in engineering. (do)
3 **A** Can I see you tonight?
B No, I _____ late. How about Saturday? (work)
4 **A** What would you like for starters?
B I _____ the prawns, please. (have)
5 **A** There's nothing in the fridge.
B OK. _____ we _____ a takeaway? (get)
6 **A** I don't have any money, so I can't go out.
B No problem, I _____ you some. (lend)
7 **A** Shall we have a barbecue tomorrow?
B I don't think so. On the radio they said that it _____. (rain)
8 **A** We land at about eight o'clock.
B _____ I _____ you _____ from the airport? (pick up)

◀ p.9

Food and cooking

VOCABULARY BANK

1 FOOD

a Match the words and pictures.

Fish and seafood

1 crab /kræb/
mussels /'mʌslz/
prawns /prɔːnz/
salmon /'sæmən/
squid /skwɪd/
tuna /'tjuːnə/

Meat

beef /biːf/
chicken /'tʃɪkɪn/
duck /dʌk/
lamb /læm/
pork /pɔːk/

Fruit and vegetables

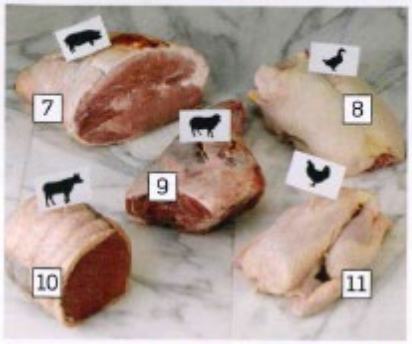
aubergine /'əʊbəʒiːn/ (*AmE* eggplant)
beetroot /'biːtruːt/
cabbage /'kæbɪdʒ/
cherries /'tʃerɪz/
courgette /kɔː'ʒet/ (*AmE* zucchini)
cucumber /'kjuːkʌmbə/
grapes /greɪps/
green beans /griːn biːnz/
lemon /'lemən/
mango /'mæŋgəʊ/
melon /'melən/
peach /piːtʃ/
pear /peə/
raspberries /'rɑːzbərɪz/
red pepper /red 'pepə/

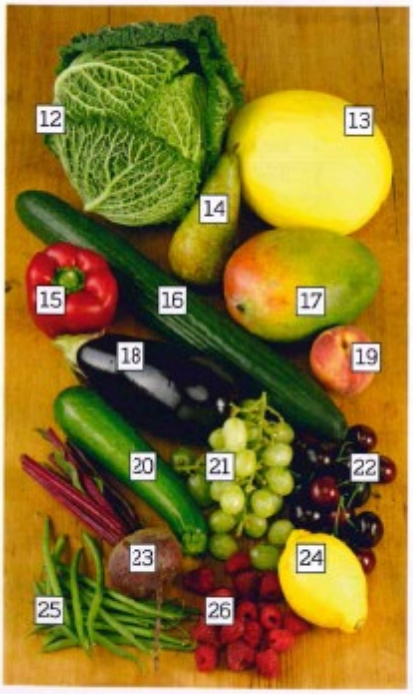
b 12 Listen and check.

c Are there any things in the list that you...?

a love
b hate
c have never tried

d Are there any other kinds of fish, meat, or fruit and vegetables that are very common in your country?





2 COOKING

a Match the words and pictures.

4 boiled /bɔɪld/
roast /rəʊst/
baked /beɪkt/
grilled /grɪld/
fried /fraɪd/
steamed /stiːmd/

b 13 Listen and check.

c How do you prefer these things to be cooked?

eggs	chicken
potatoes	fish

Phrasal verbs

Learn these phrasal verbs connected with food and diet.

*I **eat out** a lot because I often don't have time to cook.*
(= eat in restaurants)

*I'm trying to **cut down on** coffee at the moment. I'm only having one cup at breakfast.* (= have less)

*The doctor told me I had very high cholesterol and that I should completely **cut out** all high-fat cheese and dairy products from my diet.*
(= eliminate)

◀ p.4

Vowel sounds

SOUND BANK

	usual spelling	! but also
fish /ɪ/	**i** dish bill pitch fit ticket since	pretty women busy decided village physics
tree /iː/	**ee** beef speed **ea** peach team **e** refund medium	people magazine key niece receipt
cat /æ/	**a** mango tram crash tax carry bank	
car /ɑː/	**ar** garden charge starter **a** pass drama cast	heart
clock /ɒ/	**o** lorry cost plot bossy off on	watch want sausage because
horse /ɔː/	**(o)or** score floor **al** bald wall **aw** prawns draw	warm course thought caught audience board
bull /ʊ/	**u** full put **oo** cook foot look good	could should would woman
boot /uː/	**oo** moody food **u*** argue rude **ew** few flew	suitcase juice shoe move soup through queue
computer /ə/	Many different spellings. /ə/ is always unstressed. other nervous about complain information camera	
bird /ɜː/	**er** term prefer **ir** dirty circuit **ur** nursery turn	learn work world worse journey
egg /e/	**e** lemon lend text spend plenty cent	friendly already healthy jealous many said

	usual spelling	! but also
up /ʌ/	**u** public subject ugly duck hurry rush	money tongue someone enough touch couple
train /eɪ/	**a*** save gate **ai** fail train **ay** may say	break steak great weight they grey
phone /əʊ/	**o*** broke stone frozen slope **oa** roast coach	owe elbow although aubergine shoulders
bike /aɪ/	**i*** bite retire **y** shy cycle **igh** flight lights	buy eyes height
owl /aʊ/	**ou** hour mouth proud ground **ow** town brown	
boy /ɔɪ/	**oi** boiled noisy spoilt coin **oy** enjoy employer	
ear /ɪə/	**eer** beer engineer **ere** here we're **ear** beard appearance	really idea serious
chair /eə/	**air** airport upstairs fair hair **are** stare careful	their there wear pear area
tourist /ʊə/	A very unusual sound. euro furious sure plural	
/i/	A sound between /ɪ/ and /iː/. Consonant + *y* at the end of words is pronounced /i/. happy angry thirsty	
/u/	An unusual sound between /ʊ/ and /uː/. education usually situation	

* especially before consonant + *e*

☐ short vowels ☐ long vowels ☐ diphthongs

Consonant sounds

	usual spelling	! but also
parrot /p/	**p** plate pupil transport trip **pp** shopping apply	
bag /b/	**b** beans bill probably crab **bb** stubborn dubbed	
key /k/	**c** court script **k** kind kick **ck** track lucky	chemist's school stomach squid account
girl /g/	**g** golf grilled colleague forget **gg** aggressive luggage	
flower /f/	**f** food roof **ph** pharmacy nephew **ff** traffic affectionate	enough laugh
vase /v/	**v** van vegetables travel invest private believe	of
tie /t/	**t** taste tidy stadium strict **tt** attractive cottage	worked passed
dog /d/	**d** director afford comedy graduate **dd** address middle	failed bored
snake /s/	**s** steps likes **ss** boss assistant **ce/ci** ceiling cinema	science scene cycle
zebra /z/	**z** lazy freezing **s** nose cosy loves toes	
shower /ʃ/	**sh** show dishwasher selfish cash **ti (+ vowel)** ambitious explanation **ci (+ vowel)** spacious sociable	sugar sure machine chef
television /ʒ/	An unusual sound. revision decision confusion usually courgette	

☐ voiced ☐ unvoiced

	usual spelling	! but also
thumb /θ/	**th** throw thriller healthy path maths teeth	
mother /ð/	**th** the that with further together	
chess /tʃ/	**ch** change cheat **tch** pitch match **t (+ure)** picture future	
jazz /dʒ/	**j** jealous just **g** generous manager **dge** fridge judge	
leg /l/	**l** limit salary until reliable **ll** sell rebellious	
right /r/	**r** result referee primary fried **rr** borrow carriage	written wrong
witch /w/	**w** war waste western motorway **wh** whistle which	one once
yacht /j/	**y** yet year yoghurt yourself before **u** university argue	
monkey /m/	**m** mean arm romantic charming **mm** summer swimming	lamb
nose /n/	**n** neck honest none chimney **nn** tennis thinner	knee knew
singer /ŋ/	**ng** cooking going spring bring before **g** / **k** think tongue	
house /h/	**h** handsome helmet behave inherit unhappy perhaps	who whose whole

Compact Disk: *English File Intermediate Student's Book*