



This item was submitted to Loughborough's Institutional Repository (<https://dspace.lboro.ac.uk/>) by the author and is made available under the following Creative Commons Licence conditions.


C O M M O N S D E E D

Attribution-NonCommercial-NoDerivs 2.5

You are free:

- to copy, distribute, display, and perform the work

Under the following conditions:

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

**Young people: A phenomenographic investigation
into the ways they experience information**

by

Marian Smith

Doctoral Thesis

Submitted in partial fulfilment of the requirements for the award of
Doctor of Philosophy of Loughborough University

February 2010

©M. Smith 2010

Abstract

This study investigates the ways young people experience information. Having an understanding of what information means to young people is important for educators and library and information science (LIS) professionals if they are to develop information literacy skills in young people. To date the literature has revealed that scant attention has been paid to this area. This research study addresses a gap in the knowledge. The study used a phenomenographic research approach to elicit and describe the qualitatively different ways in which young people experienced information. A purposeful sample of forty one young people aged eleven to eighteen years participated in the study. The data, which were gathered through drawings and semi structured interviews, were subjected to a rigorous process of phenomenographic analysis. The outcome of phenomenographic analysis is an outcome space consisting of a finite set of categories of description which, with their relationships, explain the different ways people experience phenomena in the world. In this study six ways of experiencing information were identified: knowledge of sources of information; receiving information; process of finding information; store of unprocessed information; processing information; and use of information. The findings highlighted the fact that young people thought about information to a degree that has not always been acknowledged. In addition the findings challenged a number of commonly held assumptions, which have in the past invited criticism, for instance young people's attitude to 'cutting and pasting' information and their poor evaluation of academic information. The findings also revealed a previously unrecognised type of information behaviour described in sub-category A of Category Two, 'receiving information knowingly'. As a result of this research a more comprehensive picture of the way young people experience information to that currently available has been revealed, however the research also revealed the incompleteness of this picture and suggests the need for further research.

Keywords: Experiences of information: Young people: Phenomenography

Acknowledgements

I wish to express my heartfelt thanks and appreciation to a number of people without whose support and assistance this work would not have been completed.

I am deeply indebted to my supervisor Dr. Mark Hepworth whose guidance, support and encouragement throughout the research process has been invaluable and has enabled me to grow in confidence as a researcher. My thanks also go to Dr Janet Harrison, my Director of Research, for her helpful insights and suggestions.

I wish to express my appreciation to the schools for providing me with access to the young people who participated in the study. In addition I would like to extend my sincere thanks to all of the young people who took part in this research study and gave so generously of themselves in the interviews. It was a fulfilling and rewarding experience to work with them.

The funding provided by Loughborough University for this research study is gratefully acknowledged.

I would like to pay tribute and give thanks to my parents Mary and Jim who, although no longer with me, always loved and nurtured me and set me on my path of learning.

Finally my deepest gratitude goes to my family, my husband Danny and my children Tom, Josie and Katherine. Thank you for your patience, understanding, support and encouragement and most of all thank you for your unwavering love.

Table of Contents

ABSTRACT	II
ACKNOWLEDGEMENTS	III
TABLE OF CONTENTS	IV
LIST OF FIGURES	VII
LIST OF TABLES	VII
CHAPTER ONE: INTRODUCTION	1
1.1. INTRODUCTION	1
1.2. BACKGROUND TO THE STUDY	1
1.3. PURPOSE OF THE STUDY	3
1.4. SUMMARY OF THE RESEARCH DESIGN	3
1.5. SIGNIFICANCE OF THE STUDY	6
1.6. STRUCTURE OF THE THESIS	7
1.7. SUMMARY	8
CHAPTER TWO: LITERATURE REVIEW	9
2.1. INTRODUCTION	9
2.2. THE NATURE OF INFORMATION	9
2.2.1. <i>Introduction</i>	9
2.2.2. <i>How is information understood?</i>	10
2.2.3. <i>Data, information and knowledge</i>	20
2.2.4. <i>Summary of section 2.2</i>	23
2.3. INFORMATION BEHAVIOUR	24
2.3.1. <i>Introduction</i>	24
2.3.2. <i>Information behaviour models</i>	26
2.3.3. <i>Summary of section 2.3</i>	27
2.4. INFORMATION NEEDS	28
2.4.1. <i>Introduction</i>	28
2.4.2. <i>Information need</i>	28
2.4.3. <i>Young people and their information needs</i>	30
2.4.4. <i>Summary of section 2.4</i>	31
2.5. INFORMATION SEEKING	31
2.5.1. <i>Introduction</i>	31
2.5.2. <i>Recognising and interpreting the information problem</i>	32
2.5.3. <i>Establishing a plan of search</i>	34
2.5.4. <i>Conducting the search</i>	35
2.5.5. <i>Evaluating the results</i>	35
2.5.6. <i>Is information always sought?</i>	36
2.5.7. <i>Summary of section 2.5</i>	37
2.6. ASPECTS OF LEARNING	38
2.6.1. <i>Introduction</i>	38
2.6.2. <i>Cognitive development of young people</i>	38
2.6.3. <i>Deep and surface learning</i>	39
2.6.4. <i>Summary of section 2.6</i>	40
2.7. RESOURCES USED	40
2.7.1. <i>Introduction</i>	40
2.7.2. <i>Print sources</i>	41
2.7.3. <i>Use of people</i>	42
2.7.4. <i>Internet</i>	43
2.7.5. <i>Summary of section 2.7</i>	44
2.8. WAYS OF EXPERIENCING OF INFORMATION	45
2.8.1. <i>Introduction</i>	45
2.8.2. <i>Young people's experiences of information</i>	46
2.8.3. <i>Summary of section 2.8</i>	51
2.9. YOUNG PEOPLE AND THE ENVIRONMENT IN WHICH THEY LIVE	52

2.9.1. Introduction	52
2.9.2. Young people today: Their characteristics	53
2.9.3. Young people today: The environment in which they live.....	59
2.9.4. Summary of section 2.9.....	64
2.10. SUMMARY	64
CHAPTER THREE: RESEARCH METHODOLOGY	66
3.1. INTRODUCTION	66
3.2. THEORETICAL PERSPECTIVE	66
3.3. QUALITATIVE RESEARCH STRATEGY	68
3.4. CHOICE OF PHENOMENOGRAPHIC RESEARCH APPROACH	69
3.4.1. Criteria for choice of research approach	69
3.4.2. Consideration of other research methodologies	70
3.4.3. Relation of phenomenography to phenomenology.....	72
3.5. PHILOSOPHICAL UNDERPINNINGS OF PHENOMENOGRAPHY	74
3.5.1. Ontological issues.....	75
3.5.2. Epistemological issues.....	77
3.5.3. Nature of conceptions	78
3.5.4. Experience	80
3.5.5. Awareness.....	81
3.5.6. Phenomenographic assumptions about the relationship between language and conceptions	83
3.6. A PHENOMENOGRAPHIC RESEARCH APPROACH	84
3.6.1. Origins of phenomenography	85
3.6.2. Object of phenomenographic research.....	85
3.6.3. Outcomes of phenomenographic research.....	86
3.6.4. Categories of description.....	86
3.6.5. Outcome space.....	87
3.7. CREATING A RESEARCH DESIGN.....	88
3.7.1. Focus groups	88
3.7.2. Pilot interviews	93
3.8. PHENOMENOGRAPHIC STUDY: SAMPLE.....	99
3.9. PHENOMENOGRAPHIC STUDY: PARTICIPANTS	100
3.10. PHENOMENOGRAPHIC STUDY: ETHICAL CONSIDERATIONS	102
3.11. DATA COLLECTION	103
3.11.1. Interviews.....	103
3.11.2. Drawings	111
3.12. PHENOMENOGRAPHIC DATA ANALYSIS.....	115
3.12.1. Analysis of data.....	119
3.13. RIGOUR OF THE RESEARCH	132
3.13.1. Communicative validity	133
3.13.2. Pragmatic validity	135
3.13.3. Reliability.....	135
3.13.4. Validity and reliability: Structure of awareness	138
3.14. SUMMARY	138
CHAPTER FOUR: FINDINGS	139
4.1. INTRODUCTION	139
4.2. PRESENTATION OF THE FINDINGS	139
4.3. THE OUTCOME SPACE	141
4.4. CATEGORIES OF DESCRIPTION	151
4.4.1. Category One: Knowledge of sources of information.....	151
4.4.2. Category Two: Receiving information.....	165
4.4.3. Category Three: Process of finding information	178
4.4.4. Category Four: Store of unprocessed information	187
4.4.5. Category Five: Processing information.....	197
4.4.6. Category Six: Use of information	209
4.5. SUMMARY	216
CHAPTER FIVE: DISCUSSION	217

5.1. INTRODUCTION	217
5.2. DISCUSSION ARISING OUT OF THE PHENOMENOGRAPHIC ANALYSIS: WHAT IS LEARNT FROM THE CATEGORIES OF DESCRIPTION AND THE RELATIONSHIPS BETWEEN THEM	218
5.2.1. <i>Category One: Knowledge of sources of information</i>	222
5.2.2. <i>Category Two: Receiving information</i>	227
5.2.3. <i>Category Three: Process of finding information</i>	232
5.2.4. <i>Category Four: Store of unprocessed information</i>	236
5.2.5. <i>Category Five: Processing information</i>	240
5.2.6. <i>Category Six: Use of information</i>	246
5.3. YOUNG PEOPLE’S EXPERIENCES OF INFORMATION: WHAT WE LEARN ABOUT YOUNG PEOPLE AND THEIR RELATIONSHIP WITH INFORMATION	248
5.3.1. <i>Young people’s relationship with sources of information</i>	248
5.3.2. <i>Young people’s information behaviour</i>	253
5.3.3. <i>Young people: The knowledge base</i>	258
5.3.4. <i>Young people: Information and aspects of learning</i>	262
5.4. YOUNG PEOPLE’S EXPERIENCES OF INFORMATION: HOW THEY RELATE TO THE WAYS IN WHICH INFORMATION IS UNDERSTOOD BY LIS SCHOLARS	264
5.5. SUMMARY	269
CHAPTER SIX: CONCLUSION	271
6.1. INTRODUCTION	271
6.2. RESEARCH QUESTIONS	271
6.3. CONTRIBUTIONS TO ORIGINAL KNOWLEDGE AND REFLECTIONS ON THE FINDINGS FROM THE STUDY	272
6.3.1. <i>Ways of experiencing information: Levels of sophistication and relationships between them</i>	273
6.3.2. <i>Young people and information: A complex relationship</i>	276
6.3.3. <i>Young people: Information seeking behaviour</i>	280
6.3.4. <i>Ways of experiencing information: Comparing the experiences of young people and LIS scholars</i>	282
6.4. RECOMMENDATIONS FOR LIS PROFESSIONALS AND EDUCATORS	283
6.5. REFLECTIONS ON PHENOMENOGRAPHIC RESEARCH	288
6.5.1. <i>Challenges of a phenomenographic research approach</i>	289
6.6. LIMITATIONS OF STUDY	292
6.7. RECOMMENDATIONS FOR FURTHER RESEARCH.....	293
6.8. SUMMARY	295
BIBLIOGRAPHY	296
APPENDIX 1: FOCUS GROUP PARTICIPANTS	330
APPENDIX 2: FOCUS GROUP QUESTIONS.....	331
APPENDIX 3: PILOT INTERVIEW PARTICIPANTS	335
APPENDIX 4: PILOT INTERVIEW SCHEDULE.....	336
APPENDIX 5: RESEARCH STUDY PARTICIPANTS	337
APPENDIX 6: INTERVIEW SCHEDULE	339

List of Figures

FIGURE 1: WILSON'S MODEL OF INFORMATION BEHAVIOUR (WILSON 1997 P.47)	25
FIGURE 2: JMIS12 DRAWING	113
FIGURE 3: OUTCOME SPACE SHOWING THE RELATIONSHIPS BETWEEN THE CATEGORIES DERIVED FROM MEANING STRUCTURES	149
FIGURE 4: OUTCOME SPACE SHOWING THE RELATIONSHIPS BETWEEN THE CATEGORIES DERIVED FROM STRUCTURES OF AWARENESS	150
FIGURE 5: CATEGORY ONE: THE STRUCTURE OF AWARENESS	152
FIGURE 6: RMIS7 DRAWING	155
FIGURE 7: JFIS7 DRAWING	157
FIGURE 8: CATEGORY TWO: THE STRUCTURE OF AWARENESS	166
FIGURE 9: AFCS12 DRAWING	169
FIGURE 10: RFIS7 DRAWING	171
FIGURE 11: RFCS7 DRAWING	175
FIGURE 12: CATEGORY THREE: THE STRUCTURE OF AWARENESS	179
FIGURE 13: WMIS7 DRAWING	182
FIGURE 14: SFCS12 DRAWING	184
FIGURE 15: KFIS13 DRAWING	185
FIGURE 16: CATEGORY FOUR: THE STRUCTURE OF AWARENESS	189
FIGURE 17: AMCS7 DRAWING	195
FIGURE 18: CATEGORY FIVE: THE STRUCTURE OF AWARENESS	199
FIGURE 19: CMIS12 DRAWING	202
FIGURE 20: ZMCS 7 DRAWING	202
FIGURE 21: CATEGORY SIX: THE STRUCTURE OF AWARENESS	210
FIGURE 22: SFIS13 DRAWING	212
FIGURE 23: ABFCS12 DRAWING	214
FIGURE 24: OUTCOME SPACE SHOWING THE RELATIONSHIPS BETWEEN THE CATEGORIES DERIVED FROM MEANING STRUCTURES	220
FIGURE 25: OUTCOME SPACE SHOWING THE RELATIONSHIPS BETWEEN THE CATEGORIES DERIVED FROM STRUCTURES OF AWARENESS	221

List of Tables

TABLE 1: TERMS AND DATES APPLIED TO YOUNG PEOPLE: VARIATION AMONGST AUTHORS ...	53
TABLE 2: TECHNOLOGICAL TOOLS USED BY GRADES 6-12 STUDENTS (ADAPTED FROM PROJECT TOMORROW 2006, P.7)	59
TABLE 3: THE RELATIONSHIP BETWEEN PHENOMENOGRAPHY AND PHENOMENOLOGY (ADAPTED FROM BARNARD, MCCOSKER & GERBER 1999, P.214)	73
TABLE 4: EMERGING SET OF CATEGORIES OF DESCRIPTION NUMBER 1	126
TABLE 5: EMERGING SET OF CATEGORIES OF DESCRIPTION NUMBER 2	126
TABLE 6: EMERGING SET OF CATEGORIES OF DESCRIPTION NUMBER 3	127
TABLE 7: EMERGING SET OF CATEGORIES OF DESCRIPTION NUMBER 4	128
TABLE 8: EMERGING SET OF CATEGORIES OF DESCRIPTION NUMBER 5	129
TABLE 9: FINAL SET OF CATEGORIES OF DESCRIPTION	130
TABLE 10: THE DIMENSIONS OF VARIATION IN HOW INFORMATION IS EXPERIENCED IN RELATION TO THE INDIVIDUAL AND HOW INFORMATION IS OPERATED ON.	147
TABLE 11: FOCUS GROUP PARTICIPANTS	330
TABLE 12: PILOT INTERVIEW PARTICIPANTS	335
TABLE 13: OUTLINE OF YOUNG PEOPLE'S PARTICIPATION IN THE STUDY	337
TABLE 14: PARTICIPANTS IN THE RESEARCH STUDY	338

Chapter One: Introduction

1.1. Introduction

This thesis reports a qualitative investigation of the different ways young people of secondary school age experience information in the context of their daily lives both academic and social. The chapter commences by outlining the background to the research and the research questions are presented. Details of the research design are outlined including a consideration of phenomenographic research approach which is employed to direct the research. The concluding sections of the chapter address the significance of the study and provide an outline of the structure of the thesis.

1.2. Background to the study

The aim of the research reported in this thesis is to investigate the ways young people aged between eleven and eighteen experience information. The research does not confine itself to one area of young people's lives but seeks to investigate how they experience information in all areas of their lives both academic and social. After many years of working closely with young people, firstly as a teacher and then as a librarian, the motivation for conducting the present research study into the ways young people experience information stemmed from an earlier research study into the motivational issues associated with learning information literacy in secondary schools (Smith & Hepworth 2005; 2007). During the course of that investigation it became apparent that young people's understanding of information varied considerably. This diversity in understanding continued to be noted by the researcher in subsequent employment as a librarian in school and university libraries. Throughout this time, whilst addressing the issue of teaching young people information literacy, the researcher felt an increasing need to understand more clearly how young people experienced information. In order for educators to teach effectively it is necessary to engage with the student. Therefore, in order to teach information literacy effectively and equip young people to participate

fully in a world where information plays a central role, it is necessary to have an understanding of what information means to young people. This is the point of departure for this research study but it is anticipated that an understanding of the way in which young people experience information will have a relevance to parties other than educators, not least the library and information science (LIS) community. It is important to know and understand how young people relate to and experience information as:

...in order to make sense of how people handle problems, situations, the world, we have to understand the way in which they experience the problems, the situations, the world that they are handling or in relation to which they are acting. (Marton & Booth 1997, p.111)

A thorough review of the literature reveals that there has been little published research to date focusing on young people's experience of information. Studies by Shenton (2002), Shenton and Johnson (2008) and Shenton, Nessel and Hayter (2008) all show that there is a variance in the way young people understand the term information, however there is no depth of research relating specifically to young people's experience of the phenomenon of information. Nevertheless a large number of studies have investigated a broad range of issues associated with information and young people including studies which relate to young people and information seeking (Chelton & Cool 2004; 2007); young people and the Web (Large 2005); young people and libraries (Moore 2000; Laverty 2002; De Rosa *et al.* 2006); the information behaviour of young people in the digital age (Rowlands *et al.* 2008); young people and everyday information seeking (Agosto & Hughes-Hassell 2005) and young people's information universes (Shenton 2002).

In order to set the present research in context literature in the areas associated with information and young people is reviewed as is literature pertaining to the nature of the phenomenon of information and literature relating to young people and the environment in which they live.

1.3. Purpose of the study

The purpose of the research is to contribute to knowledge and understanding about the ways in which young people experience information. A review of the literature makes apparent a gap surrounding young people's experience of information and illustrates the need for research to be conducted in this area.

The intent of this research study is to fill the gap in the literature by allowing young people's voices to be heard. Four research questions are addressed:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

1.4. Summary of the research design

In order to describe the various ways young people experience information it is necessary to employ a methodology that seeks specifically to uncover experiences of a given phenomenon. Phenomenography has emerged in recent years as a valuable tool in providing information about the qualitative variation in how individuals experience phenomena (Marton 1981; Marton 1986; Marton & Booth 1997). Phenomenography is a research approach which allows the researcher to view the way a group of individuals in a particular context experience a given phenomenon. Marton (1986, p.31) describes phenomenography as:

...a research method for mapping the qualitatively different ways in which people experience, conceptualize, perceive, and understand various aspects of, and phenomena in, the world around them.

A phenomenographic research approach is selected to direct this research study into how young people experience information in the context of their daily lives because of its focus on understanding the different ways individuals experience phenomena.

The research is conducted with young people aged between eleven and eighteen years drawn from two secondary schools in Derbyshire, United Kingdom (UK). One school is a state funded comprehensive and the other is an independent fee paying school. The sample which is used is a purposive sample, a strategy employed to ensure that variability which might influence the ways in which participants experience information will be represented in the data.

The research seeks to investigate young people's experiences of information. Because the aim of phenomenography is to capture variation Marton has described that the terms used need not be limited. In this study the terms experience, conceptualise, perceive and understand are used interchangeably. According to Marton:

Phenomenography is the empirical study of the differing ways in which people experience, perceive, apprehend, understand, or conceptualise various phenomena in, and aspects of, the world around them. The words "experience", "perceive", and so on are used interchangeably. The point is not to deny that there are differences in what these terms refer to, but to suggest that the limited number of ways in which a certain phenomenon appears to people can be found, for instance, regardless of whether they are embedded in immediate experience of the phenomenon or in reflected thought about the same phenomenon. The different ways a phenomenon can be experienced, perceived, apprehended, understood, or conceptualised according to the way of describing them, are thus independent of the differences between experience, perception, apprehension, understanding or conceptualisation. (Marton 1997, p.97)

A prerequisite to investigating young people's experiences of information is the need to communicate and engage with them in a meaningful and effective

way. Inspired by techniques used in the Participatory Rural Appraisal (PRA) approach (Cornwall and Jewkes 1995) focus group sessions are held to ensure that the questions which are addressed to young people are meaningful.

Marton (1986, p.420) states that conceptions may be revealed in different ways including drawings, studying the behaviour of individuals and the products of people's work. Nevertheless he asserts that conceptions are most readily accessed through language, a view on which Svensson (1997, p.166) concurs. Indeed Kvale (1983, p.174) and Bruce (1997, p.98) also recommend the use of phenomenographic interviews. Bruce describes how phenomenographic interviews are distinct from other qualitative research interviews:

...their specific purpose is to seek variation in people's understanding of the phenomenon in question. Furthermore their focus is on the relation between the person being interviewed and the theme of the interview...The interviewer's focus is neither on the person, nor on the theme, but rather on how the theme appears to, or is experienced by, the person being interviewed. (Bruce 1997, p.98)

Accordingly the study reported here collects data by means of drawings and semi-structured individual interviews. The purpose of the phenomenographic interview is to ask questions which encourage participants to think and reflect and thus enable them to express their perceptions and experiences. A small number of open ended questions are asked to focus the interview around the research questions.

Data analysis in a phenomenographic study seeks to uncover the variety of ways a group of individuals' experience a phenomenon. A phenomenographic research approach allows experiences to emerge from the data and also shows the variation in the experiences and how the experiences are logically related to each other. The outcome of phenomenographic analysis is an outcome space consisting of a finite set of categories of description which, with their

relationships, explain the experiences held by people about phenomena in the world.

1.5. Significance of the study

The primary outcome of this thesis is an in-depth analysis of young people's experiences of information. The study is significant for several reasons. This study will be the first to investigate the ways young people of secondary school age experience information using a phenomenographic research approach. In many studies phenomenography has been used simply as a method of analysis and not as a holistic research approach. The research presented here will be a complete phenomenographic study with all aspects of research taken from a phenomenographic perspective.

The research will contribute to the knowledge and understanding of young people's experience of information. To date, as will be demonstrated in Chapter Two, the literature has revealed that scant attention has been paid to this area. This research study will address a gap in the knowledge and provide a baseline to allow other researchers to conduct investigations into individual's experiences of information.

The study has the potential to give voice to an often unheard group of individuals, young people of secondary school age. Although a lot of research has been conducted looking at various aspects of young people and information (Large 2005; Chelton & Cool 2004; 2007) none have focused significantly on gaining knowledge of the ways young people of secondary school age experience information. Young people's voices have not been sought in the past.

This research is important because the ways that individuals experience a phenomenon may influence their behaviour in regard to that phenomenon. Understanding how individuals understand a phenomenon affords pedagogical opportunities:

If we understand the relationship that exists between an individual and what he or she is trying to learn, our pedagogical opportunities are greatly expanded. By changing that which has to be learned or understood, we change the relationship between the object of learning and the individual. (Marton 1986 p.43-44)

The purpose of this study is to identify how young people experience the phenomenon of information and the relationship between the experiences. In doing so the research findings will provide educators with a greater understanding of young people and how they relate to information and enable them to devise situations where young people can be made aware of significant aspects of the phenomenon of information thereby potentially changing their understanding of it:

Encouraging teachers to pay attention to students' ways of thinking and to facilitate students' realization that there are different ways of thinking may be the most important pedagogical implications [sic] of a phenomenographic view of learning. (Marton 1986 p.47)

1.6. Structure of the thesis

The thesis is comprised of six chapters. In Chapter One the thesis is introduced. The background and purpose of the study are outlined and the research questions are established. Phenomenography is presented as the research approach employed and a summary of the research design is given. The significance of the study is explained. Chapter Two examines the literature relevant to the research in order to provide a context for the study. Chapter Three is a detailed discussion of the methodology and research process. Phenomenography is presented as the research approach employed to conduct the study. The rationale for employing phenomenography is given and other methodologies that were considered are discussed. The chapter continues by describing the philosophical underpinnings of the research approach and presenting a description of the data collection and analysis methods. Chapter Three concludes by addressing the issues relating to the

validity and reliability of the study. Chapter Four presents the findings. The outcome of phenomenographic analysis is an outcome space consisting of a finite set of categories of description outlining the qualitatively different ways in which young people experience information. The six categories of description that emerge from the data analysis are described and the relationships between the categories are detailed in the outcome space. Chapter Five provides the main discussion of the research study based on the findings. The final chapter, Chapter Six, reports the conclusions and implications of this study and recommendations for future research are made.

1.7. Summary

This chapter has introduced the focus of the research: An investigation into young people's experiences of information. The background to the research and the research questions have been outlined along with the research design. The significance of the study has been established and an overview of the structure of the thesis presented. A detailed review of the literature that sets the research in context is given in Chapter Two.

Chapter Two: Literature review

2.1. Introduction

In order to set the research in context a thorough review of literature relating to young people and information was undertaken. Chapter Two addresses four key areas that highlight the context of the study. In order to provide a backdrop to the research the chapter begins with an overview of the nature of information as presented in LIS literature. Attention then moves on to explore various facets of young people's information behaviour and aspects of learning before looking at the literature related to their experiences of information. The chapter concludes by looking at the characteristics and attributes of the present generation of young people and the environment in which they live.

2.2. The nature of information

2.2.1. Introduction

In today's society there is a proliferation of information. Technology is developing rapidly and individuals can now access vast quantities of information. A report by the School of Information Management and Systems at the University of California at Berkley (Lyman & Varian 2003) estimates that about five exabytes of new information were produced in 2002 (five exabytes is the equivalent in size to the information contained in 37,000 new libraries each holding a collection the size of that held in the Library of Congress, namely seventeen million books). This equates to 800 MB of recorded information per person in the world per year. They estimate that new stored information grew by about 30% a year between 1999 and 2002. Nahl and Harada (2004, p.119) state simply that "today's students live in a world in which information doubles every two years".

2.2.2. How is information understood?

Information surrounds us. It is the subject of study and comment by LIS scholars whose work will be reviewed in later sections of this chapter but how is the phenomenon known as information understood by the LIS community? In order to provide a backdrop to the research that question is addressed through a review of LIS literature. A review of the literature shows that in discussions about how information is understood the terms ‘definition’ and ‘concept’ of information are both used. A distinction is drawn between these two terms by Belkin (1978, p.58) who suggests that concern should not be with:

...definitions of information, but rather with concepts of information. The distinction is that a definition presumably says what the phenomenon defined is, whereas a concept is a way of looking at, or interpreting the phenomenon...by accepting the idea of a concept one becomes free to look for a useful concept, rather than a universally true definition of information.

A review of the literature demonstrates that the LIS community understands information in various ways. Fox (1983, p.3) states that “information seems to be everywhere...no one seems to know exactly what information is. Indeed Fox concludes that information is an abstract entity. Derr (1985, p.489) states that there is no consensus as to the nature of the concept of information within the domain of Information Science. Through an analysis of language he concurs with Fox that information is an abstract entity:

...information, as it is reflected in ordinary discourse, is an abstract, meaningful representation of determinations made of objects. Furthermore it has been concluded that information has derivative properties which enable it to communicate, inform, empower and to exist in some quantity. (Derr, 1985, p.497)

Belkin and Robertson (1976, p.198) report that “...a wide spectrum of information concepts are in current use, in a variety of disciplines”. They are

tempted to define information as: "...that which is capable of transforming structure" but concede that this definition is too broad so leave the term, in its general sense, undefined.

Levitan (1980, p.242) states that there is "no obvious agreement as to the nature of information" throughout the sciences. Through an analysis of the definition of information within the literature Levitan discovers twenty nine concepts but finds no common thread to provide an answer to the question 'what is information'?

Fox (1983, p.4) points out that there have been many attempts to define information and notes that several disciplines "have adopted definitions of 'information' that have proven useful for their purposes". Fox concludes that no one has come up with an adequate analysis of 'information' as the term is used in many and varied contexts. Nearly two decades later Case (2002, p.62) reports that there is no consensus about what constitutes a general definition of information. Machlup and Mansfield (1983, p.4) state that information is not just one thing; it means different things to different people. Authors appear to agree that information is complex and not something that is easy to describe.

Capurro and Hjørland (2003) report that the introduction of a concept of information around 1950 to the domain of special librarianship and documentation has had serious consequences for the types of knowledge and theories developed in the information science (IS) field and also how meaning attributed to the term relates to other basic terms, such as documents, texts, and knowledge. Capurro and Hjørland call Shannon's (1948) mathematical theory of communication a landmark work.

Attempts to develop a theory of information date from the publication of Claude Shannon's Mathematical theory of communication in 1948 and the subsequent joint publication in 1949 of that work alongside an essay by Weaver. (Cornelius 2002, p.393). Shannon worked as an engineer for Bell Telegraph Company and developed his mathematical theory of communication in order to ensure the maximum efficiency of telephone lines

with minimum distortion. Weaver who worked alongside Shannon claimed in his essay that “the basic concepts of Shannon’s mathematical theory of communication, which Shannon later referred to as a theory of information, can be applied in disciplines outside electrical engineering, even in the social sciences” (Cornelius 2002, pp393-394). According to Shannon’s model:

- The information source selects a desired message out of a set of possible messages.
- The transmitter changes the message into a signal that is sent over the communication channel to the receiver.
- The receiver then changes the transmitted signal back into a message, and interprets this message.
- This message is then conveyed to its destination.

In the process of travelling along the channel the message moves through noise (sources of interference) this may be internal noise (e.g. from the receiver’s own attitudes, or beliefs) or external (e.g. coming from other sources). This may lead to the signal received being different from that sent (Shannon & Weaver 1949)

Shannon’s definition of information is a theory of signal or message transmission not of information transmission. In Shannon’s model of communication Capurro and Hjørland (2003, p.360) state:

Strictly speaking no information could be communicated between a sender and receiver, because this theory is not concerned with the communication of a meaningful message, but rather with the reproduction of a selection process.

Shannon correlates information and uncertainty. Capurro and Hjørland (2003, p.361) agree with Weaver’s remarks that this concept of information seems “disappointing and bizarre-disappointing because it has nothing to do with meaning, and bizarre because it deals not with a single message but rather with the statistical character of a whole ensemble of messages, bizarre also because in these statistical terms the two words information and uncertainty find

themselves to be partners” (Shannon & Weaver 1972, p.27 cited in Capurro and Hjørland 2003, p361).

Turning his attention to guides to information and its theory Cornelius (2002, pp. 399-400) notes that Qvortrup (1993) in reviewing Shannon’s theory of information points to ambiguity about the nature of information and also to two questions about relationships: the question of information in relation to social environments and the question of information in relationship to the mind of the receiver. Qvortrup reports claims of Luhmann noting that “information is an internal change of state, not something that exists in the external environment. Externally there is only data; it is the system that makes it information”. Qvortrup thereby emphasises a constructivist approach, an approach that is also noted by Wersig. Wersig (cited in Cornelius 2002, p.400) summarised work on information theory, up to the 1970s, as six different types of meaning attached to the term information:

- Structures: structures of the world are information;
 - Knowledge: knowledge developed from perception is information;
 - Message: information is the message itself;
 - Meaning: meaning assigned to data is the information;
 - Effect: information is the effect of a specific process-reducing uncertainty, or a change of knowledge, or resolution of an anomalous state of knowledge in the mind of a recipient;
 - Process: information is a process; commonly a process of transfer.
- (Cornelius 2002, p.400)

According to Wersig from the 1970s a focus on information as the effect of a specific process was established as the main approach to information theory. Wersig in his theory of information states that “information is the amount of complexity to be reduced or that has been reduced” (Cornelius 2002, pp400-401).

Since the mid 1970s Information Science was developing an approach to information known as cognitive turn, influenced by writers such as Brookes; Belkin, Wersig and Ingwersen. Cornelius (2002, p.406) states:

The critical component in this cognitive viewpoint is that information is mediated by a potential recipient's state of knowledge...the cognitive viewpoint served to swing the research in information transfer away from information systems and toward the state of mind of the user.

The emphasis was now on meaning. Starting with an objectivist view from the world of information theory Information Science (IS) had turned to the phenomena of relevance and interpretation as basic aspects of the concept of information. Different concepts of information within IS reflected tensions between a subjective and an objective approach.

The model of information transfer used and adapted by the cognitive viewpoint is presented as an equation by Brookes (1980). Brookes' model of information was related to knowledge structure. Brookes (1980 p.131) defines information as a "small bit of knowledge". The claim represented in the equation is that information "when operating on a knowledge structure... produces an effect whereby that knowledge structure is changed" (Cornelius 2002, p.407). Cole (1997 p.716) states:

The view that 'information' modifies the individual's knowledge structure is efficiently expressed in a formula by Brookes, which he calls the 'fundamental equation' (Brookes, 1980b, p.131). In the 'fundamental equation,' Brookes describes an information process in terms of the state of mind or knowledge structure (KS) 'before' (K[S]) and 'after' (K[S+AS]) information (AI) occurs:

$$K[S] + AI = K[S + AS]$$

From this equation, information (AI) is defined as "that which modifies knowledge structure" (Brookes, 1977). Information is not additive (something added onto the knowledge structure), nor is it an accumulation of more knowledge structures.

Cornelius (2002 p.407) reports that Brookes' equation was amended by Ingwersen (1992) to allow for potential information maybe in the form of a document:

In this variation, information AI is perceived from potential information pI, and is then mediated by the knowledge state.

$$pI \rightarrow AI + K(S) \rightarrow K(S + AS) + pI$$

Cornelius (2002 p.408) notes that Brookes' model is not a complete theory of information; it lacks attention to measurement and to the concept of structure. It is unclear how information is structured. The suggestion is that it is structured by the receiver's mind thereby requiring the sender and receiver to be in some form of social relationship with a shared language. Cornelius (2002 p.410) argues that Brookes' formula "...does not give sufficient attention to the "subjective" element it recognises in information transfer".

Belkin's (1978) criteria for the concept of information required taking into account the effect of information on the recipient. Belkin views information as reducing the level of uncertainty in a recipient. According to Belkin (1978) a recipient is motivated to seek information to resolve some anomaly in her state of knowledge. This model shifts attention towards the recipient (in line with the cognitive viewpoint) but still includes the generator of information.

Buckland (1991a, p.351) analyses the uses of the term information and notes that the term information can be used in relation to things; processes and knowledge. "Information as process" refers to information seen as an act of informing. Similarly Machlup (1983, p.642) takes the stance that the definition of information is restricted to the context of communication; the telling of something or that which is being told. Buckland posits two further meanings of information, "information as knowledge" and "information as thing". Information as knowledge refers to that which is perceived in "information as process". Buckland (1991a, p.351) describes what is imparted in the process of being informed as something intangible, "...knowledge, belief, and opinion are personal, subjective, and conceptual". He argues that in order to communicate them they have to be expressed, described or represented in a physical way: "Any such expression, description or representation would be 'information as thing'". Buckland (1991a, p.352) argues that "information as thing" cannot be dismissed and notes that the practice of referring to objects

such as databases, books and the like as ‘information’ appears to be increasing. In relation to the cognitive viewpoint of information Buckland (1991b) goes further than Brookes. He states:

Information is an attribute of the receiver’s knowledge and interpretation of the signal, nor the sender’s, nor some omniscient observer’s nor of the signal itself.

It is clear from this statement that information is viewed as situational and contextual. Buckland (1991b) goes on to state:

Since information and information handling is pervasive in human activities, an exploration of information systems that did not include the social, economic, and political context and the broad social role of information would be seriously incomplete.

Buckland (1991a, p.354) asserts that the literature on information science has focused on data and documents as information resources however; he argues the case for including objects and events in addition to data and documents. This broader view is echoed by Brookes:

I see no reason why what is learned by direct observation of the physical environment should not be regarded as information just as that which is learned by observing the marks on a document...The primary source of scientific information is nature itself. (Brookes 1974, p.142)

Machlup (1983, p.645) however, draws a distinction between information and observation. He rejects the thought that an object of observation is able to “tell anything to anybody...to speak of information in this case is just a metaphor”. He does, however, concede:

If the object of observation is a human artefact, genuine information may be involved if, for example, an old inscription invites. The inscription was evidently designed to inform; hence, an attempt to read and interpret it is part of a process of information. (Machlup 1983, p.645)

Buckland (1991b, p.50) maintains that anything might be informative: “We conclude that we are unable to say confidently of anything that it could not be information”. Buckland (1991b, p.50) goes on to state: “It follows from this that the capability of being informative, the essential characteristic of information-as-thing, must also be *situational*”. Buckland’s analysis draws attention to the subjective view of information but “goes another step” (Capurro & Hjørland 2003, p.395). This view of information is known as the “domain analytic view”. Capurro and Hjørland (2003, p.395) state:

The domain analytic view sees different objects as being informative relative to the social division of labor in society. In this way, information is a subjective concept but not primarily in an individual sense. Criteria for what counts as information are formed by sociocultural and scientific processes.

Hjørland (1997, p.111) expands on this stating that: “users should be seen as individuals in concrete situations in social organizations and domains of knowledge”. He concludes: “The analysis of the concept of information...implies that informational objects should not only be analyzed and described according to an objectivist epistemology...instead information must be analyzed, described and represented in information systems according to situational, pragmatic and domain specific criteria”.

The cognitive viewpoint has been challenged by a number of scholars such as Frohmann and Vakkari; it is accused of relying on “the image of an atomistic individual” and not paying enough attention to the “social construction of reality, identity, and information” (Cornelius 2002, p.411). Nevertheless as Cornelius notes the cognitive viewpoint did succeed in moving “the attention of information science away from a preoccupation with systems and back to

the perceiving human subject” (Cornelius p.412). Similarly Capurro and Hjørland (2003 p.345) see the cognitive view as taking a position between the objective concept of information in information theory on the one hand, and the subjective or interpretative view taken by information scientists on the other hand.

In their review of concepts of information Capurro and Hjørland (2003 p.345) assert that IS starting from “an objectivist view from the world of information theory...has turned to the phenomena of relevance and interpretation as basic aspects of the concept of information”. They state:

...this change is in no way a turn to subjectivist theory, but an appraisal of different perspectives that may determine in a particular context what is being considered as informative...Different concepts within information science reflect tensions between a subjective and an objective approach (Capurro and Hjørland 2003 p.345).

Objectivist concepts centre attention on measurement; the quantity of information or the strength of transmission is measured. Information is reduced to a set of signals or symbols as demonstrated in Shannon’s theory of information (Shannon & Weaver 1949). Subjectivist concepts centre attention on information as communication of a message with meaning attached. Information theory is concerned particularly with signs and symbols of messages and not with their meaning whereas subjectivist concepts of information are very much concerned with the meaning and understanding of the messages communicated by information. Subjectivist concepts of information which can be found in the Information Science discipline require that the receiver has adequate contextual and background knowledge to decode the signals and understand the message otherwise the message will remain as data (Buckland 1991b; Hjørland 1997).

A review of the literature shows that there are a variety of understandings of information. In his survey of the literature Case (2002, p.40) makes the point

that the term 'information' has been used to denote various overlapping concepts but he opts to define 'information' as:

...any difference that makes a difference to a conscious human mind (Bateson 1972, p.453). In other words, information is whatever appears significant to a human being, whether originating from an external environment or a (psychologically) internal world.

Case (2002, p.50) finds that most information concepts contain assumptions. He lists five types of assumptions:

- **Uncertainty:** Does information, in order to be information, have to reduce uncertainty about something? It is argued by some that this is the case. Case (2002, p.51) cites the following authors whose definitions of information incorporate the role of uncertainty: Nauta (1972); Rogers (1986) and Wersig and Neveling (1975).
- **Physicality:** Must information always take on a physical form? According to Case (2002, p. 52) it is universally acknowledged that information can take a physical form but he surmises that few argue that it must.
- **Structure/Process:** Must information be structured in some way? Often an analogy is used when describing information. Case (2002, p.53) describes the following: information as an image, Boulding (1956); information as an event, Pratt (1977); information as a structure or organisation of experience and sensory data, Belkin and Robertson (1976) Cole (1994); Losee (1997) and Thompson (1968).
- **Intentionality:** When studying information, is it necessary to assume that someone (or something) intends to communicate it to another individual? Case (2002, p. 56) argues that "Although the restriction of intentionality may hold true for what is the most important sense of information - the exchange of information between humans - it does not apply to all senses in which we use the word. Information may originate... for example, as signs occurring in our environment."

- Truth: Must information in order to be information be true? A number of authors believe that "...a true-false distinction is worth keeping in defining 'information,' Dretske (1981) and Frické (1997) cited by Case (2002, p.58). Others believe that this distinction can be ignored Buckland (1991b); Derr (1985); Fox (1983) and Wilson (1973) cited by Case (2002, p.57).

Case (2002, p.61) concludes:

...there is as yet no single, widely accepted definition for the concept of information.

Like Buckland (1991a) some authors take a broad view: Bateson (1972); Case (2002); Miller (1968); Dervin (1976); Farace *et al.* (1977); Higgins (1999); Johnson, (1997) and Rogers, (1986) cited in Case (2002, p.40). Other authors, as outlined above, define information in a more restrictive way: Belkin and Robertson (1976); Boulding (1956); Cole (1994); Losee (1997); Nauta (1972); Pratt (1977); Rogers (1986); Thompson (1968) and Wersig and Neveling (1975).

Case (2002, p.59) does however argue that it does not seem possible to define information "...in an absolute and final sense" but he believes that it is not entirely necessary to do so. Case argues in favour of thinking about:

...information as a primitive concept that is so basic to human understanding that it does not require a tight definition. (Case 2002, p.63)

2.2.3. Data, information and knowledge

When discussing information it is pertinent to consider the relationship of information to data and knowledge. Quigley and Debons (1999, p.4) note that a range of meanings are attributed to the words data, information and knowledge in different contexts:

...data is variously understood as symbols, numbers, or a Star Trek character. Some see informing as a process, while informed is a mental state, and information is a commodity, product or thing. Philosophers see knowledge as justified, true belief, while scientists see knowledge as documented empirical research.

Machlup (1983, p.642) refers to academics of information science and computer science instructing their students to "...observe a hierarchy - in ascending order - within the triad: data, information and knowledge"; Machlup says that historical semantics do not fully support this proposal. Rowley (2007) discusses the data-information-knowledge-wisdom (DIKW) hierarchy in relation to the way in which the hierarchy is articulated in a number of textbooks and what they say about the nature of data, information, knowledge and wisdom. She concludes:

Typically information is defined in terms of data, knowledge in terms of information, and wisdom in terms of knowledge. (Rowley 2007, p. 177)

Hey (2004, p.5) states that data is defined in a number of ways depending on the context of its use:

...Information Science defines data as unprocessed information and other domains leave data as a representation of objective facts.

Feather and Sturgess (2003, p.244) draw a distinction between data and information. They state:

Information is data that has been processed into a meaningful form. Seen in this way, information is an assemblage of data in a comprehensible form capable of communication and use; the essence of it is that a meaning has been attached to the raw facts.

Machlup (1983, p.648) reports that there are different views held on whether data is information or information is data. He concludes:

There is no need to establish either a hierarchy or a temporal sequence in discussing data and information.

Hey (2004, p.9) whilst noting that there are "...large similarities between our conceptual representations of both information and data" makes the point that "...knowledge appears to be a quite different entity to either information or data". Whereas information exists objectively outside the head, knowledge is found inside the head of the individual; it "...is internalized by the knower, and as such is 'shaped' by their existing perceptions and experiences". Machlup (1983, p.642) in his discussion about the relationship between information and knowledge notes that although a close link between information and knowledge has always existed, a number of distinctions between the two have been proposed:

(1) Information is piecemeal, fragmented, particular, whereas knowledge is structured, coherent and often universal. (2) Information is timely, transitory, perhaps even ephemeral, whereas knowledge is of enduring significance. (3) Information is a flow of messages, whereas knowledge is a stock, largely resulting from the flow, in the sense that the "input" of information may affect the stock of knowledge by adding to it, restructuring it or changing it in any way (though conceivably information may leave knowledge unchanged).

Another difference between information and knowledge, which Machlup (1983, p.644) highlights is "Information is acquired by being told, whereas knowledge can be acquired by thinking". This is implied in the third distinction, outlined above, where new information causes the restructuring of knowledge but Machlup makes the point that cognitive processes, which lead to changes in a person's knowledge, do not necessarily require new information. Factors such as "accidental impressions, observations and even

“inner experience”” can lead to the restructuring of knowledge (Machlup 1983, p.644). Machlup concludes that information in the sense of telling and being told is a process and is always different from knowledge in the sense of knowing, which is a state. The exception is when:

Information in the sense of that which is being told may be the same as knowledge in the sense of that which is known, but need not be the same. (Machlup 1983, p.644)

Case in his consideration of data, information and knowledge concludes that:

Knowledge...is strictly a phenomenon of the human mind, whereas data and information are often represented by tangible, physical objects. (Case 2002, p.62)

2.2.4. Summary of section 2.2

A review of the literature shows that within the domain of information science there is a wide spectrum of understanding of the phenomenon information and similarly of the relationship between information and data and knowledge. In terms of this research, it is pertinent to speculate on whether or not this will be the case in the population being studied i.e. young people. Will they see information as:

- A process (being informed)?
- Knowledge (what is perceived when informed)?
- A thing?

Will they agree with Machlup (1983, p.642) that information is restricted to the context of communication or will they concur with the view held by Buckland (1991a, p.352) that “information as a thing” exists?

2.3. Information behaviour

2.3.1. Introduction

In order to set the research study investigating young people's experiences of information into context it is relevant to look at young people's information behaviour. Young people's interaction with information might be expected to have a bearing on their experience of the phenomenon. The term information behaviour is used in preference to the term information seeking and use because it is a broader term, which includes behaviours that are both purposive and passive. Some authors (Krikelas, 1983; Johnson 1997) offer restrictive definitions of information seeking:

Information-seeking behavior is defined here as any activity of an individual that is undertaken to identify a message that satisfies a perceived need. (Krikelas, 1983, p.6)

Information seeking can be defined as the purposive acquisition of information from selected information carriers. (Johnson, 1997, p.26)

Such definitions emphasise "purposive activity." The term information behaviour covers information seeking and also includes behaviours that are passive. Wilson defines information behaviour as:

...the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use. (Wilson 2000, p.49)

Wilson's (1997) model of information behaviour (Figure 1) outlines the different types of information behaviour. It recognises more types of information behaviour than previously; passive attention, passive searching, active searching or ongoing searching.

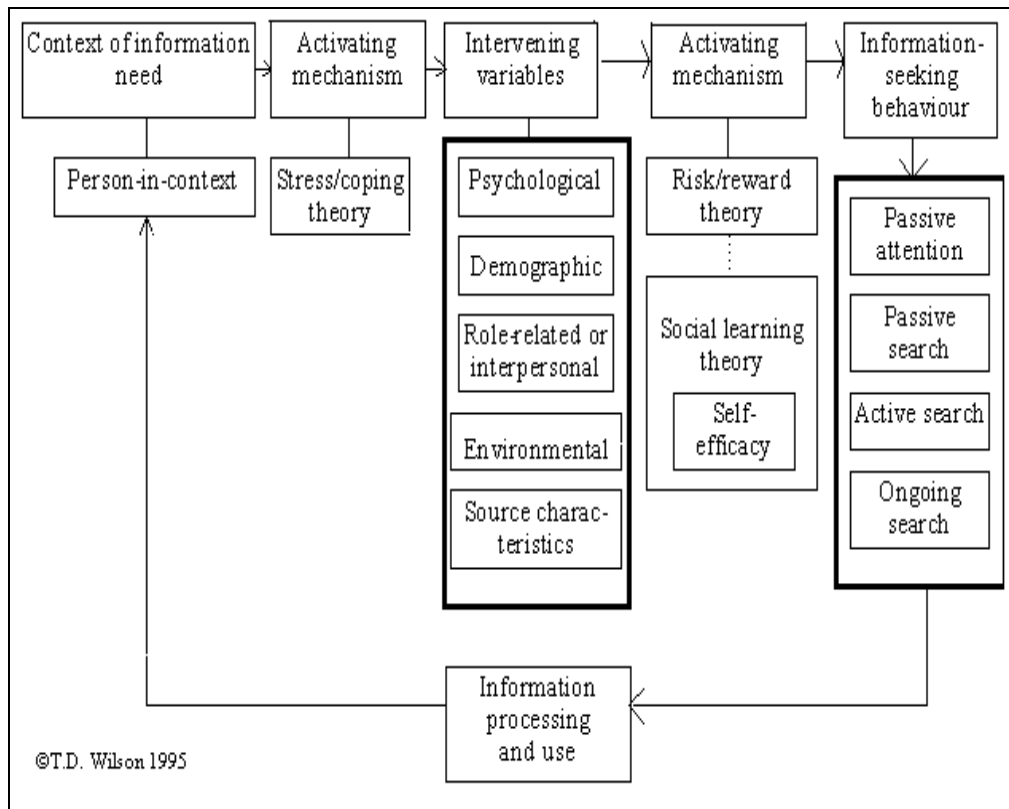


Figure 1: Wilson's model of information behaviour (Wilson 1997 p.47)

The distinction between information behaviour and information seeking is important. Information seeking is seen as having a distinct character and will be discussed in section 2.5.

A range of studies has been carried out in the area of information behaviour. Although most of the research reviewed refers to young people in the age group eleven to eighteen years some studies have been included that have looked at children of primary school age; Moore (2000); Moore and St. George (1991); Hirsh (1999) and Lavery (2002). Also included are some studies that have looked at young people in higher education: Valentine (1993); Morrison (1997) and Seamans (2002). Studies have considered the information behaviour of young people from a variety of angles. A number of investigations concentrate on a particular source or resource: the Internet (Schacter, Chung & Dorr 1998; Fidel *et al.* 1999; Bilal & Watson 1998; Bilal 2000; 2001; 2002; Large & Beheshti 2000; Broch 2000; Large 2005); libraries (Lavery 2002; Moore 2000; Moore & St George 1991; Kuhlthau 1988) and

books (Mallett 1992; Cole & Gardner 1979). Other investigations have examined the information seeking behaviour of young people carrying out a research task (Garland 1995; Hirsh 1999; Pitts, 1995). Shenton (2002) and Shenton and Dixon (2003a; 2003b; 2004a and 2004b) have carried out research which explores the generic information seeking patterns that emerge whatever the sources used.

Much of the research concentrates on information behaviour in the academic context however, although fewer in number, there are some studies which have addressed the information seeking behaviour of young people in contexts other than the academic. Hansen *et al.* (2003) carried out a study which looked at how adolescents, aged twelve to seventeen, searched for health information on the Internet. Agosto & Hughes-Hassell (2005) investigated the everyday information seeking behaviour of urban young adults, aged fourteen to seventeen. A study by Meyers, Fisher & Marcoux (2009) investigated the everyday-life information seeking of tweens (young people aged nine to thirteen).

2.3.2. Information behaviour models

A number of information behaviour and information seeking models have been published over the years, for instance Krikelas (1983); Kuhlthau (1988; 1993); Wilson (1981; 1994; 1997 and 1999). Wilson (1999, p.250) defines model as “a framework for thinking about a problem”.

Krikelas published a model of information behaviour in 1983. In terms of this research Krikelas’ model (1983) is significant for two reasons. Firstly, it moves away from the previously narrow conceptualisation of information as use of records or the literature and instead conceptualises information in broader terms allowing for alternative sources of information, such as personal memory, observations and informal conversations as well as information obtained from formal sources. It will be interesting to note if the present research will demonstrate any correspondence with this broader conceptualisation of information. Secondly Krikelas argues that it is not

possible to observe information seeking behaviour in isolation it must be accompanied by an understanding of the purpose behind the behaviour. Krikelas' model recognises the importance of the setting and context for understanding individuals' information needs.

Kuhlthau's models (1988; 1993) outline the thoughts and actions of participants during the information seeking process. Kuhlthau also gathered information about their feelings and outlines the affective stages of the information search process. Given the range of feelings that were identified throughout the process with regard to the present study the question arises as to whether or not the feelings experienced by individuals during the research process have an impact on how they experience information.

Wilson produced a series of models (1981; 1994; 1997 and 1999) of information behaviour. Wilson's (1997) model of information behaviour (Figure 1) draws attention to the fact that a number of variables, which can be either positive or negative, can intervene in the information search process. In addition, the model stresses that information may be searched for in a number of different ways: passive attention, passive searching, active searching or ongoing searching. In most cases, it is recognised that 'active searching' will be the form most commonly employed. Both of these factors may have a bearing on young people's experiences of information.

2.3.3. Summary of section 2.3

Information behaviour models demonstrate that there are many different aspects to information behaviour each of which may have a bearing on an individual's experience of information. In relation to this study, knowledge of the setting and context of information needs, the sequence of behaviour, the factors and variables which influence that behaviour and the sources used to satisfy information needs will contribute to a better understanding of an individual's experience of information. A more detailed consideration will now be given to the literature published concerning the area of information needs.

2.4. Information needs

2.4.1. Introduction

The view that information need motivates information behaviour is held by some scholars (Wilson 1981; Dervin & Nilan 1986; Pettigrew, Fidel & Bruce 2001). Shenton and Dixon (2004b, p.296) state that little is written about young people's information needs in the LIS literature. They note that a significant problem contributing to the lack of research in this area is the difficulty in defining the term "information needs". Nevertheless a number of attempts have been made to define the term.

2.4.2. Information need

A review of the literature shows that authors understand the concept of "information need" in a variety of ways. Forsythe *et al.* (1992, p.182) state:

...no explicit consensus exists in the literature regarding the meaning of the central concept of "information need"...In effect "information need" has been defined according to the particular interests and expertise of various authors.

Green (1990, pp.65-67) reflects on the nature of 'user needs' and concludes that:

- A need is always instrumental. It involves reaching a desired goal;
- Needs are usually contestable;
- Need is related to the concept of necessity;
- Individuals are not necessarily aware of their needs.

Nicholas (2000, p.19) notes that the term information needs is often used, when, in fact, people are referring to information wants or use. Derr (1983, p.273) discusses differences between needs and wants, noting that information may be needed without being wanted. The absence of awareness of an information need is recognised by a number of scholars; Faibisoff and Ely (1976, p.3) make a distinction between felt needs and unmet needs and Nicholas (2000, p.22) refers to dormant need or unrecognised need. Even

when an individual is aware of information needs these needs can be either expressed or unexpressed (Nicholas, 2000, p.24). An individual can respond to a need by taking information seeking action and expressing their information need or they may choose to take no action and thereby leave the need unexpressed.

One of the earliest theories about the mental development of information needs is that of Taylor (1968). Taylor's study explored the questions presented by people at library reference desks. He talks about the development of information needs as passing through four phases going from:

- A visceral need: A "conscious or even unconscious need for information";
- A conscious need: A "conscious mental description";
- A formalised need: The need can be formally stated, uncertainty exists at this stage as to whether the need can be answered;
- A compromised need: Where "the question is recast in anticipation of what the files can deliver" (Taylor 1968, p.182).

Case (2002, p.68) cites several problems with Taylor's conceptualisation. The perception of need may not be the same as that expressed in words; "unconscious needs" may exist; action is not always taken when uncertainty is recognised and there may be problems in expressing and communicating one's thoughts. Case concludes that this could help to explain why queries received in libraries are often very general.

Atkin (1973, p.206) and Belkin, Oddy and Brooks (1982, p.62) view information as a means of reducing uncertainty. Belkin and his colleagues believe that individuals are motivated to seek information by an anomalous state of knowledge (ASK). The individual recognises a gap or uncertainty in their existing knowledge and seeks to address it by finding the required information. Nicholas (2000, p.20) concurs with Belkin and his colleagues as does Taylor (1968, p.182) when he proposes that an information need develops from "a vague sort of dissatisfaction...probably inexpressible in linguistic terms". Like Taylor (1968), Belkin, Oddy and Brooks (1982) and

Case (2002), Dervin (1983, p.156) also sees information need as “a state that arises within a person, suggesting some kind of gap that requires filling”.

Dervin has made a significant contribution to the understanding of information needs; her approach is known as sense-making (Dervin, 1992). Individuals need to continually make sense of the world. When a gap between their understanding of the world and their experience of the world is encountered, then the sense-making ceases and information needing or gaps appear and information is needed to bridge these gaps and make sense of the whole. Dervin and Nilan (1986, p.20) show that the sense-making model can be used to understand information behaviour in a range of contexts.

2.4.3. Young people and their information needs

Given the complex and constantly changing information world in which young people are growing up scholars have recognised that only limited research has addressed the subject of their information behaviour and specifically their information needs (Shenton & Dixon 2003b; 2004b; Agosto & Hughes-Hassell 2005). Nevertheless some studies have addressed this topic. Minudri (1974, pp.155-161) identifies five areas where information needs arise for young people: school and curriculum needs; recreational needs; personal developmental needs; vocational and career information needs and accomplishment skills and information needs. Fourie and Kruger (1995, pp.227-244) identify four categories of information need: basic; developmental; curricular and personal. Shenton and Dixon (2003a, p.10) identify thirteen types of information need in their study of young people: advice; spontaneous ‘life situation’ information; personal information; affective support; empathetic understanding of others; support for skill development; school related subject information; interest-driven information; consumer information; self development information; preparatory information; reinterpretations and supplementations of information already known and verificational information. In a study conducted amongst teenagers (aged 14 to 17 years) living in urban communities and predominantly from the lower socio-economic stratum Agosto & Hughes Hassell (2005, p.160) identify a

range of information needs: school work; time; social life/leisure activities; weather; daily life routine; popular culture; current events; transportation; personal finances; consumer information; personal improvement and job information. Their study is significant because the information needs identified there support the findings from previous studies, which dealt largely with middle class suburban populations, suggesting that young people may have similar information needs across socioeconomic, ethnic and geographic boundaries. This suggestion, however, is challenged to some extent by findings from the study by Meyers, Fisher and Marcoux (2009, p. 315). Their study reports that the information needs of participants from urban areas differed from those of participants from suburban areas.

2.4.4. Summary of section 2.4

In these descriptions of information need, information is seen as something that is required to satisfy a need, a gap. The literature has shown that young people have a range of information needs but in terms of this research it will be interesting to find out if young people always experience information as something that is needed.

Information may be needed or it may be wanted. Individuals may be aware of their information needs or the needs may be unrecognised. Even when the information needs are recognised they may be unexpressed. Information can provide the answer to a problem, it can bridge a gap or it can reduce uncertainty. In order to accomplish any of these the individual will have to search for information. The review of the literature now turns to literature considering young people and information seeking.

2.5. Information seeking

2.5.1. Introduction

The information seeking process young people undertake in order to acquire information may have a bearing on the ways in which they

experience information. Therefore from the point of view of the research being undertaken it is pertinent to review the literature that looks at young people and information seeking. As discussed in section 2.3 information seeking is one form of information behaviour. Wilson's (1997) model of information behaviour (Figure 1) outlines four different types of information seeking behaviour: passive attention; passive searching; active searching or ongoing searching. In most cases, it is recognised that 'active searching' will be the form most commonly employed and it is 'active searching' that is discussed in this section.

What is information seeking? Marchionini (1989, p.54) views information seeking as a special case of problem solving:

It includes recognising and interpreting the information problem, establishing a plan of search, conducting the search, evaluating the results, and if necessary iterating through the process again.

With reference to the stages of information seeking outlined by Marchionini the literature relating to searches conducted in both digital and non-digital resources will be considered.

2.5.2. Recognising and interpreting the information problem

Are young people always able to recognise the information problem and interpret it? If they are not, can they be expected to engage with the information seeking process and resolve their information problem? In the academic environment a number of studies have highlighted the need for students to understand the purpose of their research. Herring (1997, p.258) states that, when students undertake research, identification of the purpose needs to be done in the classroom; it is only when this has been completed that students will be able to seek out appropriate information sources. Small and Ferreira (1994, p.260) report that students often have to complete a task for which they do not have a clear purpose. Moore (2000) discusses the

importance of students understanding that information is gathered for a purpose. Young people in the academic environment are often assigned problems and tasks which require them to gather information. Given this situation, does interaction with information in an educational context lead young people to view information in the same way as Atkin (1973) and Belkin, Oddy and Brooks (1982) as a means of reducing uncertainty or like Dervin (1983) as something which bridges a gap?

It is generally agreed that students are more intrinsically motivated if they are allowed to choose their own research topic (Bilal 2001, p.135; Garland 1995 p.48; Hirsh 1999, p.1278). Often young people search for information as a result of imposed queries. Gross (2001) reports that teachers often determine the nature of research assignments rather than allow students to make their own choice. Seamans (2002, p.118), when investigating student perceptions of information literacy amongst first year college students, notes "...choosing a topic already of interest to them seemed to help the students focus". Barranoik (2001, p.43) argues that the most excited, focused students "...were those who chose topics of interest and relevance to their current life situation". Young people who choose their research topic feel ownership for it because it has relevance and is of interest to them. The studies cited here have found that young people engage at different levels with research tasks and assignments depending on their nature. These findings suggest that young people feel more at ease dealing with information with which they have some familiarity or interest. In terms of this research it is pertinent to ask if an interest in the information being dealt with has a bearing on the ways in which young people experience information.

The studies which have been cited (Small and Ferreira 1994; Herring 1997; Moore 2000) suggest that young people can experience difficulties recognising and interpreting the information problem and understanding the purpose of the research task. Bilal's (2001, p.120) finding that children perform better on a fact-based search, where there is a clear focus established, rather than on a research assignment is interesting in that it suggests that children cope more easily when asked to find a fact i.e. something concrete as

opposed to something more abstract i.e. information for a research assignment. Interestingly Shenton (2002, pp.161-162) in his study of young people's information universes found that when young people used the word information in their speech it was nearly always used to mean facts conveyed by text and obtained from sources such as books and computers.

2.5.3. Establishing a plan of search

Studies have found that young people do encounter difficulties in conducting successful searches. Marchionini (1989, p.64) notes that user strategies "were highly interactive rather than planned". According to Schacter, Chung and Dorr (1998, p.847) children are "...reactive searchers who do not systematically plan or employ elaborated analytic search strategies". Although Schacter, Chung and Dorr (1998) carried out their US study with fifth and sixth grade students and therefore children slightly younger than the population in this study, the same conclusions were reached by Valentine (1993, p.302), in her study of undergraduates, where she found that none of the students used an organised search. Fidel and her colleagues, in their US study of eleventh and twelfth grade students note that:

The interactive nature of the Web supported the students' belief that there was no need to plan ahead because the progression of a search would be largely determined by what they saw on the screen. This principle was clearly reflected in their searching behaviour, which was highly reactive. (Fidel *et al.* 1999, p.27)

This suggests that young people, searching on the Internet, are moving away from a more logical way of searching, employed in libraries, towards a more exploratory way of searching on the web. Young people do not systematically plan or employ analytic search strategies. Might this be because they experience information as something that is fractured and scattered, something that needs to be gathered from a number of different locations rather than just one?

2.5.4. Conducting the search

Information can be located in a variety of information formats. Understanding how information is organised is a prerequisite to success at this stage of the process. Neuman (1995, p.297) found that one of the biggest problems students had when searching databases, was the mismatch between their personal ideas about how information was organised and how information actually is organised in databases. In a similar vein Julien (1999, p.47) found that 40% of the adolescents in her study who were seeking information for careers decision making did not know where to go for help and 38% of them perceived that the information they needed was scattered in too many different books and pamphlets, and arranged within those resources in a complex manner which they found difficult to negotiate. Latrobe and Havener (1997, p.196) observed that high school students had difficulty locating information for several reasons, amongst them were subject matter, characteristics of the research tool and information at an inappropriate level.

Hirsh (2004, p.241) provides a comprehensive summary of findings from a range of studies, which report some of the skills young people have difficulties with when searching for information in the numerous resources available. Rowlands *et al.* (2008, p.295) note that young people's poor understanding of their information needs result in them having difficulties developing search strategies. Laverty (2002, p.227) observed that students have problems locating books on shelves due to their lack of understanding of shelving conventions. Moore and St. George (1991, p.165) report the same problem. Krikelas (1983, p. 16) states that people select a source that is perceived to contain pertinent information on the basis of convenience or ease of access. The desire to access information easily and conveniently is also evident in Shenton's study (2002, p.178) where he found that some students expected all the materials necessary for their homework to be available in one place.

2.5.5. Evaluating the results

Moore (2000) observes that having an understanding of how information is going to be used appears to support students in evaluating information. In

their 1991 study Moore and St George report that Grade six children (age 11 years) have problems evaluating information; some children reject relevant information whilst others accept information which is irrelevant. Hansen *et al.* (2003) found that young adolescents searching for health information on the Internet read the pages in an unsystematic manner and as a result did not always find the information they were looking for even though it was on the screen. They also found that when an answer was found no consideration was given to the source of the answer, it was just assumed to be correct. This finding is supported by Rowlands *et al.* (2008, p.303) who state that there is little evidence to suggest that young people's ability to evaluate information from electronic sources has improved over the past fifteen years "children have been observed printing off and using Internet pages with no more than a perfunctory glance at them". Furthermore Rowlands *et al.* (2008, p.295) report that "...the speed of young people's web searching means that little time is spent in evaluating information, either for relevance, accuracy or authority". Hirsh (1999, p.1279) reports that the young people in her study were able to judge the relevance of information they retrieved based on topicality, novelty and how interesting they perceived the information to be. They did not, however, question the accuracy or authority of the information. Hirsh (1999, p.1281) concludes that students needed training in evaluating information on the Internet. It should be noted that research addressing the cognitive development of young people suggests that their ability to evaluate and question has to develop over time. The cognitive development of young people is addressed in section 2.6.2.

2.5.6. Is information always sought?

Is information always gathered for a purpose? In LIS literature information behaviour is predominantly perceived in the context of gathering information in order to solve a problem as outlined in the ASK hypothesis (Belkin, Oddy & Brooks 1982). In the context of the academic environment, it might seem reasonable to assume that this is primarily the case but in life outside of the academic environment is this always the situation? Indeed it could be asked if information is always "gathered". Information can sometimes be discovered

or encountered (Erdelez 1997). Individuals can find information when they are not seeking it. Not all information behaviour is focused (Bates 1989, p.409) and problem specific (Krikelas 1983, p.9-12). If young people are used to hearing the term information being used in the academic context where it frequently refers to something that needs to “be gathered for a purpose” how does this impact on their experience of information? Are their experiences of information inside and outside of the academic environment the same?

2.5.7. Summary of section 2.5

Factors related to the information seeking process may influence an individual’s experience of information. Some studies (Herring 1997; Small and Ferreira 1994; Moore 2000) suggest that young people do not always understand the purpose of the research and this can impede their information seeking. If this is the case does it also impact on their experience of information? Given that young people have been found to be more motivated if they are allowed to choose their own research topic (Bilal 2001; Garland 1995; Hirsh 1999; Barranoik 2001; Seamans 2002) does this suggest that young people’s experiences of information are influenced by the research topic they are undertaking? Bilal’s (2001, p.130) finding that children perform better on a fact based search rather than a research assignment and Shenton’s (2002, p.161) finding that young people’s use of the word information nearly always referred to factual knowledge suggests that young people’s experience of information may be limited to the domain of facts. If this is the case, such a limited view could impede engagement with the learning process and higher order critical thinking skills. Moore (2000) notes that having an understanding of how information is going to be used appears to support students in evaluating information. It is interesting to speculate whether young people think of information in terms of how it is going to be used. Further investigation of the ways in which young people experience information both inside and outside of the educational context is necessary in order to construct a clearer picture.

2.6. Aspects of learning

2.6.1. Introduction

The young people who took part in this study were aged eleven to eighteen and all of them were attending secondary school. Therefore it is pertinent to consider some aspects of learning which may have a bearing on their information behaviour and how they experience information. The following section considers cognitive development and deep and surface learning.

2.6.2. Cognitive development of young people

The young people who took part in this study were aged eleven to eighteen years. It is pertinent at this juncture, to consider the cognitive development of young people as this may have a bearing on how they experience information. One of the most influential theories of cognitive development is that of Piaget (Huitt & Hummel 2003). Piaget's theory holds that cognitive development occurs in a series of four distinct stages with individuals moving from one stage to the next as they mature. Each stage is distinguished by increasingly abstract levels of thought. The four stages are:

- Sensorimotor (0-2 years)
- Preoperational (2-7 years)
- Concrete operational (7-11 years)
- Formal operational (11+ years)

During the concrete operational stage young people develop an ability to think logically. They develop the ability to manipulate information mentally. Nevertheless they are limited to applying their knowledge to concrete objects and stimuli. At the formal operations stage young people are capable of hypothetical and deductive reasoning. Thinking becomes less tied to concrete reality and becomes more abstract and critical. At this stage young people are able to consider possibilities from several perspectives and evaluate their own thinking.

Whereas Piaget believed that cognitive development occurred with maturation Bloom (1956) put forward a hierarchical taxonomy classifying thinking into

six levels ranked on the basis of mental complexity. Bloom identified six thinking states:

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

According to Bloom's taxonomy evaluation relates to judging the value of an idea, concept or task and rests on the highest level of the taxonomy. Bloom's taxonomy of thinking skills indicates that the ability to evaluate is a complex thinking skill which young people have to develop. Research, however indicates that cognitive development does not necessarily occur as outlined in Piaget's model. Lutz & Huitt (2004, p.4) state that although according to Piaget's framework young people should be moving towards the formal operations stage at about the time they move into secondary education (11-12 years) data provided by Eylon and Linn (1988) and Renner *et al.* (1976) indicate that most young people do not reach the formal operational stage and some are still only moving into the concrete operational.

Given these findings it could be argued, for instance, that young people's ability to evaluate and question has to develop over time. Cognitive development is likely to have some bearing on how individuals experience information. Another aspect of learning that may have some relevance to how information is experienced is the approach taken to learning by an individual.

2.6.3. Deep and surface learning

It is relevant to consider the approaches which young people might take to learning as this may have a bearing on how they experience information. In the 1970s Marton and Säljö conducted a set of studies designed to test differences in learning (Marton 1994; Marton & Booth 1997). The studies were carried out at the University of Gothenburg with students who were asked to read an extract from a textbook. It was explained to them beforehand that on

completion of their reading they would be questioned on their understanding of the text. From their analysis of the responses Marton and Säljö identified two qualitatively different approaches to reading the text: a surface approach and a deep approach. The students who demonstrated a surface approach concentrated on the text itself. They identified isolated facts in the text which they thought the researchers would ask them about and then memorised those facts. The students who demonstrated a deep approach went deeper into the text reading it for meaning and understanding and seeking to integrate the different facts found in the text. It should not be assumed that the deep and surface approaches to learning are innate attributes of the individual. Each individual might use both approaches at different times depending on the task being undertaken. Given that young people take different approaches to learning does this affect the way they experience information?

2.6.4. Summary of section 2.6.

Individuals who took part in this study were aged eleven to eighteen and all of them were attending secondary school. It has been demonstrated that young people have different rates of cognitive development (Lutz & Huitt 2004). Similarly research has shown that individuals can adopt different approaches to learning i.e. deep and surface leaning (Marton 1994; Marton & Booth 1997). These factors may have a bearing on how young people experience information.

2.7. Resources used

2.7.1. Introduction

The information seeking behaviour of young people has been examined in terms of both digital and non digital resources. This section will now consider these more closely. This area of the literature is being reviewed because in Shenton's study (2002, p.155), when young people were asked to demonstrate their understanding of the word information by drawing what they thought it meant, they drew pictures which fell into several categories the largest category being providers of information. The most popular source was books, followed by computers. It is, therefore, pertinent to review the findings of

studies examining young people's use of resources. Shenton's study (2002) will be considered in more detail in section 2.8.

2.7.2. Print sources

Large and Beheshti (2000, p.1078) in their study of sixth grade students' use of the Internet found that young people were not ready to abandon printed resources. Some students preferred information from books because "information in books is specific and precise" (Large & Beheshti 2000, p.1074). Shenton (2002, p.178) in a study of students' use of school libraries found that school libraries were particularly well used by the older students. Books were appreciated as sources of information. One child reported that he was more successful locating books than using the Internet at home. Large and Beheshti (2000, p.1077) found that some children preferred using books to find information because the retrieval aids (chapter outlines, indexes) were easier to manage than those found on the Internet. The value attached to books was also explicit in the research conducted by Smith and Hepworth (2007, p.9) who found that students of all ages used books. They referred to a sense of familiarity with books and for that reason liked to use them as a starting point in the search process. It is evident from these studies that young people attach value to books. Conversely, Agosto and Hughes-Hassell (2005, p.158-59) in their investigation of the everyday life information seeking behaviours of urban young people found that the participants in their study turned to electronic media such as telephones, televisions, computers and radios before turning to print resources. Similarly amongst tweens (nine to thirteen year olds) in the study by Meyers, Fisher and Marcoux (2009, p.316) print sources were generally less popular than electronic and human sources. It might be that the difference in these findings lies in the contexts in which the information was sought. Generally the studies where books are reported to be valued (Large and Beheshti 2000; Shenton 2002; Smith and Hepworth 2007) were carried out in academic settings whereas the studies where electronic media is favoured over print sources (Agosto and Hughes-Hassell 2005; Meyers, Fisher and Marcoux 2009) were not.

2.7.3. Use of people

Krikelas (1983, p.15) reports that a number of user studies found that individuals, when turning to external sources, greatly prefer human contact. This finding has been supported in studies since then (Shenton & Dixon 2003b; Weiler 2005; Agosto & Hughes-Hassell 2005; Madden, Ford and Miller 2007; Meyers, Fisher and Marcoux, 2009). Case (2002, p.289) states that individuals use formal sources of information rarely, choosing instead to rely on informal sources such as family and friends. Gould *et al.* (2002, p.1187) report that most teenagers in their study prefer informal, non-professional help sources over formal professional help sources. This finding is echoed in Poston-Anderson and Edward's 1993 study of the role of information in helping adolescent girls with their life concerns. They found that more than 75% of girls had talked to someone about their information needs but only a small percentage had approached professionals and information agencies (Poston-Anderson & Edwards 1993, p.29). Participants in Latrobe and Havener's study (1997, p.197) identified people as their preferred source of information, primarily because of their interactive nature as one student said "...if you don't understand what someone is saying you can ask them to explain it further, you can't if it is a book". Shenton and Dixon (2003a, p.20) refer to students approaching people "...motivated by a desire or necessity to find information on school curriculum topics". McNicol (2003, p.209) found that although students in her study were often uncertain what resource to use when searching for information they were more confident about choosing the most appropriate person to help them. She notes the use made of family members and offers the following quote from a participant: "... they give you better information. Internet and books it's got its own language and sometimes I don't understand, but when my parents explain I understand it more" (McNicol 2003, p.210).

Young people, both inside and outside school, also use friends as sources of information (Smith & Hepworth 2007, p.9; Meyers, Fisher & Marcoux 2009, p.316). McNicol (2003, p.212) found that friends usually took second place behind family members however, she hypothesises that as young people grow

older and become more independent both educationally and socially their reliance on friends may increase and their reliance on family members decline. This was found to be the case in the study by Fisher *et al.* (2007, p.21). As the tweens in the study grew older it was found that they were more likely to seek information from peers even if the information was not as good as that they would get from adults. The decline in the use of family members as children grew older was ascertained in the study by Smith and Hepworth (2007, p.10). They found that as children grew older they sought out subject specialists such as teachers as sources of information and that young people across the age range used their friends. Fisher *et al.* (2007, p. 20) found that trust was an important issue for young people. The ability to trust someone with their situation far outweighed the source's likelihood of providing accurate information.

2.7.4. Internet

The Internet has radically changed the way information can be presented, accessed and used. As the availability of the Internet has grown an increasing number of studies have looked at young people's use of it. Macgill (2007) reports that 93% of youth in her US study regularly use the Internet. Bleakley *et al.* (2004, p.745) in their study of Internet use among US urban youth found that 82% of youth used the Internet to look up information in general with 29% of youth using the Internet everyday. Ninety per cent of the nine to nineteen year olds in Livingstone and Bober's UK study (2005, p.11) used the Internet to access information for school or college work and 94% used it to access information for other things. Ofcom (2010, p.3) report that 99% of five to fifteen year olds in their UK survey use the Internet with 75% having access to the Internet in their home (Ofcom 2010, p.9). The Internet is used, at least weekly, by 84% of twelve to fifteen year old for school work and 66% use it to find information relating to personal interests (Ofcom 2010, pp.24-25). In the light of this information it is germane to bear in mind that 7% of twelve to fifteen year old only use the Internet in school (Ofcom 2010, p.16). The overall figures (Ofcom 2010, pp24-25) reveal that 84% of twelve to fifteen

year olds use the Internet at least weekly for school work and 66% use it to find information relating to personal interests.

A number of studies report that young people hold positive views about the Internet. Ofcom (2010, p.62) found that 98% of twelve to fifteen year olds were confident overall in their use of the Internet. Young people like the speed and ease with which they can find information on the Internet (Fidel *et al.* 1999, p.27; Large and Beheshti 2000, p.1077; Gray *et al.* 2002, p.550; Ofcom 2010, p.62), the graphical interface and multimedia format (Bilal and Watson 1998), diversity in formats and levels of specificity (Fidel *et al.* 1999, p.32), not being restricted to certain works as one would be in a library (Large and Beheshti 2000, p.1079) and the lack of physical effort required to obtain information (Fidel *et al.* 1999, p.32; Ofcom 2010, p.62).

Clearly young people have become regular users of the Internet and they make extensive use of it to find information however, although they recognise the benefits of using the Internet it is not without its negative side. A range of studies report frustrations encountered by young people including slow response (Hirsh 1999, p.1270; Gray *et al.* 2002, p.549; Ofcom 2010, p.52), finding too many pages (Akin 1998; Large and Beheshti 2000, p.1077), unsuccessful searches where sites were still under construction or had moved (Fidel *et al.* 1999, p.31; Gray *et al.* 2002, p.549) and difficulty finding highly relevant sites (Large and Beheshti 2000, p.1077). In their study Hansen *et al.* (2003) found that young adolescents searching for health information encountered problems finding information due to the use of general search strings and misspelling of search terms.

2.7.5. Summary of section 2.7

A survey of the literature shows that that young people use a variety of resources to search for information. A large number of studies agree that people are a preferred source of information (Krikelas 1983; Latrobe & Havener 1997; Shenton & Dixon 2003a; McNicol 2003; Agosto & Hughes-Hassell 2005; Fisher *et al.* 2007; Weiler, 2005). The Internet is increasingly

used by young people to access information. Positive feelings towards the Internet are reported by some studies (Fidel *et al.* 1999; Large & Beheshti 2000; Bilal & Watson 1998). Other studies report negative feelings (Hirsh, 1999; Fidel *et al.* 1999; Large & Beheshti 2000; Hansen *et al.* 2003). In light of the fact that Shenton's study (2002, p.155) reveals that a majority of young people experience information in terms of providers it is important, in terms of this research, to understand young people's views of the different resources and what, if any, impact they have on the ways in which they experience information.

2.8. Ways of experiencing of information

2.8.1. Introduction

A number of studies have investigated individuals' experiences of a range of issues, for example: students' experiences of learning (Edwards 2003); experiences of learning about information systems (Cope 2006) and women's experiences of domestic violence in childbearing years (McCosker, Barnard and Gerber 2004). Some studies have looked at the perceptions and conceptions of various groups of people into areas related to information: Academics' conceptions of information literacy (Bruce 1997; Webber, Boon & Johnston 2005); undergraduates' perceptions of information use (Maybee 2006); potential college students' perceptions of libraries and information resources (De Rosa *et al.* 2006); undergraduate students' perceptions of information literacy (Morrison 1997; Hartmann 2001; Seamans 2002); college students' perceptions of information credibility (Metzger, Flanagin & Zwarun 2003); high school students' conceptions of information seeking and use (Limberg 1999); teachers' conceptions of information literacy in the classroom (Williams & Wavell 2007); fire-fighters' conceptions of information literacy (Lloyd 2005). These studies throw some light onto how people experience and understand their interactions with information but none of them address directly how young people experience information. No study has used a phenomenographic research approach to investigate the qualitatively different ways young people of secondary school age experience

information. A small number of studies have, however, addressed some aspects of young people's experiences of information (Shenton 2002; Shenton & Johnson 2008 and Shenton, Nessel & Hayter 2008).

2.8.2. Young people's experiences of information

Shenton (2002) researched the characteristics and development of young people's information universes. Participants were aged four to eighteen years. The study focuses on three areas: what young people believe the term information to mean; what their information needs are and what sources they use to satisfy those needs. Although, with regard to young people's experience of information, the study limits itself to their understanding of the term information it is nevertheless of interest to the present study. In order to elicit what young people think the term information means Shenton (2002 p.101) used overt methods. Young people were asked to:

- Draw a picture of “what you think we mean by the term information”? (Shenton 2002, p. 154);
- Explain the picture;
- Give a definition of “what you think we mean by the term information”?
- Cite information associations (based on word associations);
- List sources where they could obtain information.

Covert methods were also used (Shenton 2002, p. 102) where discussions held with young people about their information seeking were looked at to see how young people had used the term information. Shenton viewed his study as a developmental study and took a cross-sectional case study approach. Data were analysed using the constant comparative method to generate categories.

Young people in Shenton's study were asked to demonstrate their understanding of the word information by drawing what they thought it meant. Where appropriate pictures were drawn they fell into seven broad categories:

- Subjects;
- Providers of information;
- Receptors of information;
- Information icons;
- Scenarios;
- Environments;
- Forms (Shenton 2002, pp.155-160).

In their drawings representing the term information Shenton (2002, p.161) found that the younger children in the study associated books and increasingly computers with information. As children grew older a widening range of providers came to be associated with the term. The oldest children in the study, Shenton reported, had such complex understandings of the term information that they were unable to represent them as pictures.

When Shenton (2002, p.161) looked at the contexts in which youngsters used the word information in their speech he found that it was nearly always used to mean factual knowledge conveyed by text and obtained from sources such as books and computers. When asked to give explicit definitions of the word 'information' Shenton (2002, pp.165-173) identified twelve individual strands in the replies:

- The "recognitional" strand where the informant recognised the word;
- The "need-centred" strand where information was described as that which was sought in response to a feeling experienced by an individual;
- The "form-oriented" strand where the manner of information presentation was specified e.g. a piece of text or pictures;
- The "linguistic structure" strand where information was assumed to be textual;
- The "sources-driven" strand;
- The "synonymous" strand where information was associated with words which the informant thought conveyed a similar meaning. The most widely used synonym was "facts";

- The “content-based” strand where an area that information might embrace was outlined;
- The “illustrative, definition-by-example” strand where informants provided statements of fact which they considered to represent information;
- The “action-process” strand where information was associated with action by an inquirer after a need had been identified;
- The “semiotic” strand where information was understood as conveying meaning to an individual;
- The “illuminatory” strand where information was seen as something that could enhance what is known by an individual;
- The “use-related” strand where information was defined on the basis of its utility either actual or perceived.

The findings from Shenton’s 2002 study are supported by the findings from two further studies. Shenton and Johnson (2008) conducted a study amongst teenagers in an English high school investigating the ways in which young people understand the term ‘information’. The study indicates an uncertainty and lack of consensus amongst the participants regarding their understanding of the term information (Shenton & Johnson 2008, p.248). A separate study into children’s conceptualisations of the word ‘information’ was carried out by Shenton, Nessel and Hayter (2008). The data were elicited via a questionnaire from forty five Canadian school children aged between eight and ten. Although the study involves children aged between eight and ten it is of note because Shenton, Nessel and Hayter (2008, p.158) report the findings as being similar to those of the study by Shenton (2002) with all but two of the original constructs evident, the missing constructs being the *semiotic* and *illuminatory* assumptions.

Shenton (2002, p.173) identifies no common thread running throughout the twelve strands identified as a result of the explicit definitions of the word ‘information’ given by young people. The youngest children in the study often expressed “information” in terms of particular facts or areas of

knowledge. Many thought information could cover anything. Some youngsters noted that information includes both what is known and what is new to an individual, although others perceived information chiefly as the result of information seeking activity. Where information was thought to take a certain form it was nearly always text, which *told* the reader something. Akin to the definition proffered by Machlup (1983, p.645) children in middle school often equated information with a meaning that was “told” and it was frequently associated with sources such as books, computers and people. As a result of their contact with a wider variety of information forms Shenton notes that children in this age group began to articulate that information could also be conveyed in non textual forms (Shenton 2002, p.175). Support for this finding comes from the study by Shenton and Johnson (2008, p.247) who found that support for the view that “‘information’ embraced pictures as well as text” increased as the participants’ age increased.

Shenton (2002, p.176)) reports that high school youngsters have complex understandings of the term information. They tend to indicate a wider range of types and forms of information than those in the younger age group and see it as embracing fact and opinion represented by pictures and graphs as well as text. Shenton (2002, p.176) observes that at this age there is a move towards abstract understandings. He notes a significant finding amongst high school children is their tendency to discuss information in terms of the effect it has on one’s state of knowledge. It is worth noting that in studies looking at the perceptions and conceptions of information literacy and information use (Bruce 1997; Maybee 2006) one of the concepts found was that of building a personal knowledge base. Shenton found that youngsters of high school age start to use the word ‘learning’ (Shenton 2002, p.176). Williams and Wavell (2007, p.203) found that one of the secondary school teachers’ concepts of information literacy in the classroom was an independent learning concept.

A wide variety of associations with the word information were reported by Shenton (2002, p.176-177)). An association between “information” and processes was evident throughout the age groups although physical processes such as “finding out”, answering questions and copying information were

described by children in the younger half of the study and mental processes including “knowing”, “thinking”, “learning”, “concentrating”, and “using your brain” were associated with “information” in all age groups. One non-association noted by Shenton (2002, p.178) throughout all age ranges was the lack of association made between “information” and “information technology”.

Shenton (2002, p.187) found that young people from all age groups reported using books, computers and people as a means of getting information. Children in the younger half of the study often limited themselves to these sources. Older children recognised that a more diverse range of sources were available. When discussing the types of information which sources might provide Shenton (2002, p.188) found a tendency, especially amongst those in the younger half of the study, to equate information with facts. Information was also seen to include advice, instructions, visionary ideas and problem solving data but these were less frequently reported than facts. Shenton and Johnson (2008, p.247) also found general agreement that information could include personal opinions and advice.

The findings from two additional studies are worth mentioning here. Although both of the studies concern adults they both refer to the way in which the participants understand the term information. Hayter (2005) explored the information worlds of a disadvantaged community in the north of England. She found that information was perceived in various ways ranging from what was going on; local news and gossip to learning and knowledge. Hayter (2005, p.116) concludes that the term information “means many things to many people”. Similarly Beverley, Bath & Barber (2007, p.22) in their study of visually impaired people’s information behaviour found that participants understood information to be a complex concept. Some understood information “solely in terms of the information they received” others understood it in terms of communication and “emphasised the two way flow of information” and some participants viewed it in terms of a range of information sources.

As in the case of the two aforementioned studies the picture painted by the studies of Shenton (2002), Shenton and Johnson (2008) and Shenton, Nasset and Hayter (2008) illustrate that there is a multiplicity of understandings of the term information amongst young people.

2.8.3. Summary of section 2.8

Only a handful of studies have addressed the issue of young people's experiences of information. Shenton (2002, p.161) found that when young people used the word 'information' it was nearly always used to mean factual knowledge conveyed by text and obtained from sources such as books and computers. In their illustrative representations of 'information' the largest single category of pictures drawn related to providers of information with books and computers well represented.

When giving an explicit definition of 'information' the children in the younger half of the study often expressed information in terms of factual information and it was frequently associated with sources such as books and computers but also people. As young people got older their explicit definitions of information moved towards more abstract understandings. A wider range of types and formats of information were identified. Information in this age group was seen as embracing fact and opinion and represented by pictures and graphs as well as text. Another significant finding amongst the older age group was their tendency to discuss information in terms of the effect it had on one's state of knowledge.

The study by Shenton (2002) along with those of Shenton and Johnson (2008) and Shenton, Nasset and Hayter (2008) have revealed that there is a variance in the way young people understand the term information. This supports the notion that the ways young people experience information merits further investigation. The proposed research study seeks to build on the work done by Shenton (2002), Shenton & Johnson (2008) and Shenton, Nasset and Hayter (2008). It will investigate young people's understanding of the term information but it will go further than this. It will employ a

phenomenographic research approach to investigate the variety of ways which young people experience information, what sort of variation exists between these experiences and ultimately what holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information? It will also address how young people's experiences of information compare to the meanings given to information by LIS scholars.

The studies by Shenton (2002), Shenton & Johnson (2008) and Shenton, Nettet and Hayter (2008) reveal an array of understandings of the term information amongst young people. It could reasonably be expected that the environment in which they are growing up might influence the way they experience information. The next section reviews the literature looking at the population under study and the environment they are growing up in.

2.9. Young people and the environment in which they live

2.9.1. Introduction

The focus of this study is on the ways information is experienced by young people. It is therefore relevant to examine their attributes and behaviours and also the environment in which they live, as an understanding of these issues will help in understanding how they experience information. In the literature, young people have been labelled using a variety of terms. Although there may be some inconsistencies in the terms used there is agreement from a body of studies (Howe & Strauss 2000; Frand 2000; Prensky 2001a; Prensky 2001b; Kaimal 2003) that the young people of this generation share a number of key characteristics. There follows a description of those characteristics.

2.9.2. Young people today: Their characteristics

The population of this research study is young people aged eleven to eighteen years. A number of different terms have been attributed to this generation of young people by various authors (see Table 1).

Term applied to generation	Born between the years	Author and country where research was conducted
Generation Y	1977-1994	Gill 1999 (US)
Echo Boomers	1977-1997	Alch 2000 (US)
Generation Y	1979-1994	Neuborne & Kerwin 1999 (US)
Generation Y	1980-1994	Weiler 2005 (US)
Generation Y	1980-2000	Manuel 2002 (US)
Millennials	1982-	Oblinger 2003; Holliday & Li 2004 (US)
Millennials	1982-2000	Rainie 2006 (US)
Millennials	1982-2002	Howe & Strauss 2000 (US)
Google Generation	1993-	Rowlands <i>et al.</i> 2008 (UK)

Table 1: Terms and dates applied to young people: Variation amongst authors

Characteristics of young people

According to their US study Howe and Strauss (2000, p.14) report that at the end of 2000 the millennial generation had seventy six million members. They constitute 27% of America's population (Apple Computer 2003, p.2). Millennials are the most racially and ethnically diverse generation yet in the United States (US). In the US nearly thirty six per cent of the millennial generation are of non-white race and Latino ethnicity and one in five has at least one immigrant parent (Howe & Strauss 2000, p.15).

Howe and Strauss (2000, p.7) see the generation as a whole as optimists. A different account is reported by Sheesley (2002, p.27) who quotes Peter Sacks (1998) community college teacher in The US who describes students he teaches as "lazy" and "bored" however Sheesley (2002, p.28) also reports the work of Curtis (2000) and her colleagues, librarians at the University of

Georgia who examined their own assumptions about students' characteristics and recognised that it was a question of students having different values from the ones they held themselves and this did not necessarily make them wrong. Indeed Frand (2000, pp.16-22) who has drawn up an "information age mindset" based on his US research made up of attributes observed over the last thirty years, and discussed later on in this section, merely describes their attributes as different.

Howe and Strauss (2000, p.9) describe millennial children as a closely supervised generation who spend more time doing homework and housework and less time watching television than the generation before them. Alch (2000, p.43) supports this finding when he reports that based on his US study young people have a strong work ethic. They are better educated and are academically driven. In their US study Sandfort and Haworth (2002) found that young people "believed their generation viewed education as a catapult into professional careers". They quote the findings of Scneider & Stevenson (1999) who found that more than 90% of US high school seniors expect to attend college and more than 70% expect to work in professional jobs. This compares with 55% of young people planning to attend college in 1955 and 42% planning to enter professional careers. What are the implications of these statistics for the ways in which young people experience information? Is information that is used to promote career advancement perceived as more valuable than other types of information?

Over half of the respondents in the US study by Howe and Strauss (2000, p.8) say they trust government to do what is right all or most of the time; they obey rules and worry about the poor example being set by adults for their generation; half of the respondents believe that lack of parental discipline is a major social problem, and large majorities favour tougher rules against misbehaviour in the classroom and society at large. If young people do worry about the example being set by the older generation what implications does this have on the perception of information they receive from that generation? Does it mean that they attach more value to the information which comes from their own generation?

In the US studies have found that the millennial generation is characterised as having low thresholds for boredom and short attention spans (Howe & Strauss 2000, p.257). They are more prepared to protest about pointless memorisation than earlier generations and are said to prefer education that comes in entertaining packages (Tapscott 1998a, pp.147-148). The UK study by Rowlands *et al.* (2008, p.299) supports this assumption. They report young people generally "...prefer interactive systems and are turning away from being passive consumers of information". From a US perspective Prensky (2001b, p.5) notes that today's education does not meet the requirements of this generation:

Digital Natives accustomed to the twitch speed , multitasking, random-access, graphics-first, active, connected, fun, fantasy, quick payoff world of their video games, MTV and the Internet are bored by most of today's education, well meaning as it may be.

This generation has grown up in a fast paced world and are used to multitasking. Windham (2005) also reporting from a US perspective agrees with Prensky that unlike previous generations, who worked in a more linear fashion, this generation do several things simultaneously.

In terms of the present research what are the implications of the characteristics of young people today; short attention spans; low thresholds for boredom; preference for education that comes in entertaining packages and a fondness for multitasking and interactivity? Does this suggest that young people engage more readily with information that is easily accessible, interactive and presented in an entertaining manner? Are young people prepared to engage with more complex information, which may require time to evaluate and synthesize.

The Millennials tend to prefer to work together rather than alone (Howe & Strauss, 2000, p.8) and gravitate toward group activity. They are inclined to learn through discovery, by exploring for themselves or with their peers. Windham (2005) notes the collaborative style of working favoured by young

people remarking that they find peers more credible than teachers when it comes to determining what is worth paying attention to. This need to interact with others is also observed by Oblinger and Oblinger (2005, p.2.11) in the course of their US based research. They emphasise that although students are comfortable with technology they prefer only a moderate amount of it in their classrooms. Their need to be socially connected means that they want face to face interaction. A number of studies have found that young people value people as a source of information (Krikelas 1983; Poston-Anderson & Edwards 1993; Latrobe & Havener 1997; Case 2002; McNicol 2003; Shenton & Dixon 2003b; Weiler 2005; Agosto & Hughes 2005; Smith & Hepworth 2007; Meyers, Fisher and Marcoux 2009). Therefore it should not be surprising that young people like group activity.

Young people of this generation are comfortable with technology. They use technology to stay in touch with their peers and to gather information. For members of this generation technology is a natural part of their environment. They have grown up in a technologically and information rich environment. Merritt (2002, p.46) observes that young people “don’t see the Internet and technology as tools; they see them as integral parts of their lives”.

Windham (2005) who describes herself as a member of the Net Generation says that for her generation technological understanding is a necessity given that they are surrounded by a variety of digital, audio and text information. It should be noted, however, that Rowlands *et al.* (2008, p.299) report that although it is the case that young people are more competent with technology older users are catching up.

A growing body of evidence suggests that young people have developed new attitudes and aptitudes as a result of the environment they are growing up in (Tapscott 1998a; Howe & Strauss 2000; Prensky 2001a; Prensky 2001b). Based on his US research Frand (2000, pp.16-22) describes ten attributes which reflect the values and behaviours that make up what he terms as an “information mindset”:

- Computers aren’t technology

Computers have always been part of this generation's landscape (Frاند 2000, p. 16). Interestingly Bruce (1997) in her study of academics in higher education found that they experienced information literacy in seven different ways one of which was using information technology for information retrieval and communication (Bruce 1997, p.117). Similarly Webber, Boon & Johnston (2005) also found that participants in their study about academics conceptions of information literacy had an IT conception. Conversely Shenton (2002, p.178) found that young people in his study did not report associating the word information with information technology. The lapse of time between the studies being conducted, with the use of computers more prevalent in society today than a decade ago could account for the difference in findings;

- The Internet is better than TV

In recent years the interactive nature of the Internet has attracted young people to spend increasing amounts of time online and fewer hours watching television (Frاند 2000, p. 16). Tapscott (1998b) concurs with this view; however, it is contested by findings from Nielsen Media Research, which reports an increase in viewership of television amongst 12 to 17 year olds (Consoli 2006);

- Reality is no longer real

In a period of advanced data manipulation a question hangs over what is real for instance are emails always sent from the person who claims to be the sender? (Frاند 2000, p.17);

- Doing is more important than knowing

The life of information is no longer measured in decades and centuries but in months and years. This means that what a person can do is more important than what they know; the ability to deal with complex and often ambiguous information will be more important than simply knowing a lot of facts or having an accumulation of knowledge (Frاند 2000, p.17);

- Learning more closely resembles Nintendo than logic
Frans (2000 p.17) makes the point that this generation follow a trial and error approach to solving problems. This attribute is also reflected in the findings of Schacter, Chung and Dorr (1998, p.847) and Fidel *et al.* (1999, p.27) who report on the exploratory nature of young people when searching the Web;
- Multitasking is a way of life
Young people are in the habit of doing several things simultaneously (Frans 2000, p. 18);
- Typing is preferred to handwriting
Young people prefer to use a keyboard to handwriting. Word processing gives individuals the ability to manipulate data (Frans 2000, p. 18);
- Staying connected is essential
The ability to stay connected is imperative for this generation. Technology has ensured that they can be connected with increasing numbers of individuals participating in real time dialogues from any where, at any time (Frans 2000, p. 18);
- There is zero tolerance for delays
Young people expect services to be delivered at all times (Frans 2000, p. 22). Rowlands *et al.* (2008, p.300) disagree with this assumption stating that "...there is no hard evidence to suggest that young people are more impatient in this regard";
- Consumer and creator are blurring
The distinction between owner, creator and user of information are blurring (Frans 2000, p. 22).

It is argued that today's generation of young people have their own unique set of attributes and behaviours. An understanding of these attributes and behaviours will help in understanding the different ways they experience information. Also helpful will be an understanding of the environment in which young people of today are growing up. Today's generation are growing up in a digital environment where they interact with information in a different

way compared with past generations. The chapter continues by looking at the environment young people are growing up in more closely.

2.9.3. Young people today: The environment in which they live

In the US Project Tomorrow (2006, p.7) found that students in Grades 6-12 (ages 11-18 years) used an array of technological tools. See Table 2:

Technological tools	Percentage of grade 6-12 students who use tool
Desktop computer	82%
Laptop	35%
Mobile phone	75%
Personal digital assistant (PDA)	16%
Digital camera	43%
MP3 player or iPod	46%
Videogame player	61%

Table 2: Technological tools used by grades 6-12 students (adapted from Project Tomorrow 2006, p.7)

Young people were using more kinds of technology and more regularly than in the past, an increase in use of about 10% in most categories on that of the 2004 survey (Project Tomorrow 2006, p.8). A study from Pew Internet American Life Project reports that 71% of teenagers own a mobile phone and 59% own a desktop or laptop computer (Lenhart *et al.* 2008, p.8). Interestingly Mumtaz (2001, p.352) found in her study of UK primary school students' use of computers in the home and in school that young people were regular users of computers, however the findings suggest that youngsters made more use of the computer at home than at school with 39% of students using a computer at home every day and only 2% doing so at school.

Young people appear to be confident users of technology. De Rosa *et al.* (2006, p.5-1) in their investigation of US college students' perceptions of

libraries and information resources found that participants in their study used newer types of electronic resources more readily than older respondents. These findings demonstrate that young people are readily accessing and using information in different ways. It is worth noting that in line with studies that found a regular and increased usage of technology amongst young people Kennedy *et al.* (2007) in their study of Australian undergraduates' use of Web 2.0 technologies also found that students were regular users of established applications of technology for example Internet searching and email but they were not frequent users of Web 2.0 technologies.

Prensky (2001a) describes the young people of this generation as Digital Natives. They are the first generation to grow up with the new digital technology. Increasingly different forms of digital media are found in the home and school environments. Today young people are exposed to enormous quantities of information on the Internet in text, audio and video images. A number of studies, for example Kolb (1984) and Gardner (1983), propose that people have different learning styles. It might be expected, given that information is now available in a range of formats, that young people find it easier to access, interact with, understand and use information.

Internet

The Internet is used for a variety of reasons, for example accessing information, communication, playing games, interacting with others and chatting in online communities. Macgill's US study (2007) found that 93% of those aged twelve to seventeen years use the Internet, an increase from 73% in 2000. Livingstone (2006, p.5) reports the findings of the UK Children Go Online study which found that 98% of children and young people (aged 9-19 years) have used the Internet. In a UK study exploring the digital disconnection between technology rich students and their technology poor schools Selwyn (2006, p.5) found that over 50% of students interviewed felt restricted in their use of the Internet at school. Out of school this was not the case (Selwyn 2006, p.8). Whilst considering the reported use/lack of use of the Internet it is interesting to bear in mind the findings of a study by Madden, Ford and Miller (2007). The study looked at the information seeking habits of

young people at an English secondary school and found that when asked to rank the most useful information resource the Internet was placed among the top three however when asked to record which information resources were actually used it was found that the Internet was actually used quite infrequently (Madden, Ford & Miller 2007, p.8).

The most common response when teenagers were questioned about what they wanted from the Internet was the ability to find “new information” (Oblinger & Oblinger 2005, p.2.4). Livingstone and Bober (2005, p.11) report that 90% of the 9 to 19 year olds in their UK study used the Internet to access information for school or college work and 94% used it to access information for other things. Lenhart *et al.* (2007, p.26) in their US study found that the two most popular Internet activities reported by teenagers are entertainment information seeking (81%) and information seeking about news and current events (77%).

Young people view the Internet as a familiar and convenient resource. The Internet offers the potential to access information more readily and in a different way. Increasingly, when accessing information from the Internet, young people do not have to deal with the whole original body of work such as a complete journal. They are accessing ‘customised information’ i.e. specific pieces of information they have requested which arrives on their screens in isolation from their original context (Harley, Dreger & Knobloch 2001, pp.24-26). It is germane to consider how young people view this readily available, customised information provided by the Internet and if they view it in the same way or differently from information provided by other sources.

Communication and staying connected is important for young people. With today’s technologies individuals can communicate or collaborate almost instantaneously from anywhere at anytime and they are in control. Project Tomorrow (2006, p. 6) reports on an “explosion of communications tool use”. They report 65% of US students saying that they use email and IM on a daily basis. Conversely Lenhart *et al.* (2007, p.20) report a decline in the use of

email amongst US teenagers with only 14% of teenagers use email daily. Similarly they report a drop in the use of IM from 75% in 2004 to 68% in 2006 (Lenhart *et al.* 2007, p.27).

Project Tomorrow (2006, p. 6) notes an increase in the use of personal websites such as *MySpace*. Lenhart *et al.* (2007, p.28) report that 55% of teenagers surveyed used social network sites such as *Facebook* or *MySpace*. Social networking sites offer individuals the means of communicating online. Individuals are able to communicate with a wide network of contacts and can chat in real time via instant messaging. Conversations can be one to one or group discussions. The question as to whether or not there is an information component in this social communication could be posed. Gefter (2006, p.46) argues that “socialisation rather than information has emerged as the primary use of the Internet”. Certainly socialisation is an important feature in young people’s online lives but social networking sites are also used by young people to access information. Oblinger & Oblinger (2005, p.2.4) found that social technology was used by young people to meet new people, to express their feelings and exchange personal information. Grintar and Palen (2002, p.25) in their study of instant messaging and teenagers found that the three main activities which characterised IM communications were informal talk or socialising, event planning and schoolwork collaboration. All participants reported using IM to support them with their homework.

Blogs

Blogs are a web based journal. They can be written by an individual or a group of individuals. Williams and Jacob (2004, p.234) describe the mechanism of blogging as a “public space for comment and information dissemination”. Gefter (2006, p.46) reports that the most popular place for teenagers to blog is *Livejournal*, noting that *Livejournal* has 10.8 million users around the world. Blogs are written for various purposes. Blogs listed on the *Livejournal* site include, amongst others, sites dedicated to music, travel, football and reading (Livejournal 2006). Blogs are updated regularly. Lenhart and Madden (2005, p.4) report that US teenagers surpass adults in blog

keeping and reading with 38% of teenagers reading blogs and 19% creating their own blogs.

Mobile phones

Prensky (2004) calls mobile phones “powerful computers” that can fit into the pocket. He argues that they could be useful tools for learning. Lenhart (2009, p.3) in her US study found that the number of teenagers who possessed a mobile phone increased from 45% in 2004 to 71% in 2008. In a study of young people in the UK Haddon (2008, p.4) found a decline in the use of mobile phones as a means of communicating in favour of IM, a cost-free alternative. Cost was also an issue when it came to accessing the Internet on a mobile phone. Although young people were able to see the positive aspects of this facility very few actually did so because of the cost. One of the major uses of mobile phones reported by Haddon (2008, p.13) was the storage of images and photos.

Television

Television enables young people today to see world events unfold before their eyes. Statistics concerning the television viewing figures of young people are not consistent. Tapscott (1998b) argues that today’s media-literate kids find television’s current methods old fashioned and clumsy stating that they prefer interactive media and want to be users not just viewers or listeners. He states that “today’s kids watch less television than five years ago and much less than their parents did at the same age”. Consoli (2006), however, reports the findings of a study by Nielsen Media Research which found big gains in viewership of television among American 12 to 17 year olds with 3% viewing more television during the day than they did during the 2004-05 season. This might in part be explained by the fact that young people frequently multitask. Therefore it might not be a matter of relinquishing one task for another but a case of taking on an extra task.

2.9.4. Summary of section 2.9

It has been argued by some that today's generation of young people have developed new attitudes and aptitudes as a result of the environment they are growing up in (Tapscott 1998a; Frand 2000; Howe & Strauss 2000; Prensky 2001a; Prensky 2001b; Windham 2005). The attributes and behaviours of this generation of young people may have a bearing on the way they experience information, so might the environment they live in. Young people are growing up in an environment that means they can access information in different formats from different sources. Does this mean that information is more accessible and if so does this affect the way young people experience information?

2.10. Summary

In this chapter the literature relating to young people and information has been reviewed in order to set the present research in context. The chapter was organised into four sections beginning with a review of literature to explore the meanings given to information by the LIS community. The literature review revealed a wide spectrum of interpretations. In terms of the research being carried out in this study it will be significant to determine how close the ways young people experience information will be to those held by the LIS community. Attention then passed to studies relating to various aspects of young people's information behaviour: their information needs, information seeking, aspects of learning and the resources they use. The third section of the chapter considered the literature related to the ways young people experience information. With the exception of the study by Shenton (2002); Shenton & Johnson (2008) and Shenton, Nettet and Hayter (2008) very little work has been done in the area of young people's experience of information. The proposed research study seeks to build on the aforementioned work. It will aim to discover the variety of ways that young people experience information in all aspects of their lives, what sort of variation exists between the different experiences and ultimately what holistic picture of young people's relationship with information can be composed from knowledge of

the different ways young people experience information? The chapter came to a conclusion looking at the characteristics and attributes of the present generation of young people and the environment in which they live.

Examination of the literature provided a context in which to set the present research study. Throughout the review of the literature a number of thoughts and questions have arisen and been articulated by the researcher. In the course of the research it is likely that some of these questions will be answered however it needs to be stated that the focus of the study is on the core research questions. In line with the principles of the phenomenographic research methodology, which will be described in Chapter Three the thoughts and questions that have arisen will be bracketed as the data are collected but will be considered if and when they arise during the discussion of the findings.

There is a scarcity of research into the area of young people's experiences of information and given the fast changing environment in which we live findings from past studies can quickly become outdated (Shenton 2002, p.424). Furthermore this generation of young people is a generation who are reported to have different characteristics from previous generations. This set of circumstances provides justification for pursuing an investigation into the ways young people experience information. Chapter Three addresses the research methodology used in this research study.

Chapter Three: Research methodology

3.1. Introduction

The methodology is the design which supports the methods chosen. When undertaking research a fundamental concern is to determine an appropriate methodology. The purpose of the research determines the methodology to be used. The purpose of this study was to investigate and document the variety of ways in which young people of secondary school age experience information in all areas of their lives. Four research questions were addressed:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

Chapter Three addresses the research methodology used in this study. The theoretical stance is described. The reasons for the choice of a phenomenographic research approach are given along with an overview of other approaches that were considered. The philosophical foundations of phenomenography are detailed and the phenomenographic research approach is outlined along with the creation of the research design. Details of data collection and analysis are given along with a discussion about the rigour of the research.

3.2. Theoretical perspective

The theoretical perspective describes the stance that lies behind the methodology chosen to direct the research (Crotty 1998, p.7). The purpose of this study was to investigate and document the variety of ways in which young

people of secondary school age experienced information. The theoretical perspective, i.e. the philosophical position, taken in order to address the research study was interpretive (Crotty 1998). Researchers who adopt an interpretivist stance take a contrasting position to positivists. The interpretivist approach “looks for culturally derived and historically situated interpretations of the social life world” (Crotty 1998, p.67). Interpretivists believe that the focus of study for social scientists i.e. people and their institutions is essentially different from the focus of study by natural scientists. Interpretive researchers believe that social phenomena exist in the minds of people and, in general, attempt to understand phenomena through the meanings that people give to them. Positivists hold that social phenomena can be defined objectively. Interpretivists hold that social phenomena have to be defined subjectively (Bryman 2004). Opponents of positivism reject the idea of a detached, objective observer who can apply the methods of natural sciences to the study of social reality. They take the viewpoint that understanding the social world is fundamentally different from understanding the natural world. Cohen, Manion and Morrison (2000, p.20) state:

...anti-positivists would argue that individuals' behaviour can only be understood by the researcher sharing their frame of reference: understanding of individuals' interpretations of the world around them has to come from the inside not the outside. Social science is thus seen as a subjective rather than an objective undertaking, as a means of dealing with the direct experience of people in specific contexts.

From an interpretivist view point the theoretical perspective is a way of looking at the world and making sense of it. It is assumed that it is inevitable that a number of assumptions are brought to the methodology chosen. It is therefore considered good practice to reflect on these assumptions and state them. This is done in section 3.5 where the methodology is discussed. It is argued that it would not have been appropriate to adopt a positivist approach when researching the ways in which young people experience information because the focus is “understanding of individuals' interpretations of the

world” (Cohen, Manion & Morrison 2000, p.20). The theoretical stance taken was therefore interpretive.

3.3. Qualitative research strategy

It is pertinent, at this stage, to address briefly quantitative and qualitative research strategies in order to describe why the adoption of a qualitative research strategy was appropriate for this study. Husén (1997) describes quantitative and qualitative research strategies. The quantitative research strategy is:

...modelled on natural sciences with emphasis on empirical, quantifiable observations which lend themselves to analyses by means of mathematical tools. (Husén 1997, p.17)

The qualitative research strategy is “derived from the humanities with an emphasis on holistic and qualitative information and interpretive approaches” (Husén 1997, p.17). Qualitative research, broadly defined, means:

...any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification. (Strauss and Corbin 1990, p.17)

Since the 1970s there has been an increasing interest in and use of the qualitative research strategy:

...which moves us away from numbers and back to asking people questions and to observing. (Tesch 1990, p.2)

Vidich and Lyman (2000, p.38) state that qualitative research “was born out of concern to understand the ‘other’”. Strauss and Corbin (1998, p.11) state that qualitative methods can be used to better understand any phenomenon about which little is yet known. With regard to this study very little research has addressed the issue of the ways in which young people experience

information. Studies by Shenton (2002), Shenton & Johnson (2008) and Shenton, Nasset and Hayter (2008) explored young people's understanding of the term information but little is known about the variety of ways that young people experience information. Creswell (2007, p.39-40) claims that a qualitative research approach is taken when a problem or issue needs to be explored and also:

...when we want to empower individuals to share their stories, hear their voices... To level all individuals to a statistical mean overlooks their uniqueness.

Given the distinctions drawn between quantitative and qualitative research approaches and in response to the research questions the adoption of qualitative research methods was considered to be the most appropriate for directing the present research study.

3.4. Choice of phenomenographic research approach

3.4.1. Criteria for choice of research approach

In her discussion of qualitative research Tesch (1990, pp.60-70) constructs a model of the different types of qualitative research. The model consists of four cognitive maps containing twenty six different types of qualitative research. The four maps outline:

- Research that studies the characteristics of language;
- Research that aims at the discovery of regularities;
- Research that seeks to discern meaning;
- Research that is based on reflection.

The present study aimed to explore the different ways in which young people experience information. Four research questions were addressed:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?

- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

Within Tesch's model the map that outlines "research that aims at the discovery of regularities" (Tesch 1990, p.63) identifies phenomenography as a method that discerns patterns in conceptualisation; as a method that looks for regularities in terms of commonalities. Given the research questions of this study phenomenography was considered to be an appropriate research approach to direct the study. It should be stated, as Tesch (1990, p.59) herself points out; the cognitive maps in her model have boundaries that overlap and are fuzzy. Discerning patterns in conceptualisation is the focus of this research however the research also pays attention to language. As discussed in section 3.5.6 it is assumed that language is used by individuals to communicate their conceptions to others. The research also pays attention to discerning meaning. Tesch (1990, p.67) makes the point that "often the comprehension of meaning is likened to the discovery 'the pattern which connects' (Bateson, 1978)".

3.4.2. Consideration of other research methodologies

The decision to adopt a phenomenographic research approach was reached after consideration was given to a number of other research approaches. The consideration given to two approaches: the repertory grid technique and grounded theory are discussed here.

Repertory grid technique

The repertory grid technique has as its basis the Personal Construct Theory, which was developed by George Kelly (1955). It is an approach designed to elicit how individuals view the world from their own perspective. The repertory grid technique is described by McKnight (2000, p.731):

The repertory grid method aims to build a model of a particular domain of knowledge by enabling people to verbalize how they perceive certain factors within the area of interest. These verbalizations are known as constructs in Kelly's terminology. The factors are termed elements. A construct is a bipolar dimension, where each pole represents the extreme of a particular view or observation.

In essence the technique captures how an individual construes (understands) their experience; which in this case would be how an individual understands their experience of information. As such it was an approach that could have directed the study and in its favour it is an approach that attempts to avoid researcher bias however there were a number of problematical issues. In order to elicit from young people an accurate view of information, they would have had to provide a clear set of elements however, as information is an abstract concept, it was thought that this would have proved difficult. The choice of elements is fundamental for the method to be successful. Whereas compared to the repertory grid technique, a major strength of phenomenography was the opportunity it afforded for reflective thought enabling conceptions to emerge.

Grounded theory

Grounded theory methodology was also considered. It provides a rigorous approach to qualitative research. As in phenomenography the purpose of grounded theory is to reveal and group issues into categories. Also as in phenomenography categories or themes emerge from analysis of the transcripts rather than forcing data to fit a pre determined model. There were two main reasons why grounded theory was considered as a possible methodology to direct the research. Firstly it is a specific, planned set of procedures for producing theoretical ideas about social phenomena. It is particularly useful for developing theories where little is known about the phenomenon. No major research study has directly addressed the ways young people experience information. As reported by Shenton (2002, p.83) only limited research had been conducted on the way the word 'information' is understood by young people and for that reason alone it could be argued that

grounded theory would be an appropriate methodology to employ. Secondly due to its inductive approach and emphasis on exploring the themes raised by the participants using a grounded theory methodology it would have been possible to hear the individual voices of participants. Whereas phenomenography as a methodology tries to capture the core ways in which a group experience a phenomenon and how the ways differ qualitatively as well as their relationships with each other. Thus it could be argued that it does not give voice to the individual. Meanings are pooled and a finite set of categories, which explain the different ways in which a phenomenon is experienced are arrived at.

Reflecting on the purpose of the research, however, it was thought that the use of a phenomenography was a more appropriate approach than the use of grounded theory. Unlike grounded theory the phenomenographic approach was able to map out the variety of qualitatively different ways young people experience information and was able to describe the logical relationships between the different ways of experiencing. It is accepted that phenomenography does not give voice to individuals in the way that a grounded theory approach does but nevertheless with the inclusion of participants' quotes it would be untrue to say that individual participant's voices are not heard.

In addition grounded theory places a heavy emphasis on theory development and even though one of the research questions posed by the present research study sought to capture a holistic picture of young people's relationship with information the main focus of the study was not on theory formulation but on description and understanding. This description and understanding provides a valuable contribution to the state of knowledge about the ways in which young people experience information.

3.4.3. Relation of phenomenography to phenomenology

Before discussing in some detail the phenomenographic research approach it is pertinent to discuss the relationship between phenomenography and

phenomenology as it is important not to confuse the two approaches. Phenomenography and phenomenology do have some similarities. Both are qualitative research approaches with an interest in human experience of phenomena (Giorgi 1999, p.86). Indeed Giorgi (1999, p.87) claims “...in terms of origin and inspiration” that their relationship is close. Marton and Booth (1997, p.117) describe the relationship between the two approaches as “...no more than a cousin-by-marriage” relationship. Table 3 is adapted from Barnard, McCosker and Gerber (1999, p.214) and outlines the relationship between phenomenography and phenomenology.

Phenomenography	Phenomenology
No dividing line is drawn between pre-reflective experience and conceptual thought. The structure and meaning of a phenomenon as experienced can be found in pre-reflective and conceptual thought.	A dividing line is drawn between pre-reflective experience and conceptual thought.
Phenomenography aims to describe the variety of different ways in which individuals conceptualise a particular phenomenon. The aim is to describe variation in understanding from a perspective that views ways of experiencing phenomena as closed but not finite; new discoveries may mean that there are new ways of seeing a phenomenon.	The aim is to clarify experiential foundations in the form of a singular essence; phenomenology is concerned with entering the unique lifeworld of an individual.
An emphasis is placed on collective meaning.	An emphasis is placed on individual experience.
Phenomenography focuses on a second order perspective i.e. the participant’s perspective; the world is described as it is understood.	Phenomenology focuses on a first order perspective i.e. the researcher’s perspective; the world is described as it is.
Phenomenographic analysis results in identifying conceptions of a phenomenon and an outcome space.	Phenomenological analysis leads to the identification of meaning units.

Table 3: The relationship between phenomenography and phenomenology (adapted from Barnard, McCosker & Gerber 1999, p.214)

The perspective adopted in the phenomenographic and phenomenological research approach is different. Phenomenography is interested in a second order perspective and aims to describe the world as it is understood. A second order perspective is described by Marton (1981, p.178) as one where “...we orient ourselves towards people’s ideas about the world (or their experience of it) and we make statements about people’s ideas about the world (or about their experience of it)”. Phenomenology, on the other hand, is interested in a first order perspective in which the world is described as it is. Marton (1981, p.178) describes a first order perspective as one where “...we orient ourselves towards the world and make statements about it”.

Phenomenography places an emphasis on reflective experience and collective meaning whereas the emphasis in a phenomenological approach is on pre-reflective experience and individual meaning. In phenomenology the focus is on capturing the singular essence of an experience and the aim is to develop a single theory of experience (Marton & Booth 1997, pp.116-117). In phenomenography, on the other hand, the focus is on capturing the variation in individuals’ experiences of a phenomenon. The aim is to find “...the variation and the architecture of this variation in terms of the different aspects which define the phenomena” (Marton 1996, p.186).

A further difference between the two research approaches is an ontological difference. Phenomenology takes a dualistic ontology where the object and subject are viewed separately and independently. Whereas a basic tenet of phenomenography is that the nature of reality is defined as non-dualistic. This implies that the subject and object are inseparable.

3.5. Philosophical underpinnings of phenomenography

Phenomenography is not based on an explicit foundation of metaphysical beliefs. Metaphysical beliefs and ideas about the nature of reality do not come first (Svensson 1997, p.164). Nevertheless phenomenography does make some assumptions about the nature of the objects of study i.e. the nature of

conceptions and knowledge (Svensson 1997 pp.164-165). As stated by Dall'Alba (1996, p.17):

The challenge to those engaging in phenomenographic research, then, is to clarify and justify what their research involves ontologically, epistemologically and methodologically...

The philosophical assumptions that underpin the present research study are discussed below.

3.5.1. Ontological issues

Ontology is about the nature of reality (Maykut & Morehouse 1994, p.4). It is concerned with the nature of existence. According to Uljens (1996, p.114) the ontological issue in phenomenography refers to "...the relation between consciousness and reality". The world is a described world; the way individuals experience it creates knowledge about it and therefore reality.

In ontological terms a basic tenet of phenomenography is that the nature of reality is defined as non-dualistic. This implies that the subject and object are inseparable:

From a non-dualistic ontological perspective there are not two worlds: a real, objective world, on the one hand, and a subjective world of representations on the other. There is only one world, a really existing world, which is experienced and understood in different ways by human beings. It is simultaneously objective and subjective. An experience is a relationship between object and subject, encompassing both. The experience is as much an aspect of the object as it is of the subject. (Marton 2000, p.105)

The relationship between the subject and object is central to phenomenographic research. The only world an individual can know about (and describe) is the world an individual experiences. An individual's experience, however, is not the whole of reality as reality can be experienced

by other individuals in varied ways. The different ways in which individuals experience the world are all there is. Thus from a phenomenographic stance an object is constituted of all the different ways in which it can be experienced by the subject. Accordingly phenomenographic researchers look for meaning in how others experience the world:

...experiences, conceptions, understandings, etc., (terms which I have used interchangeably) refer to subject-object relations of an internal nature. Our world is a world which is always understood in one way or in another; it can not be defined without someone defining it. (Marton 2000, p.115)

Associated with this ontological stance phenomenography uses a second order perspective. A fundamental feature of a phenomenographic approach is the distinction between a first order and a second order perspective. A first order perspective makes statements about the world; the world is described as it is. A second order perspective makes statements about other people's experiences of the world; the world is described as it is understood. A second order perspective allows researchers to:

...find out the different ways in which people experience, interpret, understand, apprehend, perceive or conceptualize various aspects of reality...the descriptions we arrive at from the second-order perspective are autonomous in the sense that they cannot be derived from descriptions arrived at from the first-order perspective. (Marton 1981, p.178)

Phenomenographic researchers undertake research from a second order perspective. They aim to interpret other people's experiences of a particular phenomenon. In doing so it becomes necessary for the researcher to 'bracket' out their own values and judgements:

Experiences are reflected in statements about the world, in acts carried out, in artefacts produced. Now in the light of what we know about the world, such statements can appear more or less valid or consistent or useful, the acts more or less skilled, the artefacts more or less functional. Judgements of this kind belong to the first order perspective. When adopting a second order perspective, we have to bracket such judgements. (Marton & Booth 1997, p.120)

Researchers do not take a first-order perspective and attempt to describe what reality is like but instead take a second-order perspective and focus on how it is experienced and described by individuals who experience it.

3.5.2. Epistemological issues

Epistemological assumptions concern the origins of knowledge (Maykut & Morehouse 1994, p.4). The ontology and epistemology of phenomenography are interdependent (Uljens 1996, p.114). As stated the ontological issue in phenomenography concerns the relationship between consciousness (awareness) and reality (phenomenon). The epistemological issue in phenomenography concerns the relationship between reality and theory (descriptions e.g. in language, sign and symbol) (Uljens 1996, p.115). Theory has no direct access to reality. Theory always depends on consciousness (awareness) and sense making to access reality (phenomenon). Phenomenographic researchers' interest lies in the individual's consciousness of reality (ontological issue) as well as their expression of reality (epistemological issue).

The epistemology of phenomenography has its emphasis on description. It is concerned with the content of description revealed by individuals in the way they experience the phenomenon. In phenomenography knowledge is understood in terms of meaning and the similarities and differences in meaning (Svensson 1997, p.167). The epistemological stance of phenomenography is that reality is always dependent upon how it is understood or conceived by an individual:

...reality is considered to exist through the way in which a person conceives of it. (Uljens 1996, p.112)

Uljens goes on to explain:

A phenomenographic conception is the way man is related, or rather conceives himself to be related, to the world. (Uljens 1996, p.112)

Phenomenographic research seeks to describe the different conceptions of the specific phenomenon under investigation amongst a group of individuals in a specific context. It should be stated that within phenomenographic research the terms experience, conceptualise, perceive and understand can be used interchangeably. Marton explains why this is so:

The words “experience”, “perceive”, and so on are used interchangeably. The point is not to deny that there are differences in what these terms refer to, but to suggest that the limited number of ways in which a certain phenomenon appears to people can be found, for instance, regardless of whether they are embedded in immediate experience of the phenomenon or in reflected thought about the same phenomenon. (Marton 1997, p.97)

Because the aim of phenomenography is to capture variation Marton has described that the terms used need not be limited. In this study the terms experience, conceptualise, perceive and understand are used interchangeably. Given the importance of conceptions to phenomenographic research the nature of conceptions is now considered.

3.5.3. Nature of conceptions

As stated the knowledge interest in phenomenographic research is in the description of the different conceptions of the specific phenomenon under investigation amongst a group of individuals in a specific context. A phenomenon can be defined as “...the thing as it appears to us” (Marton 2000, p.105). Conceptions are seen as fundamental to understanding the

surrounding world. Svensson (1989, p.531) outlines the distinctions between the terms concept, conception and conceptualisation:

- Concept – the abstract general meaning attributed to a phenomenon as it is presented in a language;
- Conception – the experienced meaning of a phenomenon;
- Conceptualisation – a cognitive activity through which a conception is constituted.

A conception is a phenomenon as it is experienced and described by an individual. From a phenomenographic stance conceptions are ways of understanding or making sense of some aspect of the world.

Conceptions have a relational nature. As discussed earlier in this chapter they are constituted in a non-dualist relationship between individuals and their reality (Marton 1981, p.178). The relationship is sometimes referred to as an internal relationship, where the meaning is constituted within the subject-object relationship (Marton & Booth 1997, p.13). Svensson (1997, p.166) states that the relationship between individuals and their reality may vary in character. It is the varying character of this internal relation that forms the object of phenomenographic research. He goes on to state that conceptions may be expressed in different forms of action but they are most accessible through language.

The relationship between the subject and object is contextual. The aspects of the phenomenon being focused on will depend on the context in which the phenomenon is experienced by an individual. Marton (1986, p.33) argues that conceptions do not reside within an individual but are relations between an individual, a task and a context. As such conceptions are not stable entities but are dynamic and depend on the context in which the task is being undertaken. If the context alters the conception may alter.

The nature of conceptions can be explained with reference to two theoretical frameworks, both based on phenomenological principles, Husserl's theory of intentionality (McIntyre & Woodruff Smith 1989) and Gurwitsch's (1964)

theory of consciousness. In the present study both theories were drawn on in order to investigate conceptions and their relationship with each other. This is discussed in more detail in the next sections where *experience* and *awareness*, two central aspects of phenomenographic research, are discussed.

3.5.4. Experience

Phenomenographic research aims to describe the variety of ways individuals experience phenomena. Marton and Booth (1997, p.111) describe phenomenographic research thus:

The unit of phenomenographic research is a way of experiencing something ...and the object of the research is variation in ways of experiencing something.

According to phenomenographic principles experience is not a mental representation or a cognitive structure. 'Experience' is described as a relationship formed between the individual and the world (Marton 2000, p.105). This line of thought stems from the principle of intentionality which stems, in the main, from the work of Franz Brentano who posited that all psychic (in today's terms psychological) phenomena refer to objects beyond themselves (Marton & Booth 1997, p. 84). The theory of intentionality suggests that in order to experience there has to be an object; there is a subject-object interaction. Marton and Booth refer to it as an "*internal relationship*" (Marton & Booth 1997, p.122).

The way in which a phenomenon is experienced is conceptualised as having two aspects: a referential (or meaning) aspect and a structural aspect and the two aspects "are dialectically intertwined and occur simultaneously when we experience something" Marton & Booth (1997, p.87). The referential aspect focuses on *what* is being experienced; it describes what the phenomenon means in everyday language. The structural component refers to *how* an individual thinks about the phenomenon; it describes a deeper level of phenomenal understanding. Irvin (2006, p. 110) notes that a range of different

understandings of the terms *what* and *how* are exhibited in a number of phenomenographic studies. Marton and Booth (1997, p.33), themselves, state that there are different ways of using the terms *what* and *how*. In this research study the *what* aspect relates to ‘what information means to the individual in everyday language’ and the *how* aspect relates to ‘how is information experienced by an individual’. In order to fully describe the ways in which young people experience information the structural and referential aspects of the internal relationship between the subject and the object must be stated.

3.5.5. Awareness

In phenomenography to experience something is to be aware of something. “...the totality of our experiences we call awareness” (Marton and Booth 1997, p.122). It should be noted that the term ‘awareness’ is used interchangeably with ‘consciousness’ throughout the text. Marton (1997) draws on Gurwitsch’s (1964) ideas about the structure of awareness:

Awareness is not seen in terms of the dichotomy aware/unaware or conscious/subconscious, but as being characterised by an infinitely differentiated figure-ground structure. (Marton 1997, p.98)

Marton (2000, p.110) explains the figure-ground structure in more detail:

Certain things come to the fore, they are figural, they are thematised while other things recede to the ground, they are tacit, they are unthematized.

There are different levels of awareness. Individuals are aware of everything at the same time but not in the same way. Awareness is structured in a particular way that gives meaning to an individual’s conception of an object. At any given time an individual will hold certain things in the foreground of their awareness. Beyond them at the next level are other things and further away at outer level, on the fringe, are yet other things. Individuals are not consciously aware of most things but at a time when they become relevant they enter the

foreground of an individual's awareness. It is important to note that nothing is experienced in total isolation. Experiences are always embedded in a context (Marton & Booth 1997, p.96).

A way of experiencing something is linked to how an individual's awareness is structured. Marton and Booth (1997, p.108) state that in order to experience something as something an individual needs to "be able to discern it from and relate it to a context, and be able to discern its parts and relate them to each other and to the whole". The whole, the parts and the relationship between them are discerned in terms of various aspects which represent dimensions of variation in awareness.

As stated earlier Marton and Booth (1997, p. 87) describe an experience as having a referential (or meaning) aspect and a structural aspect. The referential aspect comprises the overall meaning that has been attributed to the phenomenon by the person experiencing it. Marton and Booth describe the structural aspect of experience in terms of an external and internal horizon. The internal refers to the different aspects that make up the experience in other words the core of the individual's awareness and the external refers to the context in which the phenomenon is being experienced. The following example illustrates this. A student is discussing a chapter of work with her supervisor. In her case the external horizon comprises amongst other things the room where she is sitting, the building in which the room is situated, people who surround her, her family and their demands on her time. These aspects constitute the external horizon of her awareness. In this research the external horizon is made up of the elements that surround the phenomenon of information which is being investigated.

The internal horizon, which makes up the focal core of an individual's awareness, is described by Marton and Booth as "the parts and their relationships, together with the contours of the phenomenon, we call its internal horizon" (Marton & Booth 1997, p.87). The internal horizon is made up of aspects of the phenomenon and the relationships between these aspects and the phenomenon as an entity. In the example described above the internal

horizon refers to the chapter the student is discussing but it might also include other aspects such as how well the chapter is written, how well the language used conveys the meaning. In this study the internal horizon will refer to what is the focal point of awareness of young people in relation to the way they experience information.

To sum up experiencing a phenomenon has two aspects a referential aspect i.e. a meaning and a structural aspect comprising an internal and external horizon. The meaning (referential aspect) is derived from the related aspects of the phenomenon in the internal horizon and the aspects that comprise the external horizon and the relationship between the two horizons. The two aspects (referential and structural) are intertwined (Marton & Booth 1997, p.87) and occur simultaneously when an individual experiences something.

3.5.6. Phenomenographic assumptions about the relationship between language and conceptions

The assumption is made that language is used by individuals to communicate their conceptions to others. Svensson (1997, p.166) argues that “conceptions may be expressed in different forms of action but they are most accessible through language”. Säljö (1997, p.177) states that “...language, culture and human experience are inextricably intertwined”. Nevertheless concerns are raised by Säljö (1997, p.177) about data representing ways of talking and not conceptions. Marton and Booth (1997, p.134) address this issue when they cite Smedslund (1970) who “exhorts us to assume that what people say is logical, given their particular way of seeing the world”.

In order to address these concerns in this study every effort was made to ensure that interview questions were as open as possible to allow participants to choose the dimensions of the discourse and report their particular way of seeing the world.

Säljö (1997, p.178) argues that an individual’s ability to describe their experience is limited by language and social practices. He suggests that:

...the basic observation of phenomenography “that whatever phenomenon we encounter we experience it in a limited number of qualitatively different ways [can be accounted for by] the fact that there is a limited number of ways of talking about a phenomenon that is perceived as relevant in a particular situation.

Individuals may have limited means of describing a conception however, from the point of view of a phenomenographic research approach; the interest is in describing the collective conception and not the individual. Sandberg (1997, p.206) notes that:

...a specific conception cannot be seen in its entirety in data obtained from a single individual, but only in data obtained from several individuals. The data obtained from each individual express some important aspect of the particular conception.

Consequently even if some young people were unable to convey their experiences articulately the aim of the research study was to identify variation in experience among the group of young people.

Having considered the philosophical underpinnings of the present study the next sections consider the methodological underpinnings by looking at phenomenography, the methodology chosen to guide the research study.

3.6. A phenomenographic research approach

Phenomenography is described as a research approach. Barnard, McCosker and Gerber (1999, p.223) state that “Phenomenography is less a methodology than an explorative and analytic approach to qualitative research”. Marton and Booth (1997, p.111) describe it thus:

Phenomenography is not a method in itself, although there are methodological elements associated with it, nor is it a theory of experience, although there are theoretical elements to be derived from it. Also phenomenography is not merely an opportune player that can assume the role needed for the moment. Phenomenography is rather a way of - an approach to - identifying, formulating, and tackling certain sorts of research questions...

Phenomenography is used not just as a method of analysis but as a holistic research approach.

3.6.1. Origins of phenomenography

Phenomenography was developed in Sweden at the University of Gothenburg in the 1970s by a team of researchers led by Ference Marton as a qualitative research approach to study learning. Since that time it has been employed to capture the variation in the ways in which individuals experience a number of phenomena, amongst them: literature reviews, number, reading, Australian Aboriginal culture, domestic violence and environmental responsibility (Bruce and Gerber, 1995). Outlines of the development and use of the approach are recorded in the literature (Marton 1981; Dall'Alba & Hasselgren 1996; Marton & Booth 1997).

3.6.2. Object of phenomenographic research

Phenomenography is a qualitative research approach that is empirically based. The objective of phenomenographic research is to determine variation in the ways individuals experience a phenomenon (Marton & Booth 1997, p.124). It is important to note that variation is not that of one individual it is a description of the collective variation of the population studied. Like other qualitative methods phenomenography is descriptive but it is unique in its focus on qualitative variation in understanding a phenomenon.

A fundamental assumption underlying phenomenographic research is that there are a finite number of qualitatively different ways of perceiving a

phenomenon. Marton (1986, p.37) reports that as a result of undertaking a number of studies it was repeatedly found that phenomena were experienced “in a limited number of qualitatively different ways”. The intention of the present study is to uncover variations in the qualitatively different ways young people experienced information. Accordingly a phenomenographic research approach was employed to direct the research.

3.6.3. Outcomes of phenomenographic research

The outcome of a phenomenographic study is a diagrammatic representation known as an outcome space which is made up of a related set of a limited number of categories of description that together expresses the variety of ways in which a particular phenomenon is experienced by a group of individuals in a given context. Marton and Booth (1997, p.111) describe phenomenographic research thus:

The unit of phenomenographic research is a way of experiencing something ...and the object of the research is variation in ways of experiencing something.

As the units of analysis of phenomenography are the qualitatively different variety of ways in which a phenomenon can be experienced the outcome is not accounts of the experiences of single individuals. A pool of individual experiences is collected and the collective variation is extracted. The outcome of phenomenographical analysis is a finite set of categories which, with their relationships, explain the different ways individuals experience phenomena in the world. Consideration is now given to categories of description and the outcome space.

3.6.4. Categories of description

Categories of description describe the variation in ways of experiencing a phenomenon at a collective level. Categories of description are not formulated prior to data collection or data analysis. Categories of description emerge

from the researcher's interpretive analysis of the data and describe the variety of ways in which a group of people in a specific context experience a phenomenon. It should however, be stated that even if only one participant describes a category it is still valid. An individual category does not constitute the phenomenon itself; it represents a unique way of experiencing the phenomenon being investigated. The name given to a category of description is intended to convey the meaning of the category. The description of each category shows what is distinct about the category in relation to other categories. Quotes from the data are used to demonstrate important features of each category.

The set of categories should fully represent the collective experience of the population being studied and is understood to be reasonably stable in a certain population and context however they cannot claim to be exhaustive given the limited number of people studied. According to Marton and Booth (1997, p.125) a set of categories of description need to satisfy three criteria:

- Each individual category of description should relate a distinct way of experiencing the phenomenon;
- There should be a logical relationship, commonly hierarchical between the categories;
- The outcome space should be as parsimonious as possible.

3.6.5. Outcome space

The outcome space documents the relationship between the categories of description:

The outcome space is the complex of categories of description comprising distinct groupings of aspects of the phenomenon and the relationship between them. (Marton and Booth 1997, p.125)

Categories of description are logically related to one another. Usually, but not always, this relationship is a hierarchically inclusive relationship with some categories being more advanced and complex than others. The outcome space

represents the variety of ways in which a given population experiences a phenomenon.

3.7. Creating a research design

The methods used are the practical ways of gathering data, i.e. the techniques used to gather and analyse the data about the research questions. In this research study the methods used were interviews and drawings. In advance of gathering data by means of each of these methods focus groups and pilot interviews were carried out which informed the design of the study. Before considering how participants were selected and how the data were collected and analysed the following sections look in detail at the focus groups and pilot interviews and how they informed the design of the research study.

3.7.1. Focus groups

This section considers the purpose of the focus group for this research study. A description of the focus groups is given and is followed by a reflective discussion of the lessons learned and how they informed the design of the study.

Purpose of the focus groups

In May 2007 two focus group sessions were conducted with young people from the two schools who had agreed to take part in the study. The aim of the research was to investigate the ways in which young people experience information. In order to do so it was necessary to communicate and engage with them in a meaningful and effective way. Mindful of this and inspired by techniques used in the Participatory Rural Appraisal (PRA) approach (Cornwall and Jewkes 1995), focus group sessions were held to ensure that the questions which were addressed to young people were as meaningful as possible. Cornwall and Jewkes (1995, p.1667) describe participatory research as “a ‘bottom-up’ approach with a focus on locally defined priorities and local perspectives”. In terms of this research study it was important to be able to communicate as clearly as possible with the young people. It was important

for the researcher to be made aware of the language and terms as well as the sources of information used by young people which the researcher may have been unfamiliar with. The aim of the focus group sessions was to:

- Provide a forum to elicit the language and terms used by the participants when discussing information;
- Learn about the sources of information used;
- Give young people an opportunity to express their views and opinions on the research.

The information elicited from the focus group sessions ensured that the questions addressed to young people in the interviews were as meaningful as possible.

Focus groups

Kreuger defines a focus group as:

...a carefully planned discussion designed to obtain perceptions in a defined area of interest in a permissive, non-threatening environment. (Kreuger 1988, p.18)

Focus group interviews can be used in a variety of settings and for a variety of reasons. Morgan and Kreuger (1993, p.15) suggest that focus groups are particularly useful when there are power differences between the participants and decision makers or professionals, when the everyday use of language and culture of particular groups is of interest, and when one wants to explore the degree of consensus on a given topic.

Focus group sample

The selection of participants for the focus groups was purposive i.e. a non-random sample where participants were specifically sought out. It is believed that non-random sampling is the most effective strategy to ensure that variability common in any social phenomenon will be represented in the data (Maykut & Morehouse 1994, p.45). In order to sustain and control a discussion Morgan (1997, p.43) recommends a sample size somewhere in the range of six to ten participants. In this study the size of the focus groups

ranged between eight and ten participants (see Appendix 1 for details of participants).

Focus group procedures

Both focus group sessions were conducted by the researcher at the independent school in a room not used for teaching purposes. The researcher's role was that of moderator, providing a clear explanation of the purpose of the group and facilitating interaction between group members. Each focus group session began with an introduction that explained the purpose of the session and all the necessary assurances were given about confidentiality and anonymity. Reassurances were given that there were no right or wrong answers all that was of interest was the thoughts and opinions expressed by the young people. Participants were informed that they were free to leave the room at any point without the need for explanation. Every effort was made to make participants comfortable and as detached as possible from the school environment. Drinks and snacks were provided. The duration of each session was one hour. Both sessions were recorded and notes were made by the moderator to reflect the content of the discussions Kreuger (1988, p.79).

Focus group questions

As recommended by Kreuger (1997, p.4) a list of questions was prepared in advance (see Appendix 2). The questions came directly from the research questions. Open ended questions were asked to allow the participants to answer from a variety of dimensions. When answering the questions participants were asked to write down their thoughts on post-it notes and then each participant in turn was asked to tell the others what they had written. This strategy ensured that everyone was given the opportunity to contribute to the discussion. Probes such as 'give me an example' and 'tell me more' were used to explore the issues raised.

Analysis of focus groups

The interview data collected from the focus group discussion were transcribed in full. The transcripts were read and sections that related to the following

areas: language and terms used, sources used and the participants' views on the conduct of the research were highlighted. Each of these areas was analysed separately and a summary statement was written. This analysis informed the next stage of the study namely the pilot interviews.

Limitations

It is recognised that using focus groups to capture data does have some limitations. They are:

- Focus group interviews can be more difficult to control than individual or group interviews;
- Group responses are shorter and more influenced by what the others in the group emphasise;
- Data can be difficult to analyse.

Piloting of focus group questions

Prior to conducting the Year 7 and Years 12 and 13 focus groups the focus group questions were piloted with a Year 7 participant and a Year 12 participant to ensure that they could be understood and that they were able to elicit the required information.

Reflections on the focus groups and lessons learnt

Lessons learnt from the focus groups were used to inform the structure of the interviews. The aim of the focus groups was to:

- Provide a forum to elicit the language and terms used by the participants when discussing information;
- Learn about the sources of information used;
- Give young people an opportunity to express their views and opinions on the research.

Language and terms used

When interviewing young people language is an issue that requires special consideration. At the outset of the research study it was anticipated that:

- The language and terms used by the young people taking part in the research might differ from that of the researcher;

- The language and terms used by the young people could vary in different contexts.

It was therefore important to learn what language and terms were used by young people. Indeed research has shown that encouraging young people to use their own language results in better research:

Research suggests that it is more profitable to encourage children to use their own language, and their own ways of communicating and to ask them to clarify where necessary rather than attempt to understand and reply using other people's words. (Williams, Wetton & Moon 1989, p.113)

The discussion about the language and the terms used when referring to information revealed that there was a perception amongst participants, that the term information was often not used instead it was implied whilst using terms relevant to whatever was being discussed both in the school context and particularly outside of the school. The researcher was made aware of terms and language currently used by the participants and was also made aware of the different terms used in the different contexts. Some examples of terms used in the school context were: research; facts; instructions; stuff; answers; describe; explain and talk about the topic. Amongst the terms mentioned by participants relating to outside of school were: gossip; rumour; opinion; chat; news; stuff and give me the low down.

Sources of information used

A range of information sources were used by the participants. People were perceived by both age groups to be an important information source in school and even more so out of school. In school there was widespread use of Internet search engines and printed materials. Most references were to books but some mention was made to the use of newspapers and magazines. Outside of school Internet search engines were also used along with the newer Internet technologies such as social networking sites. No references were made to the use of books outside of school but newspapers and magazines were read to access information and the traditional media of the television and radio was

also used. Young people perceived emails and mobile phones to be important sources of information. Mobile phones were recognised as providing a means to access and share information via the Internet, email, talk and text.

Participants views on the conduct of the research

It was considered important to garner the views of the young people on the conduct of the research. The participants' responses suggested that the measures taken to ensure a comfortable, relaxed atmosphere where the participants felt that their views and opinions were being listened to and respected had been successful. They concurred that an interview situation could be daunting and emphasised the importance of measures to create a relaxed atmosphere where their thoughts and opinions were valued.

Year 12 and Year 13 participants thought that it was easier to discuss 'information' in concrete terms. They thought it was important to give participants concrete examples of information and to ask the participants to think about specific times when they had interacted with information. The planned interview strategy of using drawings and words was validated by the participants. The information elicited from the focus groups was used to structure the interviews conducted with young people and ensure that they were as meaningful and comfortable as possible.

3.7.2. Pilot interviews

Prior to the interviews taking place pilot interviews were carried out. As recommended by Bell (1987, p.65) pilot testing is necessary to remove any problems about clarity of questions, objections to answering any questions, time required to conduct interview and any omissions. Teijlingen and Hundley (2001) state:

One of the advantages of conducting a pilot study is that it might give advance warning about where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are inappropriate or too complicated.

Silverman (1993, p.148) advocates the careful piloting of interview schedules in order to enhance the reliability of interviews.

A description of the pilot interviews and a discussion of the lessons learned and how they informed the interview stage of the study is given in this section. Pilot interviews were conducted with four young people in June 2007 (see Appendix 3 for details of participants). The interviews lasted for between forty five minutes and one hour.

The objective of the interviews was to answer the research questions therefore the interview schedules were piloted and revised based on their success in accomplishing that objective. Each of the four pilot interviews consisted of:

- A request for each participant to draw and if they so wished to write about the first thing that came into their head when they heard the word information;
- A set of open ended questions aimed at capturing the ways in which participants experienced information.

See Appendix 4 for pilot interview schedule.

Reflections on the pilot interviews and lessons learned

The pilot interviews were conducted to explore the effectiveness of the interview schedules in answering the research questions. To determine the effectiveness of the interview schedule the following questions were addressed:

- Did the interview schedule allow the participants to feel at ease and ready to engage in the interview process?
- Was adequate provision made for participants to detach themselves from the school environment and talk comprehensively about information in an out of school context?
- Was the approach taken to the drawing task appropriate to engage the participants?
- Did the participants understand the questions?
- Was the sequencing of the questions appropriate?
- Did the probing questions adequately serve to engage the participants in reflective thought?
- Were the questions asked appropriate for answering the research questions?
- Was there a need for any additional questions to be included?
- Were the presuppositions of the researcher bracketed?

Readiness to engage in interview process

The purpose and details of the interview were explained at the outset and all the necessary assurances were given about confidentiality. All interviews took place in areas of the school not used for teaching. Drinks and snacks were provided. All participants appeared happy and comfortable in the interview situation. At the end of the interviews two participants expressed their delight at having spent an hour eating chocolate and chatting, not something they usually did in school. These comments highlighted the importance of making every effort to detach the participants from the school environment.

Capacity to talk about information in an out of school context

Although the sample for the study was drawn from a school population the study sought to investigate the different ways young people experienced information in all aspects of their lives and not just in the academic environment. When asking participants to talk about their experience of information in the out of school context every effort was made to place them in that context by talking to them about their friends, their interests and their

leisure activities out of school. This strategy appeared to work well although there were a few occasions when participants started to drift into talking about the school environment and therefore it was particularly important for the researcher to remain alert and ready to put the participant back on the right track.

Approach to drawing

Participants were asked to draw the first thing that came into their head when they heard the word information. Reassurances were given that no assessment was going to be made of the drawing. Following the recommendation made by Shenton (2002, p.419) two of the four participants (the two Year 12 participants) chose to add words to their drawings and talked to the researcher about what they had drawn immediately after they had completed their drawing. Valuable lessons were learnt from this exercise. Asking the participants to explain what they had drawn and why they had drawn it gave them time for reflection and gave the researcher an opportunity to tease out of them what their lines of thought were.

Understanding of questions

Although all the participants understood the questions that were asked they all demonstrated that it was not always easy, given the abstract nature of information, to talk about it. If a participant was finding it difficult to continue talking about a situation then it was found helpful to put a question to them based in a specific context.

Sequencing of questions

Given the nature of a phenomenographic interview the sequence of questions was not rigid; however it had been decided at the outset of the pilot interviews to make a point of discussing with the participants their experiences of information in life outside school before discussing their experiences of information in school. This was as a result of findings from the focus groups where the opposite order had been adopted and it was found that when the participants started by discussing information in school it then appeared to be difficult for them to transfer their thoughts to information outside school.

During the course of the interviews it was discovered that it was not possible to adopt this order in all cases. The pilot interviews revealed that not enough consideration had been given to the nature of phenomenographic interviews. Marton (1986, p.42) states “though we have a set of questions at the start of the interview, different interviews may follow somewhat different courses”. When the participants were presented with open ended questions a couple chose to answer their initial question about what information was, what it meant to them, in the context of information in the school environment. In order to conduct the interview adhering as closely as possible to phenomenographic principles as possible the participants were allowed to let their thoughts develop and were encouraged to reflect on them. At a later point in these interviews the participants were asked to think specifically about how they experienced information in the context of life outside of school. The pilot interviews demonstrated the importance of the researcher remaining aware and alert to what needs to be covered in the interview.

Probing questions

The use of probing questions was helpful with all participants. Probing questions encouraged participants to reflect on their statements. Reflection was very important in uncovering thoughts which might otherwise not have been articulated. Repetition of statements made by participants also encouraged them to continue with their line of thought and to reflect upon it.

Range of questions

The range of questions led to participants discussing all of the areas covered by the research questions although sometimes answers to questions were short and sharp and probing questions had to be used to encourage reflection.

Additional questions

The set of interview questions was small and open ended therefore it was not anticipated that there would be many additional questions to add. A discussion during one of the interviews, however, highlighted a question which could be added to the list. One of the participants referred to his mobile phone as a source of information as he talked about texting friends to make

social arrangements he was asked by the researcher if he considered this to be information. In reply he was adamant that texts were not information. Probing questions led to reflective thought and a discussion about why this was not information. In his view information had to be concerned with learning something of value. Therefore the question ‘what is not information?’ was added to the list of interview questions.

Bracketing of researcher’s presuppositions

In order to understand the participants’ experience it is necessary for the researcher to bracket any presuppositions (Ashworth and Lucas 2000, p.297). At the end of each pilot interview the recordings were listened to so that an assessment could be made as to how well this had been achieved. In one of the pilot interviews the following instance of an assumption on the part of the researcher was noted:

Researcher: OK that’s interesting. So all this stuff that is going on around you and you take for granted I presume that doesn’t stay in your memory or does it?

PCFCS12: No, you sort of think about it and then something happens or you’re watching T.V. and an advert comes on and you think for a couple of seconds and a new advert comes on and it’s just blank it’s gone.

This was a valuable exercise in building up an awareness of the need for constant vigilance.

Summary of the lessons learned from the pilot interviews and how they informed the interviews

In summary the pilot interviews demonstrated the importance of putting the participants at ease by providing a comfortable environment, which was different from the teaching environment. They also demonstrated the value of spending time talking to participants about their life outside school in order to create, within them, an appropriate frame of mind to talk about their experiences of information outside school. The drawing task was a useful way

to introduce the topic under discussion and allowed the participants to take the lead in the interview process. A low key approach to the drawing task with reassurances that the drawing itself was not going to be assessed and the provision to write words and phrases provided a setting in which the participants completed the task without hesitation. The interviews highlighted some of the difficulties that participants felt when discussing the abstract nature of information. It was found that putting the discussion into a specific context helped to alleviate some of these difficulties.

Reflection in a phenomenographic interview has the ability to uncover thoughts not previously acknowledged and although the significance of reflection had been recognised the pilot interviews emphasised its significance and consequently the importance of the use of probing questions. In addition it was found that repetition by the researcher of statements made by participants also encouraged them to continue with their line of thought and to reflect upon it. The pilot interviews also emphasised the need to allow participants to discuss and reflect on issues as they arose and not to interrupt these thoughts by imposing questions in a rigid sequence. That said there does need to be an acute sense of awareness on the part of the researcher as to what needs to be covered during the interview. The question of what is not information was added to interview schedule. The pilot interview findings were used to revise the interview schedules for the phenomenographic interviews in the main study.

3.8. Phenomenographic study: Sample

The selection of a sampling strategy depends on the focus of inquiry. The sample used for the interviews was purposive i.e. a non-random sample in which participants are specifically sought out. Maykut & Morehouse (1994, p.45) claim:

Purposive sampling increases the likelihood that variability common in any social phenomenon will be represented in the data, in contrast to random sampling which tries to achieve variation through the use of random selection and large sample size.

Marton and Booth (1997, p.125) state that "...a phenomenographic study always derives its description from a smallish number of people chosen from a particular population". Sandberg (2000, p.13) suggests that the number of different ways a phenomenon is experienced reaches saturation after twenty interviews. In this study a total of eighteen participants completed drawings and took part in full length interviews. In addition another twenty three participants completed drawings accompanied by a short interview. The volume of data generated by this number of participants was considered sufficient to allow variation to be revealed without producing an unwieldy volume of data to be analysed.

3.9. Phenomenographic study: Participants

The population of interest was young people between the ages of eleven and eighteen. The sample was drawn from two co-educational secondary schools in Derbyshire, United Kingdom:

- A state-funded comprehensive school for young people aged eleven to eighteen;
- A fee paying independent school for young people aged eleven to eighteen.

These locations were chosen because they afford good access to a cross section of young people of secondary school age.

Initial contact was made via email and this was followed by meetings. At the comprehensive school a meeting was held with the Head teacher and Assistant Head teacher and email contact was made with the School Librarian. At the independent school a meeting was held with the Deputy Head teacher, the Head of Academic Development and the School Librarian. Both schools agreed to be involved in the research project. A series of meetings took place

in the Spring Term of 2007 to make arrangements for the focus groups, pilot interviews and interviews to take place later in the year.

As stated in section 3.8 when selecting participants purposive sampling was used. The aim of the data collection was to maximise the variation in the pool of meaning. Each school was approached and asked to identify a group of young people from a wide range of backgrounds. Ashworth and Lucas (2000, p.302) argue that assumptions about the nature of the phenomenon held by particular types of individuals should be avoided:

Such assumptions should be identified and set aside, in the sense of acknowledging them and being aware of the possibility that they are false.

They stipulate, however, that every effort should be made to obtain descriptions from individuals whose descriptions of the phenomenon represent a variety of experiences:

...selecting interviewees who seem intuitively likely to have different lifeworlds and within these, different experience of the putative research phenomenon, is worthwhile. (Ashworth & Lucas 2000, p.302)

Therefore when participants were selected for the present research study individuals were selected from different age groups, gender, social and academic backgrounds and with a range of different interests.

Participants were all volunteers and were recruited from Year 7 (eleven to twelve years of age) and Years 12 and 13 (sixteen to eighteen years of age). Due to curricula and exam demands only young people from these age groups were available for interviews. A total of forty one young people were interviewed, twenty one from the state funded comprehensive school and twenty from the independent school. A total of twenty three Year 7 students, ten Year 12 students and eight Year 13 students were interviewed. The intent

of the interviews was explained and consent to participate in the research was sought via letters sent out to parents and guardians of the participants and to the participants themselves. For ethical reasons details of individuals are not given but an overview of the participants is presented in Appendix 5.

3.10. Phenomenographic study: Ethical considerations

When conducting the research the recommendations of Loughborough University's Ethical Advisory Committee's Code of Practice on Investigations Involving Human Participants (2006) were fully adhered to.

- All participants received information about the nature, objectives and duration of the research;
- Consent was sought from the participants and in the case of participants under the age of eighteen, consent was sought from their parents or guardians;
- Participants were assured of confidentiality of data collected during the research. All participants were assigned a code (see Appendix 5) and all data was stored against that code rather than the names of participants;
- Clear and accurate records have been kept of all procedures followed;
- Participants were informed of their right to withdraw from the investigation at any time.

An application was made for Disclosure from the Criminal Records Bureau. This was received in April 2007. In addition an application was made to the Ethical Advisory Committee of Loughborough University seeking approval for the research to be carried out. This is in accordance with the University Code of Practice on Investigations Involving Human Participants (Loughborough University 2006). Approval was granted in April 2007.

3.11. Data collection

Data were collected via interviews and drawings during the Autumn Term of 2007 with consideration given to the input received from the young people during the focus groups and pilot interviews. There now follows a discussion of the methods of data collection.

3.11.1. Interviews

This section looks at the interview method chosen for this research study. It begins by considering the phenomenographic interview approach and then moves on to give details of the phenomenographic interviews which were conducted. Interviews enable participants:

...to discuss their interpretations of the world in which they live, and to express how they regard situations from their own point of view.

(Cohen, Manion & Morrison 2000, p.267)

Interviews were chosen as a research method in order to explore in depth the ways in which participants experienced information. The intention was to capture data of complexity and detail. Use of the interview method allows the researcher:

...to collect more complex information, where necessary, qualifying answers and generally obtaining results with a greater 'depth'.

(Moore 1983, p.27)

Phenomenographic interview approach

The interviews in this research study were conducted from a phenomenographic approach. The purpose of the phenomenographic interview as distinct from other qualitative interviews is to seek variation in people's experience or understanding of a phenomenon. In the interview attention should focus on the relationship between the person and the phenomena.

The phenomenographic interview is usually semi-structured. In a semi-structured interview the researcher is able to interact with the interviewee in order to explore the issue being investigated. Moore (1983, p.26) states:

Semi-structured interviews provide much more scope for the discussion and recording of respondents' opinions and views.

The interview may be structured so that there are a small number of pre-planned open ended questions, which aim to keep the interview on track by addressing the main themes as determined by the research questions but the researcher should be prepared to follow any new and unexpected lines of discussion which the participant might introduce as these new areas of discussion may lead to new reflections not anticipated by the researcher.

Careful consideration has to be given to questioning in a phenomenographic interview. Questions should be:

... as open ended as possible in order to let the subjects choose the dimensions of the question they want to answer. The dimensions they choose are an important source of data because they reveal an aspect of the individual's relevance structure. Furthermore, though we have a set of questions at the start of the interview, different interviews may follow somewhat different courses. (Marton 1986, p.42)

Marton (1986 p.42) elaborates further on the phenomenographic interview by stressing that interviews should not have too many pre-planned questions. Most questions should follow from what the participant says. Questions were designed to focus awareness on different aspects related to their experiences of the phenomenon in question. Francis (1996, p.36) notes "in phenomenography the conception comes fresh from the individual's reflection on a particular experience". Francis goes on to argue that the preconceptions of the researcher should not be used to prompt thoughts about the topic. She describes how in much interviewing a researcher will guide a participant through a list of questions asked from the researcher's perspective and resulting in answers that

are a summary of general abstraction rather than an account arising from reflective thought.

In phenomenographic interviews the process is reflective; questions need to be asked, which will open up the thoughts and reflections of the participants. The interview needs to be carried out as a dialogue to encourage the participants to reflect upon as many aspects of the phenomenon as possible and draw out understandings. The participant needs to become aware and reflect upon their understanding. The aim should be to get the participant to tell about things they may never have reflected upon before. The questions posed should encourage the participants to think about why they experience the phenomenon in certain ways and how they constitute meaning. Booth (1997, p.138) talks about an open and deep interview:

That the interview is open means that while a structure might be planned in advance, to approach the phenomenon in question from various interesting perspectives, the interviewer is prepared to follow unexpected lines of reasoning that can lead to fruitful new reflections. That the interview is deep means that particular lines of discussion are followed until they are exhausted and the two parties have come to a state of mutual understanding.

Thus during the interview the phenomenon is discussed in a dialogic manner until the researcher and participants have reached a state of mutual satisfaction that all aspects of the participants' experiences of the phenomenon being investigated have been explored.

Phenomenographic interviews

All interviews were conducted with young people during the period September 2007 to December 2007. The issues covered by the interview questions were derived from the four research questions:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?

- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

Individual interviews were employed to capture a rich set of data. A total of forty one interviews were conducted. Eighteen interviews were conducted at length each lasting between fifty minutes and one hour and ten minutes. Twenty three short interviews were conducted to accompany the drawings each lasting in the region of fifteen minutes. All interviews, regardless of length, were treated equally. A total of twenty three Year 7 students and eighteen Year 12 and 13 students were interviewed (see Appendix 5 for a list of participants). All interviews were conducted and recorded by the researcher. Recording interviews can reduce researcher subjectivity (Slater 1990, p.114). All recorded interviews were then transcribed verbatim.

At the outset of each interview the purpose and details of the interview were explained and all the necessary assurances were given about confidentiality. Participants were assured that there was no pressure to answer questions quickly and reassurances were given that there were no right or wrong answers to questions as Hazel notes, it is:

...important to relieve pressure from participants by reassuring them that there are no correct or incorrect responses to any issues which may arise. Fear of false perceptions may be more likely in an educational setting where tests are a familiar occurrence. (Hazel 1995)

Participants were informed that they were free to leave the interview at any point without the need for explanation. All interviews took place in rooms not used for teaching purposes. Interviews took place in privacy; no third parties were present in the interview room. This was an important factor in allowing participants to feel relaxed and secure in the knowledge that there would be no interruptions. All rooms, however, did have to have a window or glass door

so that the interview could be observed by a third party; this was to fulfil the requirements of Loughborough University Ethics Committee. Drinks and snacks were provided throughout the interviews.

Each interview started with a request to the participant to draw the first thing they thought of when they heard the word information. An example of the opening of an interview is given here:

Researcher: To start the interview I am asking everyone to draw the first thing that comes into their heads when they hear the word information. Don't worry about the artistic quality of the drawing. I am just interested in what your first impressions are when you hear the word information. If you would also like to add a few words or a sentence please do so.

WMIS7: I've finished.

Researcher: OK do you want to tell me what you have drawn.

WMIS7: Well a computer because the Internet is really, really big. If you have a book it is just like one book. It only gives you a certain amount of information then you have to take that back and get another but for the Internet you can just scan it, get something, save that onto a document go off it and just get back another and then just click back and get another copy onto your document...[continuing]

As illustrated in the example above the drawing provided a concrete example of information, determined by the participant. The use of drawings as a methodological tool will be discussed in more detail in section 3.11.2. All interviews then proceeded with a discussion about how information was experienced stemming from the drawing which had been completed by the participant. Once this discussion had taken place the twenty three short interviews ended. The eighteen long interviews continued in a semi-structured fashion with a small number of pre-planned open ended questions. Details of the interview schedule are presented in Appendix 6.

The first interview question focused on a general understanding of information. Questions then followed which allowed the participants to clarify their answers and describe their personal, subjective understanding of information fully. When talking about information the participants needed to become aware and reflect upon their understanding of the phenomenon of information. They needed to be encouraged to think about things they may never have reflected upon before. Marton and Booth (1997, p.130) state:

Sometimes such reflection occurs spontaneously, and sometimes the interviewer and interviewee have to persist to reach the required state.

The researcher had to remain at all times sensitive to what the participant made known and encourage elaboration and explanation of what was said. In order to increase the chances of capturing a participant's understanding of the phenomenon the interview questions approached the phenomenon from a variety of directions. The setting of the phenomenon was varied with the aim that the participant should, by experiencing the different contexts for the phenomenon, be stimulated to reflect on the different experiences and understandings of it. Marton and Booth (1997, p.83) state:

We cannot separate our understanding of the situation and our understanding of the phenomena that lend sense to the situation. Not only is the situation understood in terms of the phenomena involved, but we are aware of the phenomena from the point of view of the particular situation. And, further, not only is our experience of the situation moulded by the phenomena as we experience them, but our experience of the phenomena is modified, transformed and developed through the situations we experience them in.

It was recognised that conducting interviews in school had the potential to make it difficult for participants to think in terms of their life outside of the school environment. Therefore every effort was made when they were asked to talk specifically about information outside of school to place the

participants in that environment by talking to them about where they lived; who they lived with, the friends they saw, their interests and leisure activities. A number of the participants talked about their sporting and musical interests. Others mentioned time they spent with their friends and what they enjoyed doing at the weekend. Ideas proffered by participants were explored and reflective articulation of their experiences, ideas and conceptions about information were encouraged. This was facilitated by the use of probing questions. Probing questions were addressed to the participants in order to get them to clarify or explain their comments further. These questions were an important means of getting participants to reflect on what they had said. Examples of probing questions are given in Appendix 6.

The aim, when asking participants to talk about information, was always to avoid responses that were a summary of long term memory in favour of detail and direct thoughts arising from a particular memory. Where possible anecdotes and stories were sought as they revealed more than structured answers. Osteraker (2002) notes:

Phenomenography is an interpretative method the researcher needs a rich empirical material to work with i.e. stories instead of structured answers.

A brief example of the use of probing questions, which lead to a participant relating a story to illustrate an experience of information, is given below. The sequence starts with the researcher returning to something the participant had said earlier in the interview:

Researcher: You said earlier information is a form of communication can you give me an example of where it might be that?

AFCS12: Well planning an occasion you need information on how to do it, how many people need to be there... otherwise everything would go totally wrong especially if it is a party or a meeting or something.

Researcher: Have you an example of where you have arranged something?

AFCS12: My birthday party, a simple one I had to invite...well enough people but to make sure that I wasn't actually segregating anyone so I had to make sure the friendship groups were intact [laughter]...that meant phoning around and checking on who was friends with who.

Researcher: Can you expand on that?

AFCS12: Yeah also like I had to find out about food backgrounds cos some people were vegetarians so I had to make sure there was enough food for them as well as all the meat eaters. Yeah so it was a bit oh... [laughter] it was a bit stressful but I just asked around basically, using my mobile to ring everyone up... [continuing]

Although this is a brief section of the interview it does give an impression of the way probing questions were used to encourage the participant to relate an anecdotal account of an experience of information.

Reflection was very important in uncovering thoughts which might otherwise not have been articulated. As well as the use of probing questions reflection on the part of the participant was also encouraged by the researcher repeating statements made by the participant. Sometimes a participant would hesitate appearing to feel unsure whether or not to continue. On occasions such as these the researcher repeated the statement and thereby encouraged the participants to continue with their line of thought and to reflect upon it. An example of this follows. The participant has been talking about “*taking in information*”:

SMIS12: Then it [information] becomes whatever your head thinks it is. It becomes if you know that it is true information then it becomes a fact. [pause]...

Researcher: It becomes whatever your head thinks it is [pause]...

SMIS12: I'd describe it as information is idea, opinion or fact that has to be processed in your mind and retained or unretained [pause]...

Researcher: You say it has to be processed [pause]...

SMIS12: It is anything that is description, detail, fact or opinion that has to be processed by someone.

Researcher: So it needs a human. It needs to involve a human.

SMIS12: Yeah it needs to involve conscious thought I'd say [pause]...yeah definitely conscious thought... [continuing]

The pauses in this account intimated that the participant was unsure about continuing with his line of thought. The researcher had to take her cue from the participant when deciding how long to sustain the silence before repeating part of his statement. Conducting the interview in as relaxed and interpersonal manner as possible greatly assisted in making such a judgement. The pauses afforded to participants as the researcher repeated what they had said gave them time to think and reflect. It should be added that on other occasions participants might fall into silence as they reflected on their experiences. It was important that the researcher did not interrupt these silent reflections.

3.11.2. Drawings

The interviews started with a request to the participants to draw the first thing that came into their head when they heard the word information. In providing a drawing young people were providing a concrete example of information to begin the interview. Van Manen (1990, p.9) argues that researchers can learn about a phenomenon through visual imagery because "...it is in this work that the variety and possibility of human experience may be found in condensed and transcended form".

Children's drawings have been used as a methodological tool in a number of studies. MacPhail and Kinchin (2004, p.89) used children's drawings as an evaluative tool in an investigation into students' perceptions of sport

education. In their introduction they provide a summary of the general areas in which drawings have been frequently used and studied, namely:

- In clinical settings as indicators of a child's:
 - Intelligence;
 - Intellectual maturity;
 - Personality;
 - Emotional adjustment;
- An examination of children's understanding of:
 - Family relations;
 - The classroom environment;
 - Good and bad.

Tamm and Granqvist (1995) carried out a phenomenographic study of drawings to investigate children and adolescents' concepts of death. They cite several reasons for choosing to focus their study on children's drawings one of which was:

...drawings are a well established medium for assessing thoughts and perceptions that may not be immediately accessible at the verbal level. (Tamm and Granqvist 1995, p.207)

For this reason drawing appeared to be a particularly appropriate tool to use in the present research study.

When conducting a phenomenographic interview one of the aims is to avoid the preconceptions of the researcher being used to prompt thoughts about the topic. At the start of each interview participants were asked to draw the first thing they thought of when they heard the word information. The completed drawings allowed the participants to take the lead in the interview process by providing concrete examples of information to start the interviews, as recommended by the focus group participants. Shenton (2002) reported some reluctance on the part of the older participants in his study (i.e. high school students) to complete a drawing task. In view of this a low key approach was taken and it was only at the point when the researcher asked the participants to

draw that paper and pencils were produced. Reassurances were given that no assessment was going to be made of the drawing.

Asking the participants to explain what they had drawn and why they had drawn it gave them time for reflection and gave the researcher an opportunity to tease their lines of thought out of them. Shenton (2002, p.160) reported that many of the high school participants in his study found it difficult to draw their abstract understandings of information. In the interviews of the present study it was found that all the participants except for one drew without any hesitation, nevertheless some of the ideas incorporated in their drawings were abstract and without a discussion would have remained hidden. The drawing by one particular participant (JMIS12) illustrated this (see Figure 2).

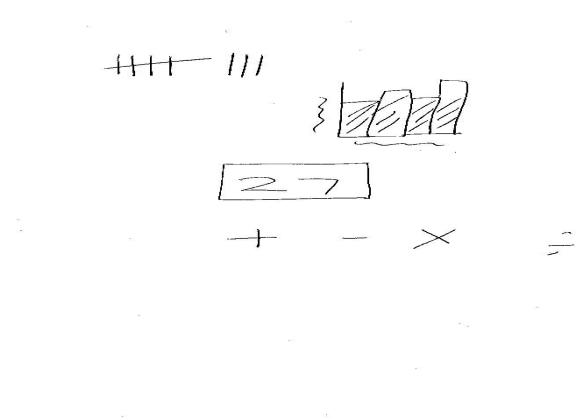


Figure 2: JMIS12 drawing

The participant produced a series of drawings: a tally chart; a bar chart; the number twenty seven and some mathematical symbols. When asked to explain his drawing and what it meant he explained that the tally chart was a means of recording information, the bar chart was a means of showing information and the number twenty seven and mathematical symbols showed how information could be “*worked out*”. When asked to explain why he had chosen to draw these images the participant said that he was a “*bit of a mathematician*” and usually thought of information in terms of numbers and charts. On first inspection these presented merely as examples of mathematical information but the thinking behind the drawings revealed in the conversation demonstrated the participant’s contemplation about the process

of how information is arrived at. This example illustrated the importance of talking to participants about their drawings.

As stated in the previous paragraph one participant did not complete a drawing. Instead he wrote the word frightened on the piece of paper. He explained that he associated the word information with the need for him to display knowledge of something and usually to someone in authority. Although no picture was drawn the conversation which ensued as a result of the word 'frightened' was extremely useful and served to demonstrate the value of opening the interview process in this way.

Drawings have been used previously to understand the changes in the ways in which young people experience phenomena. Wetton and McWhirter (1998) in their discussion about principles of curriculum development and teachers' knowledge about how topics should be taught at different ages suggested that when children of different ages were given a relevant drawing task i.e. about the topic in question:

The results of this will reveal a spiral of children's changing perceptions. (Wetton & McWhirter 1998, p.269)

This suggestion was supported by the findings of Shenton (2002, p.161). In his study he found that in illustrations, young children associated the term information with books and computers. As children grew older it was associated with a widening range of providers with the oldest children in the study having such complex understandings of the term information that they were often unable to represent them as pictures. The present research sought to discover the participants' perceptions or ways of experiencing information therefore drawing appeared to be a suitable methodological tool to use. There are, however limitations to consider when using this method. Wetton and McWhirter (1998, p.269) note that "the more complex the concept the children are asked to draw, the more ambiguous the meaning can become".

Given what is known about children having different learning styles (Gardner, 1983; Kolb, 1984) it was important for young people to be given the opportunity to express their experiences in a variety of ways. Drawings allowed young people who tended towards visual learning to express themselves in a way which was best suited to them. It should be noted that Shenton (2002, p.160) found that some young people, particularly the older participants in his study were reluctant to draw pictures. This reluctance was due to reasons varying from cognitive overload i.e. having too many ideas about what information was to perceived lack of artistic ability. With this in mind it was decided that, in addition to being asked to draw a picture of what they understood information to be, participants were also invited to add some words or sentences if they wanted to. In this way young people who felt uncomfortable about drawing and viewed it as a barrier, had another means of expressing themselves. In the study nineteen participants wrote words to accompany their drawings. In one case the written words explained the reasons behind the drawing. In all the other cases participants had labeled their drawings. The completion of drawings provided young people with a starting point for the interviews.

3.12. Phenomenographic data analysis

In this section an overview of the principles underlying phenomenographic data analysis is given. The next section (section 3.12.1) addresses how the data of the present study was analysed. Phenomenographic data analysis aims to uncover and identify variation in ways of experiencing. The intention of the analysis of the data is to make explicit the fundamental nature of that which is being thought about. The outcome of phenomenographic research is a diagrammatic representation known as an outcome space which is made up of a related set of a limited number of categories of description that together expresses the variety of ways in which a particular phenomenon is experienced by a group of individuals in a given context.

A contentious issue in regard to phenomenographic data analysis concerns the nature of the analysis process. Bruce (1997, p.103) refers to the argument put

forward by Walsh (1994) that phenomenographic researchers view the analytical process in various ways:

- As a process of construction (considers the categories of description to be in the mind of the researcher);
- As a process of discovery (considers the categories of description to be in the data).

Each view has a range of possible consequences. If viewed as a process of construction researchers lay themselves open to the accusation that they are imposing a logical framework which is not justified and if viewed as a process of discovery they may be accused of bypassing the analytical process. Bruce resolved the dilemma by viewing the analysis process as a combination of construction and discovery:

It is a process of discovery because the conceptions reveal themselves through the data and it is a process of construction because the researcher must identify and describe these conceptions in terms of referential and structural elements. (Bruce 1997, p.103)

The stance taken in this study is in accord with the view expressed by Bruce. Phenomenography is an interpretive, empirical research approach. The categories of description do not fit into pre-determined categories but rather they emerge from the data. They are determined by the researcher's analysis and description of the participants' accounts of their experiences of the phenomenon of information.

In a phenomenographic study the data are analysed from a second order perspective; the phenomenographic researcher describes how a phenomenon appears to the participants rather than how it appears to the researcher. The focus of phenomenographic research is the relation between the participants and the phenomenon. Bruce (1997, p.103) states that data analysis "continues the process of exploring the subject-object relations begun when data gathering".

Data analysis aims to uncover and identify the various perceptions or ways of experiencing a phenomenon. In the present study this involved identifying the different ways in which young people experienced the phenomenon of information.

By accepting as a basic tenet of phenomenography that the nature of reality is defined as non-dualistic the phenomenographic researcher acknowledges that:

There is only one world, a really existing world, which is experienced and understood in different ways by human beings.
(Marton 2000, p.105)

It was vital for the researcher to focus at all times on what had been said by the participants and record their experiences faithfully. In phenomenographic research the participants' accounts are treated as objective data. The separation between data collection and data analysis emphasises this. The technique of bracketing was applied throughout the research process. Bracketing is an essential part of this process. Ashworth and Lucas (2000, p.297) discuss in detail the need to bracket; they state that "steps must be taken – at the beginning and throughout the research – to bracket anything that would lead us from the student experience".

Bracketing enables the researcher to view data from a second order perspective; it ensures that any preconceived ideas and assumptions of the researcher are set aside. The researcher is considered as an independent observer who is expected to:

...bracket preconceived ideas: instead of judging to what extent the responses reflect an understanding of the phenomenon in question which is similar to their own they are supposed to focus on similarities and differences between the ways in which the phenomenon appears to the participants. (Marton 1994)

It is understood that it is not possible for a researcher to disengage themselves from their own lifeworld as that is what makes it possible for them to interpret what is said by the participants; however they do need to bracket any preconceived ideas and assumptions and concentrate on the experiences of the participants.

There is a variation in approaches to phenomenographic data analysis regarding whether the focus should be on the whole transcript or on parts of the transcript. Åkerlind (2005, p. 327) discusses this matter in detail. Bowden (1994, pp.43-55) considers the use of whole transcripts to be necessary whereas Marton (1986, pp.42-43) in contrast extracts significant quotes from the transcripts and creates a pool of data. One criticism of a focus on quotes rather than whole scripts is made on the grounds that it is more difficult to consider quotes in context when they have been taken out of the transcript and a criticism of the whole transcript view is that there may be more than one way of experiencing a phenomenon described by a participant in an interview. Given that young people in the present study were being asked to describe their experience of information in a number of different environments, which made up their life experience, the assumption was that participants were likely to describe more than one way of experiencing information during an interview therefore it was decided that a focus on transcripts alone would not be the best approach. Instead a combination of both approaches was used. The transcripts were read as a whole first and then relevant quotes were extracted (Marton 1986, p.42). In addition it was deemed that with the use of Atlas.ti software the difficulty of considering quotes in context after they have been taken out of the transcript would be overcome.

Phenomenographic data analysis proceeds using an iterative process to look for meaning (how the phenomenon is experienced) and the structure (the relationship between different ways of experiencing) within the context of each transcript and between the transcripts. The transcripts were read many times searching for similarities and differences in ways of experiencing the phenomenon. When the researcher looks for similarities she may look for two expressions, which though they might use different words reflect the same

meaning. Differences are identified when two expressions reflect two different meanings. It is important that the data are analysed in reference to their context (Marton 1986, p.42).

3.12.1. Analysis of data

A total of forty one interviews were conducted. Eighteen interviews were long interviews, lasting between fifty minutes and one hour and ten minutes and twenty three were short interviews lasting in the region of fifteen minutes. All interviews were recorded and transcribed verbatim by the researcher. The transcripts were subjected to an iterative process to identify fundamental categories of description in the data. The analysis aimed to group the participants' different experiences of information into categories of description according to the dimensions of variation. The forty drawings (one participant failed to complete a drawing; see section 3.11.2.) were analysed in conjunction with the parts of the transcripts referring to them and formed part of the data pool from which the categories of description were constructed.

There is no single prescribed procedure for analysing phenomenographic data but as described by Bruce (1997, p.104) various ways have been suggested together with indications of what a researcher should be seeking during the process, which are:

...fundamentally related to directing the reader towards the structural and referential components of the subject-object relation which lie at the heart of the conception.

The data analysis procedure used in this study follows closely that of Bruce (1999). Bruce (1999, p.43) summarised phenomenographic analysis as:

- Becoming familiar with the data;
- Identifying relevant parts of the data;
- Comparing extracts to find sources of variation or agreement;
- Grouping similar segments of data;
- Articulating preliminary categories;

- Constructing labels for the categories;
- Determining the logical relationships between the categories.

It is important to note as Bruce (1997, p.104) states:

Although it is portrayed in a linear fashion, the actual implementation was recursive, and often drew simultaneously on more than one phase of the analysis.

This procedure was carried out repeatedly, as categories of description were identified and refined. The categories of description emerged from this iterative process and were not formulated prior to data collection and analysis. There was no attempt to fit the data into pre determined categories.

Each step of the analytical procedure was completed with the assistance of a qualitative software package Atlas.ti (Lewins & Silver 2007, pp.24-25). When all the data had been transcribed a project known as a Hermeneutic Unit (HU) was created. Each interview transcript was imported and became known as a Primary Document. Each of the Primary Documents was given a title bearing the code name assigned to each interview e.g. AFCS12 (see Appendix 5). The Atlas.ti software was a useful tool in facilitating the organisation of data i.e. for selecting, sorting, comparing, and grouping data. The use of the software made it easier to deal with the large volume of data in a systematic and controlled manner adding to the rigour of the research.

Becoming familiar with the data

In order to become familiar with the data all of the transcripts were read at least four times and each recording was listened to in its entirety at least twice. Re-reading the transcripts and listening repeatedly to the recordings of the interviews permitted the researcher to become intensely engaged with the data and in doing so become closer to the participants. This undoubtedly helped in the data analysis process.

Identifying relevant parts of the data

In his discussion of data analysis Marton (1986, p.42) stated:

The first phase of the analysis is a kind of selection procedure based on criteria of relevance. Utterances found to be of interest for the questions being investigated are selected and marked.

Within the individual transcripts relevant parts of the data were identified with reference to the questions posed in the interviews, which were themselves derived from the research questions. The core question being asked at this stage was: *what do the transcripts reveal about the ways young people experience information?* Through the use of the Atlas.ti software the relevant segments of the data within the Primary Documents in the HU were selected and coded accordingly.

It was important at all times during the analysis process for the researcher to maintain an open-mind, avoiding any preconceived ideas of their own about the phenomenon in question. Åkerlind (2005, p.323) states that the researcher as far as possible should avoid:

...any predetermined views or too rapid foreclosure in views about the nature of the categories of description. The researcher needs to be willing to constantly adjust her/his thinking in the light of reflection, discussion and new perspectives.

The selected parts of the data were then examined to identify themes and significant words, sentences and extracts were underlined and labelled with one or more key words reflecting the different ways participants experienced information. By the beginning of April 2008 in the region of fifty different initial themes had been identified to reflect the participants' perceptions or ways of experiencing information. Three examples of the themes which were identified are given below along with illustrative quotes:

Information tells you something:

Well the information I was given in ICT it sort of told me what to do. (JMIS12)

Information is remembered:

Yeah some information sticks because I remember I went to a Cantonese restaurant for someone's birthday recently and I can remember exactly what happened and everything. (AFCS12)

Information is told:

Sometimes I don't know what time I am going to go home, and because I share a journey to school with another person if it is their mum's week and I have got a hockey match I ring my mum and tell her and she will come to pick me up and she rings my friend's mum to let her know. (HFCS7)

Comparing extracts to find sources of variation or agreement and group similar segments of data

After the initial themes had been identified the selected parts of the data were taken from individual transcripts and pooled, shifting attention from the individual to the meanings expressed by the group as a whole:

Thus each quote has two contexts in relation to which it has been interpreted; first the interview from which it was taken and second the "pool of meanings" to which it belongs. (Marton 1986, p.43).

It is important to emphasize that in phenomenographic research the focus is on the collective rather than the individual experience. In a phenomenographic study the individual is not the unit of analysis, for an individual may articulate more than one way of experiencing a phenomenon. All of the transcripts from

the individual interviews combine to make up the data to be analysed (Marton 1994).

Within Atlas.ti reports were created where all the data assigned a particular code were grouped together. The use of Atlas.ti software meant that whilst reading an extract within the pool of data it was always possible to refer to the data in its original position within the Primary Document i.e. the context within which the participant had made their statement.

Once the data had been pooled the analysis continued with the identification of distinct ways of experiencing information by comparing extracts and searching for similarities and differences. The aim was to identify the referential and structural dimensions of the ways in which young people experienced information. The referential dimension referred to the overall meaning; the various ways young people experienced information. The structural dimension referred to what young people focused on when experiencing information; experiencing information was now considered in terms of awareness.

Although identifying the referential and structural dimensions are two distinct stages in the process of analysis they often take place in parallel with each other. Marton and Booth (1997, p.87) assert that the two dimensions occur at the same time when an individual experiences a phenomenon:

Structure presupposes meaning, and at the same time meaning presupposes structure. The two aspects, meaning and structure, are dialectically intertwined and occur simultaneously when we experience something.

Identifying the referential dimensions of each way of experiencing information had as its aim the establishment of the essential meanings underlying the categories of description. It involved an iterative process of comparing extracts and seeking variations in the data. As the iterative process continued the dimensions of variation became apparent. These dimensions of

variation were aspects of the phenomenon of information that made a distinction between the emerging categories of description. At this stage of the analysis the question being asked was: what is the most appropriate way, on the basis of the data to complete the statement 'information is experienced as...' (Bruce 1997, p.105).

As the distinct ways of experiencing information were identified they were grouped on the basis of their similarities and differentiated from one another in terms of their differences (Marton 1986, p43). In order to do this it was necessary to have as complete an understanding as possible of what had been said and meant. This was achieved by iterating between two contexts the interview from which the extract came and the pool of meanings to which it belonged. Åkerlind (2005, p.324) describes the phenomenographic process of analysis thus:

The whole process is strongly iterative and comparative one, involving the continual sorting and resorting of data, plus ongoing comparisons between the data and the developing categories of description, as well as between the categories themselves.

At all times the researcher was interpreting the participants' responses in relation to the phenomenon.

Identifying the structural dimensions of each way of experiencing information involved exploring the participants' layers of awareness as they experienced information; what they focused on, what remained in the background and what rested on the periphery. The main question being asked at this stage of the analysis was: 'What does the participant focus on, in order to experience information in this particular way?' (Bruce 1997, p.105). As the structural dimensions of the ways of experiencing information were identified they were entered into structure of awareness charts (see Figures 5; 8; 12; 16; 18; 21).

Articulating preliminary categories

During this process the referential and structural dimensions of young people's experiences of information were brought together and a set of emergent categories of description was constructed (see Table 4). The variations between each of the categories were articulated and each set of categories was furnished with illustrative quotes. Subsequent to this many reviews and reiterations of the transcripts were made before a final set of categories of description was arrived at. Bruce (1997, p.106) describes this analytical stage of her research study:

Due to the recursive nature of the analysis, draft categories of description were actually constructed early in the process; these were progressively revised as the noetic and noematic elements of each conception were clarified through regular consultation with the transcripts.

It is difficult to convey the intense nature of the process of revising the emerging categories of description, as the data were scrutinised closely to refine the essential features of each category. In this section it is only possible to give a brief outline of the evolution of the categories but nevertheless the evolution outlined gives an impression of the process undertaken. For the purposes of description the categories listed in Tables 4 to 8 were assigned a letter. It should be noted that the numbering of the categories was not finalised until the outcome space was constituted. Table 9 lists the final set of categories of description with the numbers and labels assigned to them. It is important to stress that all changes outlined here were made as a result of repeatedly revising and closely analysing the data. Table 4 shows the preliminary set of categories of description.

Category	Category label
Category A	Information is sensual
Category B	Information is external to the self
Category C	Information is held internally
Category D	Information is used/passed on

Table 4: Emerging set of categories of description number 1

Continuing analysis made it apparent that some changes were necessary. Categories A and B from Table 4 were untangled and reformatted into three new categories of description (see Table 5). In Table 4 all references to sources of information were subsumed into Categories A and B but the intense analytic process suggested that ‘Knowledge of sources of information’ was an emerging category. Table 5 shows that Category A: Information is sensual (from Table 4) was subsumed into the new Category A: Information is external to the self. It can be noted that in Table 5 the label given to Category C implies some form of process as the terms received, encountered and found are used. Notably Categories D and E remained stable for the time being.

Category	Category label
Category A	Information is external to the self
Category B	Knowledge of sources of information
Category C	Information is engaged with <ul style="list-style-type: none"> • Information is received • Information is encountered • Information is found
Category D	Information is held internally
Category E	Information is used/passed on

Table 5: Emerging set of categories of description number 2

Table 6 reveals that Category A: Information is external to the self was no longer listed in the new set of categories of description; it had been subsumed into Category A: Knowledge of sources of information and Category B: Information is engaged with and its attendant subcategories. Once again the

two categories ‘Information is held internally’ and ‘Information is used/passed on’ remained stable.

Category	Category label
Category A	Knowledge of sources of information
Category B	Information is engaged with <ul style="list-style-type: none"> • Information is received • Information is encountered • Information is found
Category C	Information is held internally
Category D	Information is used/passed on

Table 6: Emerging set of categories of description number 3

The set of categories listed in Table 6 shows a difficult period encountered in the process of stabilising the categories of description and goes some way towards illustrating the complexity of a process which requires the researcher to surrender them self entirely to the data and consider it from every angle. It cannot be over emphasised that each twist and turn in the analytical process has to be made in direct relation to the data as the researcher interprets the participants’ responses in relation to the phenomenon. The process can be both demanding and exhausting with the utterances of participants continually clamouring to be heard and the researcher must listen to each utterance until she is satisfied that what it says it is completely understood.

Re-reading the data the researcher experienced doubts about ‘Information is external to the self’ losing the status of a category of description. Consequently having been subsumed by Categories A and B in Table 6 ‘Information is external to the self’ re-emerged as Category A in Table 7. Category B in Table 7 was labelled ‘Information is received’ into which the subcategory ‘Information is encountered’ was subsumed.

‘Information is found’ combined with ‘Knowledge of sources of information’ to form Category C with the new label ‘Information is found in sources.’

When this set of categories was arrived at it was apparent to the researcher that Category C was particularly unstable and the data had to be scrutinised more closely. Questions needed to be addressed. The more immediate questions were:

- Were participants experiencing information as something that was found?
- Were participants experiencing information as a source of information?
- Were participants experiencing information as a process of finding information?

In addition to the instability and changes occurring in the first three categories of description, the category ‘Information is held internally’ which had remained stable in the first three lists of sets of categories of description now ruptured to form three new categories:

- Information is remembered (Category D);
- Information is processed (Category E);
- Making connections/new information (Category F).

This occurred as a result of an increasing feeling of unease on the part of the researcher that more analysis of the data assigned to this category was necessary. A substantial period of time was spent reviewing the data and as a result the three new categories emerged. Once again the final category in the set, Category G: Information is used/passed on, remained stable.

Category	Category label
Category A	Information is external to the self
Category B	Information is received
Category C	Information is found in sources
Category D	Information is remembered
Category E	Information is processed
Category F	Making connections/new information
Category G	Information is used/passed on

Table 7: Emerging set of categories of description number 4

Table 8 shows how the set of categories listed in Table 7 continued to evolve. Category A: Information is external to the self, having re-emerged in Table 7, remained stable in Table 8 as did the last category in the set ‘Information is used/passed on.’ Categories B, C, D, E and F (from Table 7), as a result of deeper analysis, reformed into two new categories each with a set of subcategories. ‘Knowledge of sources of information’ (Category B) re-emerged but this time with subcategories referring to the process of finding and receiving information. ‘Knowledge of sources of information’ now appeared to be a stable category. Categories D, E and F (from Table 7) combined to form a new category, Category C: Knowledge Base with three subcategories. As analysis continued the term knowledge base was established as a better representation of what the participants were describing as their experience with information.

It must be stated that when this set of categories of description was completed there was some concern on the part of the researcher about the weightiness of Categories B and C and it was decided that the data needed to be re-visited to see if the categories really were stable.

Category	Category label
Category A	Information is external to the self
Category B	Knowledge of sources of information <ul style="list-style-type: none"> • Information is received from • Information is found
Category C	Knowledge base <ul style="list-style-type: none"> • Information store • Processing information • Creating new information
Category D	Information is used/passed on

Table 8: Emerging set of categories of description number 5

The final period of analysis before the categories were stabilised was the longest and perhaps most challenging. As noted the major concern was about

Categories B and C. Each of the four categories was carefully examined and through an iterative process of scrutinising the data, moving back and forth between the context of the whole transcript and the context of the pool of data, the categories of description were reconsidered and refined until a final set of stable categories of description was arrived at (see Table 9). The categories of description in Table 9 are shown with the numbers and labels assigned to them.

Category	Category label
Category 1	Knowledge of sources of information
Category 2	Receiving information <ul style="list-style-type: none"> • Knowingly • Encounter
Category 3	Process of finding information
Category 4	Store of unprocessed information
Category 5	Processing information
Category 6	Use of information

Table 9: Final set of categories of description

It should be reiterated that this section of the Methodology Chapter only gives a brief, but nevertheless important, outline of the categories and how they were arrived at. The full content and richness of the categories of description is described in Chapter Four.

Constructing labels for the categories

An individual category of description represents one way of experiencing the phenomenon. Constructing labels for the categories of descriptions was a crucial stage in the process of analysis as the label had to capture the essence of the ways in which the participants experienced information. Labels describe young people's experience of information based on their linguistic expression and the researcher's interpretation of their descriptions of the phenomenon. Labels were only attached to categories of description when the researcher was content that the data had been condensed to its core meaning.

Determining the logical relationships between the categories

When the categories of description had been labelled attention moved to the outcome space. Marton (1986, p. 34) describes an outcome space as a structural framework housing the categories of description. Francis (1996, p.45) describes the ultimate aim of phenomenography as the exploration of the relationships between the obtained categories of description and the subsequent derivation of a structural model of the perceptions exhibited by the participants in the study. She states:

This search for meaningful structure demands identification of the distinguishing features of categories and the determination of logical or other relations between them.

The logical relationships between the categories of description based on the referential and structural aspects of the phenomenon are described in the outcome space. These logical relationships were determined as the result of scrutinising the meaning structure and awareness structure for each category.

A principle underlying the phenomenographic research approach is that the different categories of description are logically related to one another, frequently in a hierarchical fashion. Marton and Booth (1997, p.125) assert that “categories have to stand in a logical relationship with one another, a relationship that is frequently hierarchical”. Barnard, McCosker and Gerber (1999, p.220), however, assert that “the logical relationship between conceptions is portrayed in the outcome space in numerous ways depending on understanding. Morris (2006, p.3), in her discussion of hierarchical relationships, notes that opinions on this point are varied and open to interpretation. She cites published studies using a phenomenographic approach which present a variety of outcome spaces ranging from those that assume a hierarchical relationship is necessary and establish them without question for example McLean (2001) to those that have noted this as a feature of phenomenography but have not presented findings with such relationships for example Brew (2001). At the outset of this present research study it was not known how the categories of description would be related. As data

analysis proceeded the logical relationship between the different categories of description in the outcome space was found to be hierarchically inclusive.

At the end of the process of analysis an outcome space was constituted that illustrated the structure of the qualitative variation in the way young people who participated in the study experienced information. The outcome space is presented in Chapter Four (Figures 3 and 4).

3.13. Rigour of the research

Kvale (1989, pp.73-91) highlights that the criteria of reliability and validity, in their quantitative sense, are inappropriate for qualitative research because they are based on a positivist epistemology and not an interpretativist one. Sandberg (1997, pp.207-208) argues that reliability and validity are concerned with ‘external’ processes whereas phenomenographic research is concerned with an ‘internal’ process. Therefore it is inappropriate to justify research primarily against positivist criteria. Nevertheless Åkerlind (2005 p.330) states that qualitative researchers are still expected to address issues of the validity and reliability of their research and asserts they should be addressed in relation to the assumptions guiding the research. The validity and reliability of the present study were both addressed in accordance with the assumptions guiding phenomenographic research.

Sandberg (2000, p.14) states there are three criteria to justify researchers’ interpretations in phenomenographic studies. They are:

- Communicative validity;
- Pragmatic validity;
- Reliability.

Cope (2002) asserts that the identification of the structure of awareness will strengthen phenomenographic data analysis and hence the validity of the results. The justification of the researcher’s interpretations in the present study is discussed in terms of these criteria.

3.13.1. Communicative validity

Communicative validity was addressed by testing knowledge produced by means of communication throughout the research process. Sandberg (2000, p.14) proposes three stages in the phenomenographic process where communicative validity is relevant:

- Within the interviews communicating with the subjects;
- In the analysis process communicating with the text;
- In communicating the results to other researchers and professionals.

Communicative validity within the interviews communicating with the subjects

Communicative validity was established through ongoing dialogue between the researcher and the participants (Sandberg 2000, p.14). Prior to the interviews and again at the start of the interviews participants were informed that the researcher was interested in how they experienced information and assured that there were no right or wrong answers. This was important in terms of developing a common understanding between the participants and the researcher about what was discussed in the interview. During the interviews communicative validity was established by generating data through dialogue (Sandberg 2000, p.14). This allowed the researcher to check that participants were being correctly interpreted. Data were collected via interviews which employed a small set of open ended questions to stimulate discussion. The use of open ended questions encouraged young people to identify and describe the ways they experienced information and limited the possibility of the interviews being biased according to the researcher's experiences of the phenomenon. To increase the validity of the data the researcher repeated statements made by the participants to give them the opportunity to express their reflected thoughts and to ensure that the researcher had understood their answers. Probing questions were also used as a means to stimulate participants to elaborate and clarify their descriptions of the ways they experienced information.

Communicative validity in the analysis process communicating with the text

Quality of the research depends on how the researcher interacts with the data (Sandberg 2000, p.14). The second stage in the phenomenographic process where communicative validity is relevant is during the analysis process. In data analysis the main control of researcher's interpretations was a strict adherence to the data. To ensure that the descriptions were faithful to the text meant retaining the context of all the sections of the data that were selected for consideration and constantly going back to the data as whole and reading the participant's statements in context. This was facilitated by the use of Atlas.ti software which afforded easy access to the whole transcripts.

It should be noted that in contrast to some qualitative research paradigms phenomenographic researchers do not seek communicative validity from participants. This has received criticism from some (Francis 1996, p.41), however in phenomenographic research interpretations are made on a collective basis and are based on the interviews as a holistic group and not as individual interviews. In addition, in accordance with ontological assumptions guiding phenomenographic research, an individual's experience of a phenomenon is context specific and therefore if consulted at another point in time participants may not necessarily experience the same understanding of the phenomenon as they did when interviewed (Åkerlind 2005, p.330-331).

Communicative validity in communicating the results to other researchers and professionals

Marton (1997, p.100) stipulates that "...once the outcome space of a phenomenon has been revealed it should be communicated in such a way that other researchers could recognise instances of the different ways of experiencing the phenomenon in question". According to Sandberg (2005, p.55) this involves discussing findings with other researchers. The third stage in the phenomenographic process where communicative validity is relevant involved communicating the findings to other researchers and professionals. Throughout the research process checks were made with the researcher's academic supervisor regarding research methods and interpretations. The evolving findings were presented and discussed with researchers, LIS

practitioners and educators at the Librarians' Information Literacy Annual Conference (LILAC) 2008 (Smith & Hepworth 2008). The final set of findings were presented to and discussed with the research community at a Department of Information Science research seminar at Loughborough University¹. These measures were taken to ensure that the research methods and final interpretation were regarded as appropriate by the research community (Åkerlind 2005, p.330). Feedback from researchers, LIS practitioners and educators was assumed to have strengthened the communicative validity of the research.

3.13.2. Pragmatic validity

Pragmatic validity refers to the extent to which the outcomes of the research are seen as useful. The findings from the present study provide an insight into the ways in which young people experience information and provide a framework to guide developments in pedagogic practices in relation to young people and their relationship with information. This is discussed in section 6.4.

3.13.3. Reliability

Reliability refers to replicability of results. In terms of phenomenographic research this would envisage that an identical outcome space would be replicated by another researcher handling the same data. According to the assumptions guiding phenomenographic research individuals experience the world in different ways so the assumption is that researchers would experience the variation in participants' experiences of the phenomenon in different ways; replicability is neither consistent with the relational nature of the constitution of categories nor the dynamic nature of awareness (Sandberg 1997, p.207-208). According to Marton (1986, p.35), however, there are two issues relating to the demand for replicability of results. The issues are:

¹ A presentation entitled *A phenomenographic study of young people's perceptions of information* was given by Marian Smith at a Department of Information Science research seminar at Loughborough University on 25th February 2009.

- Would other researchers establish the same categories of description if the study was repeated in different contexts?
- Would other researchers identify the same conceptions as categorised by the original researcher?

Marton acknowledges the need for replicability in relation to the second issue but not the first.

Interjudge reliability, where reliability is determined by the extent to which other researchers are able to recognise the conceptions and categories determined by the first researcher, is used by some researchers to establish reliability however it has been criticised (Sandberg 1997, p.205). Sandberg argues that interjudge reliability is inconsistent with the relational nature of phenomenographic research and advocates the use of a procedure called interpretive awareness. Marton (1996, p.169) acknowledged that Sandberg's argument was "...fairly convincing". Interpretive awareness means "...to acknowledge and explicitly deal with our subjectivity throughout the research process instead of overlooking it" (Sandberg 1997, p.209). In the present study interpretive awareness was used to check and control the quality and consistency of the researcher's interpretation process. Sandberg (1997, p.209) argues that the interpretive awareness is consistent with the epistemology of intentionality that underpins the research approach. Sandberg (1996, p.137) stipulates that in order to establish the reliability of their interpretations researchers must show how they have dealt with their intentional relations to the individual's conceptions being studied; they must demonstrate how they have controlled and checked their interpretations throughout the research process. The use of phenomenological epoché as a strategy for achieving interpretive awareness is suggested by Sandberg (2005, p.59) with the aim of ensuring that researchers withhold all their presuppositions. It is acknowledged, however, that a researcher cannot bracket all previous experience. To maintain interpretive awareness Sandberg (1997, p.209-210) suggests the following criteria are met:

- Suspension of researcher's theories and biases;
- Accurate description of the individual's conception rather than providing explanation;
- Equal importance paid to all aspects of an individual's experience;
- Search for structure of meaning by focusing on the relationship between the 'what' and 'how' aspects of the experience.

Throughout this research all of the aforementioned criteria were met ensuring that interpretive awareness was achieved.

Suspension of researcher's theories and biases

Reliability as interpretive awareness means acknowledging researcher bias and explaining how it is dealt with in the study. This was implemented throughout the data collection and analysis through a process of bracketing prior knowledge and experiences of information. Bracketing is discussed in section 3.12 of this chapter.

Accurate description of the individual's conception rather than providing explanation

The researcher described what constituted the phenomenon of information rather than explaining why it appears as it does. Interview questions directed the participants to focus on what the phenomenon meant for them. The use of quotes to provide evidence in support of the descriptions was another strategy used to ensure that analysis was faithful to the text.

Equal importance paid to all aspects of individuals' experience

The researcher aimed to treat all aspects of the participant's experience equally in both the data collection and analysis stages of the phenomenographic research process. During the interviews each statement made by a participant was considered worthy of following up. In the data analysis stage of the research process no statement was dismissed all were considered equally.

Search for the basic meaning structure of the experience under investigation

The search for the basic structure of meaning was achieved by focusing on the relationship between the ‘what’ and ‘how’ aspects of the experience and repeatedly checking the variety of interpretations as the data were read until the meaning structure of the experience was stabilised (Sandberg 2005, p.61).

3.13.4. Validity and reliability: Structure of awareness

According to Cope (2002) identification of the structure of awareness will strengthen phenomenographic data analysis and hence the validity of the results. For instance Cope (2002) suggests that interview questions and analysis of data during the interview can be based on the analytical framework of a structure of awareness. As such the researcher is more likely to focus on aspects of a structure of awareness and less likely to focus on their own prior knowledge of the phenomenon being investigated. Thus the structure of the interviewing “can be justified as minimizing the influence of the interviewer’s prior knowledge of the phenomenon” (Cope 2002).

3.14. Summary

This chapter has presented a comprehensive discussion of the research methodology selected for the research study described here. A detailed description of the phenomenographic research approach employed in this study is provided. This may be more detailed than may otherwise be the case with other studies using different methodologies however, due to the nature of phenomenographic research and the possible critique based on a lack of rigour it was felt necessary to do so. The chapter concludes by addressing the issues of validity and reliability of the research. Chapter Four will outline the findings of the research study presented here.

Chapter Four: Findings

4.1. Introduction

This chapter describes how information is experienced by the young people who took part in this research study. The outcome of phenomenographic analysis is an outcome space consisting of a finite set of categories of description which, with their relationships, explain the different ways individuals experience phenomena in the world. Collectively the descriptions outlined in the categories here represent the phenomenon of information revealed in this research study. They are the outcomes of the data collection and analysis reported in Chapter Three. In a phenomenographic study the categories of description relate not to the phenomenon itself but to the different ways in which a group of individuals can be aware of the phenomenon (Marton 1994). In the case of this study the categories of description relate to the different ways the group of young people participating in this research study are aware of the phenomenon of information. The Findings Chapter begins with an overview of how the findings are presented.

4.2. Presentation of the findings

The Findings Chapter consists of two parts:

- Outcome space;
- Categories of description.

The first part of the chapter looks at the outcome space. The outcome space contains the categories of description for each of the recognised ways in which young people experience information and outlines the structural relationships between those categories. In this study the outcome space is presented in the form of two diagrams which map the different ways information is experienced by young people based on meaning structures and structures of awareness (See Figures 3 and 4). Taken together these two maps reveal the structural relationships between all the categories.

The second part of the chapter is a detailed account of the six categories of description. To ensure that the main character of each way of experiencing the phenomenon is made explicit each category must be described sufficiently. Entwistle (1997) argues that the categories of description should give a fair reflection of the participants' responses and suggests that this can be achieved by providing sufficient numbers of interview extracts which represent each category comprehensively and fairly. He states:

The meaning resides in the essence of the comments from which the category has been constituted. (Entwistle 1997, p.132)

In order to ensure that each category is represented comprehensively and fairly the following are included throughout the chapter:

- Participants' drawings;
- Quotations from the participants;
- Extracts of interviews;
- Words of the participants are woven into text.

The description of each category is presented in the following way:

- Category label;
- The diagrammatic representation of the subject-object relationship at the beginning of each category description (Bruce 2003, pp.5-6);
- Description and focal point of each way of experiencing;
- The structure of awareness;
- The meaning structure which establishes "the essential parts of the meaning" being attributed to information in each category "...and also specify how these parts are combined to form a whole" (Bruce 1997, p. 112). In each description the *essential parts* of the meaning are given at the beginning and then each is looked at in turn.

The internal relationship i.e. the subject-object relation (in this study the relation between young people and information), which makes up the way of experiencing described in each of the six categories is made known through a referential component and a structural component. The referential and

structural components are intertwined parts of the whole (Marton & Booth 1997, p.87). The referential component (*what* is being experienced?) of each phenomenon is conveyed in the category label and in the diagrammatic representation of the subject-object relationship at the beginning of each category description. The meaning structure describes the *essential parts* of the subject-object relation which makes up the way of experiencing described in the category. The structural component (*how* is information experienced?) of each phenomenon is conveyed in the structure of awareness. The structure of awareness describes the arrangement of young people's awareness. Three levels of awareness are described:

- Focal point (what an individual focuses on);
- Second level of awareness (the level of awareness is receding);
- Peripheral awareness (the least intense level of awareness).

It should be noted that the categories of description do not represent an individual's experience of information but exemplify characteristics of the whole phenomenon of information as reported by all of the participants in the research study. Since the interest in a phenomenographic study lies not in the individual's experience but in the experience of the collective some phenomenographic studies use no codes or names of participants however as this study intends to discuss the findings in Chapter Five it has been decided that this will be facilitated if the quotes are labelled therefore each quote is followed by a code name (as described in Appendix 5).

4.3. The outcome space

The outcome of phenomenographic analysis is an outcome space consisting of a finite set of categories of description which, with their relationships, explain the different ways individuals experience phenomena in the world. The outcome space presented here describes the phenomenon of information as it is experienced by the young people who participated in this research study (see Figures 3 and 4 and Table 10). Following analysis of the data a total of six different ways of experiencing information were identified. They are reported here as categories of description:

- **Category One:** Knowledge of sources of information – information is experienced as residing in information sources;
- **Category Two:** Receiving information - information is experienced as something that is received;
- **Category Three:** Process of finding information – information is experienced as something that is found;
- **Category Four:** Store of unprocessed information. Information is experienced as something that is internalised and unprocessed which is stored;
- **Category Five:** Processing information – information is experienced as something that is internalised and processed;
- **Category Six:** Use of information – information is experienced as something that is “put into action”; it is used.

The outcome space is described by Marton (1986, p.34) as a structural framework housing the categories of description and by Bruce (1997, p. 87) as a diagrammatic representation of the logical relationships between the different conceptions of a phenomenon. In order to reveal the structural relationships between all of the categories the outcome space in this study is presented as three diagrammatical representations. Table 10 illustrates the dimensions of variation in how information is experienced in relation to the individual and how information is operated on. Figure 3 demonstrates the dimensions of variation and relationships between the meaning structures of the different categories. Figure 4 demonstrates the dimensions of variation and relationships between the structures of awareness for each category. Taken together the three diagrams map the structural relationships between all the different ways information is experienced by young people who participated in the study.

The structural relationships between the ways in which information is experienced portrayed in the categories of description can be viewed in different ways. Laurillard (1993, p.36) argues that there are three types of outcome spaces:

- An inclusive, hierarchical, outcome space in which a more sophisticated perception will logically include previous, or lower, ones;
- An outcome space in which the different perceptions are not related to each other but to the history of participants' experience of the phenomenon;
- An outcome space which defines a developmental progression, where each successive perception, in a manner similar to the progression defined for scientific theories, has more explanatory powers than others, and thus may be seen as 'better'.

The outcome space in this research study is an inclusive hierarchical structure. The categories have been arranged on four levels (see Figures 3 and 4). In ascending order they are:

- Information landscape (Category One: Knowledge of sources of information);
- Acquisition of information (Category Two: Receiving information, Category Three: Process of finding information);
- Knowledge base of internalised information (Category Four: Store of unprocessed information, Category Five: Processing information);
- Application of information (Category Six: Use of information).

The outcome space is hierarchical in the sense that the ways of experiencing information identified range from simple to more sophisticated. Categories are placed on levels and the levels are hierarchical. Levels placed higher up the hierarchy embrace levels lower down the hierarchy. There follows a description of levels within the outcome space.

Level one: Information landscape

Category One (Knowledge of sources of information) has been placed on Level One because it is the least complex way of experiencing information. In this category information is seen as an external entity. There is no focus on interacting with information. Information exists within the source but knowing the information landscape i.e. knowledge of the source of information and its characteristics is paramount.

Level two: Acquisition of information

Category Two (Receiving information) and Category Three (Process of finding information) have been placed on Level Two because although information is still understood as something external the experience of information is more complex than in the case of Category One because in these two categories there is interaction with information. In Category Two information is received either knowingly or encountered. In Category Three a process is undertaken to find information. In both categories information is acquired.

Level three: Knowledge base of internalised information

Category Four (Store of unprocessed information) and Category Five (Processing information) have been placed on Level Three because in both categories the experience of information is more complex than in the previous three categories. Information is internalised and forms a knowledge base. There is a hierarchy within this level. The experience of information in Category Five is more complex than in Category Four and therefore Category Five is placed higher up the hierarchical structure.

Level four: Application of information

Category Six (Use of information) is at the top of the hierarchy on Level Four. In this category the experience of information is more complex than in Categories Four and Five. In Category Six information which has been internalised and forms a knowledge base is used. The diagrammatic representations of the outcome space are given in Figures 3 and 4. In both figures it can be seen that categories on levels further up the hierarchy include the previous or lower ones.

There follows an explanation of the structural relationships found in both the outcome space showing the relationships between the different categories derived from the meaning structures and the outcome space showing the relationships between the different categories derived from the structures of awareness.

Outcome space derived from meaning structures

The outcome space showing the relationships between the different categories derived from the meaning structures is shown in Figure 3. Consideration is given to how the *essential parts* of the meaning structures demonstrate the variations between each of the ways in which information is experienced. The *essential parts* are presented in emboldened text. It can be seen by looking at the *essential parts* of the meaning that there are inclusive hierarchical relationships between the categories where categories on levels further up the hierarchy include the previous or lower ones. Arrows indicate the inclusive hierarchical nature of the outcome space.

Category One ‘Knowledge of sources of information’ rests on Level One. Knowledge of sources of information is an essential part of both Category Two and Category Three on Level Two with one exception. As indicated by the arrow positioned between Categories One and Two the subcategory ‘Encountering information’ does not necessarily require knowledge of sources of information although once encountered knowledge of the source can be used to validate the information. The hierarchical relationship between the categories on Levels Two and Three are evident in that ‘Acquisition of information’ is an essential part of Categories Four and Five. Although placed on the same level as Category Four, Category Five is positioned higher up the hierarchical structure than Category Four as connecting with information already internalised is an essential part of Category Five and this includes ‘Stored unprocessed information.’ This is the only point in the outcome space where there is a relationship between categories resting on the same level. In a similar fashion the hierarchical relationship between the categories on Levels Three and Four are evident in that ‘Knowledge base of internalised information’ is an essential part of Category Six ‘Use of information’.

Outcome space derived from structures of awareness

The outcome space showing the relationships between the different categories derived from the structures of awareness is shown in Figure 4. Just as with the outcome space showing the relationships between the different categories derived from the meaning structures the outcome space derived from the

structures of awareness demonstrates the variations between each of the categories. Each awareness structure is made up of three components: the focal point, the second level of awareness and the peripheral level of awareness. Together these components constitute the way information is experienced in each category by individuals in the study.

Relationships between the categories based on their structures of awareness are complex but looked at in terms of the levels where they rest it can be argued that the outcome space derived from structures of awareness show a similar emphasis on inclusiveness that was found in the outcome space derived from the meaning structures (Figure 3). By following the arrows indicating levels of awareness in Figure 4 it is possible to discern that there is a flow of awareness running from the base to the top of the hierarchical structure. For example there is an awareness of 'Knowledge of sources of information' which is found on Level One in both Category Two ('Receiving information') and Category Three ('The process of finding information') placed on the second level but it must be stated that sometimes the degree of awareness varies, as in the case of the previously mentioned two categories with the degree of awareness in the 'Process of finding information' category at the second level of awareness and the degree of awareness in the 'Receiving information' category on the periphery of awareness. Similarly there is an awareness of 'Receiving information' and the 'Process of finding information' housed on the second level in Category Five housed on the third level and an awareness of the 'Store of unprocessed information' and 'Processing information', housed on the third level in Category Six on the fourth level. It should be noted that there is one instance, that of Category Four, where there is no awareness of any categories on a lower level in the hierarchy. When storing information awareness appears to focus on the future i.e. the possibility of connecting with new information ('Processing information') and the potential future 'Use of information'. The placement of this category at this point on the hierarchical structure can be explained in relation to its meaning structure (see Figure 3) where, as it has already been explained the 'Acquisition of information' is an essential part of Category Four. Category Five resting on the same level as Category Four does have an awareness of

some categories on a lower level of the hierarchy. There is an awareness of both ‘Receiving information’ and ‘Process of finding information’ housed on the second level. It should be noted that Category Five does not have an awareness of ‘Store of unprocessed information’, which although it is on the same level rests below Category Five in the hierarchy. Category Four does, however, have an awareness of ‘Processing information’. It can be seen that this is the only place within the outcome space derived from the structures of awareness where there is a degree of awareness between categories resting on the same level. The relationship between Categories Four and Five is hierarchical both in terms of the outcome space derived from the meaning structures and from the structures of awareness with Category Five placed above Category Four but nevertheless they both rest on the same level because in both categories information is experienced as being internalised and forming part of a knowledge base. The emphasis on inclusiveness continues with Category Six where there is an awareness of ‘Knowledge base of internalised information’ and a peripheral awareness of ‘Acquisition of information’.

Table 10 outlines the dimensions of variation in how information is experienced in relation to the individual and how information is operated on.

Category	How information is experienced in relation to the individual	How information is operated on
One	External	Observed
Two	External	Received
Three	External	Found
Four	Internal	Stored
Five	Internal	Processed
Six	Internal	Used

Table 10: The dimensions of variation in how information is experienced in relation to the individual and how information is operated on.

Two further diagrammatic representations representing the outcome space are given in Figures 3 and 4. It should be noted in Figure 3 the essential parts of the meaning structure of each of the categories of description are highlighted.

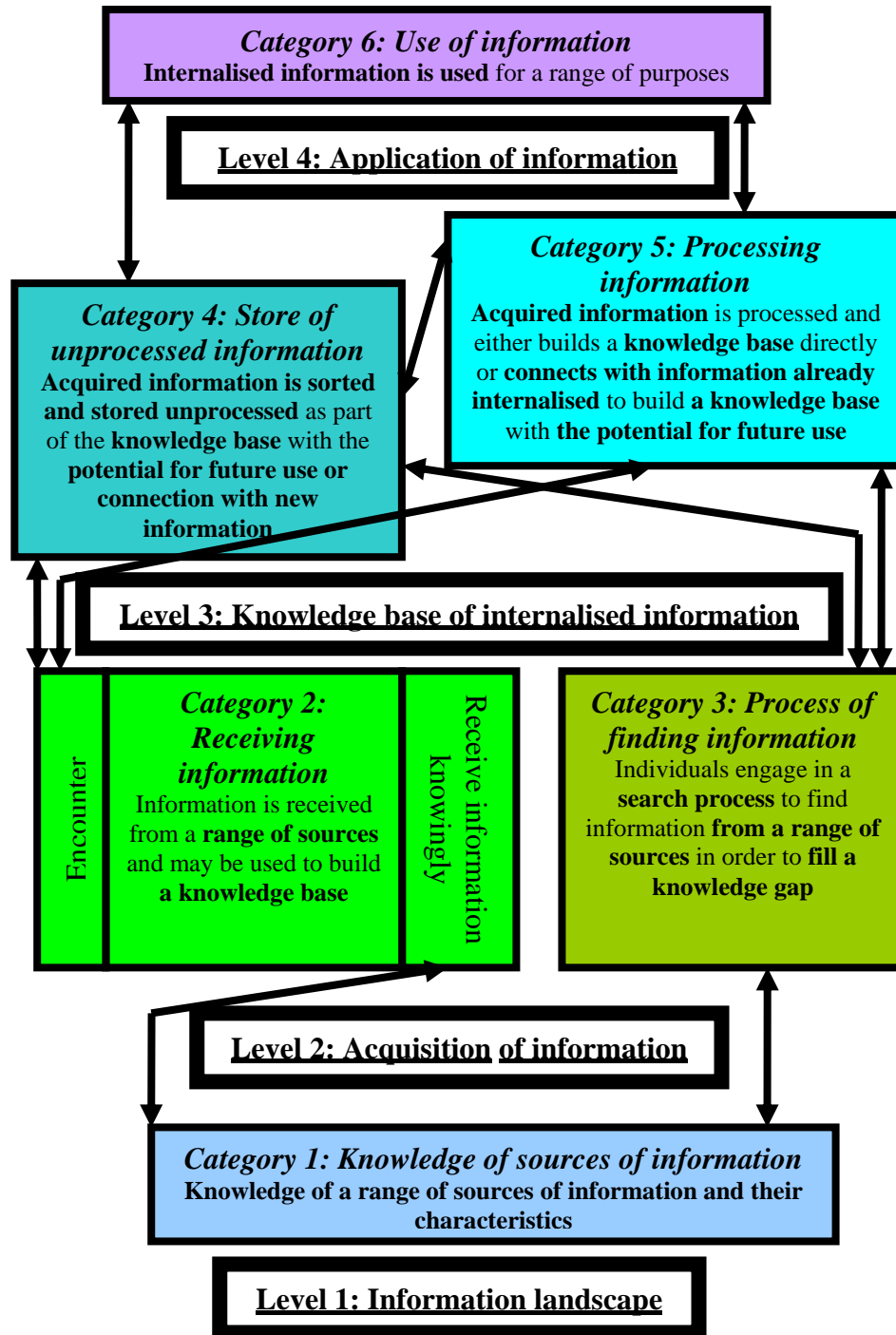


Figure 3: Outcome space showing the relationships between the categories derived from meaning structures

➔ Arrow indicates the inclusive hierarchical nature of the outcome space.

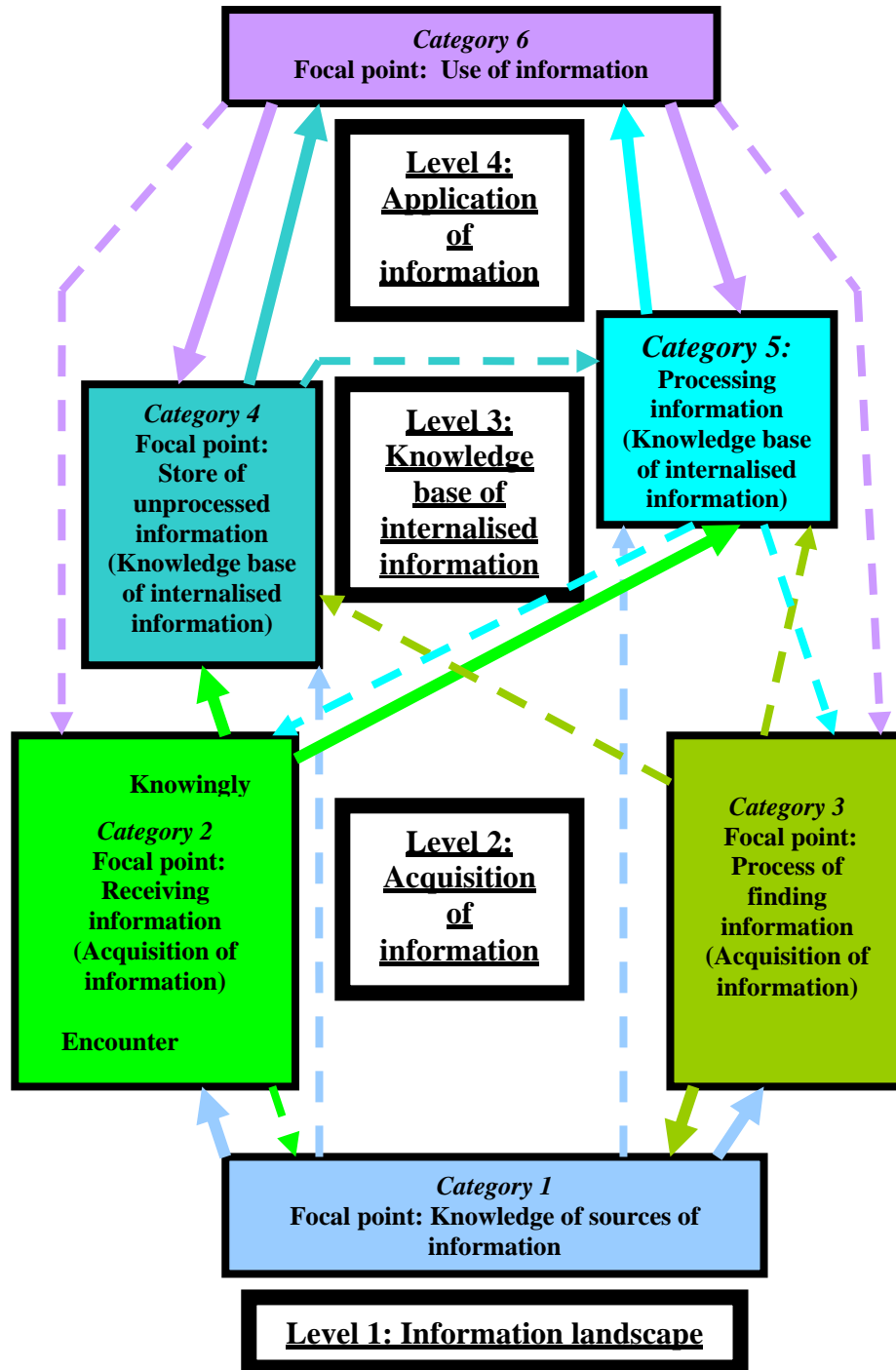


Figure 4: Outcome space showing the relationships between the categories derived from structures of awareness

Key



Second level of awareness



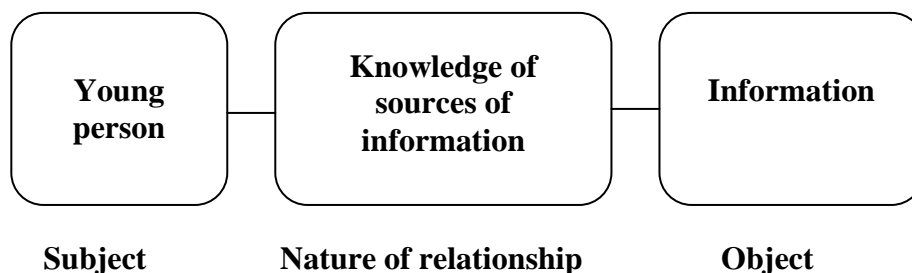
Periphery of awareness

4.4. Categories of description

Each category of description describes one way of experiencing information. The names given to the categories are important as they are named according to the key features the young people have discerned and keep in their focal awareness. The chapter continues with a consideration of each category of description. Note in the structure of awareness the term ‘acquisition of information’ is used where both receiving information and the process of finding information are the focus of attention and the term ‘knowledge base of internalised information’ is used where both store of unprocessed information and processing information are the focus of attention.

4.4.1. Category One: Knowledge of sources of information

In Category One the relationship between young people and information can be expressed in terms of knowledge of information sources.



Description and focal point of Category One

In this category of description information was seen as residing in sources of information. In both the meaning structure and the structure of awareness the focus of this category was on knowledge of sources of information and an understanding of their characteristics. Participants referred to knowledge of characteristics such as understanding how information was organised within the source, understanding how to use the source to access information and knowing the amount of time and effort required using them. Information was viewed objectively as something external to the individual. Information was observed. It was seen as residing in a range of sources:

Well thinking about information the Internet has a lot of good information but not everyone could have a computer so the library is another good place because you have got computers there and you can find information in books and on DVDs.
(HFCS7)

The structure of awareness

The focal point of this category was knowledge of sources of information. Knowledge of sources of information was of prime concern. Acquiring information, be that finding information or receiving information, was in the next level of awareness and a knowledge base of internalised information was on the periphery of the structure of awareness. The structure of awareness in **Category One** is shown in Figure 5:

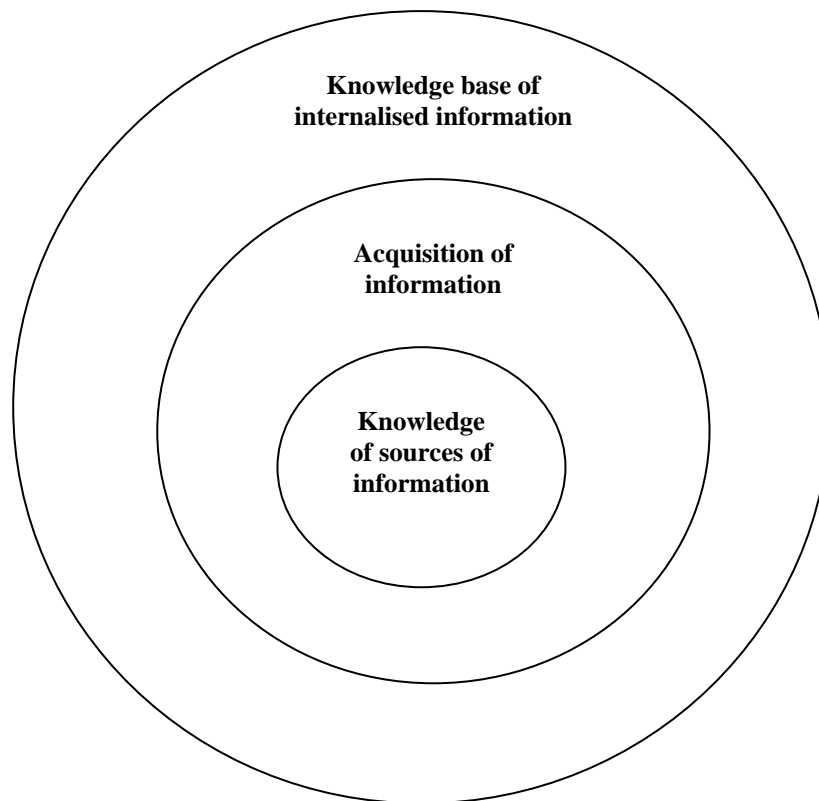


Figure 5: Category One: The structure of awareness

The meaning structure

The relation between people and information was described in terms of knowledge of a range of sources of information, which creates an information landscape and provides individuals with access to information either through receiving it or by finding it. The outcome of this experience of information was individuals have knowledge of a range of sources of information.

The meaning structure of this category (with the *essential parts* highlighted)

Information was seen as residing in sources. ***Knowledge of a range of sources of information and their characteristics*** created an information landscape which provided young people with the means to access information. There follows a detailed account of Category One. Each of the essential parts of the meaning structure is described making clear what is distinctive about the category. The description is furnished with illustrative quotes.

Knowledge of a range of sources of information and their characteristics

The sources of information described by participants, and outlined in this section, include electronic sources, print sources, human sources, and the natural environment. Knowledge of information sources and an understanding of their characteristics i.e. what they contain and how they are organised along with an ability to evaluate them in order to either choose the best source to find information in or to determine the relative value of information received from a source was the focus of this category. The next section will consider young people's knowledge of a range of sources of information.

Knowledge of a range of sources of information

Young people who experienced information as it is described in this category talked about information in terms of where it resided. Participants centred their awareness on the information landscape. They referred to the fact that information "*is in a lot of places*", it "*is found all around us*". Participants who experienced information as it is described in this category referred widely to the Internet as a source of information:

The Internet is probably the biggest source of information there is and basically you can change what you are looking for at the click of a button. (JMIS12)

All participants cited *Google* as a recognised source of information and it was frequently used by all. *Google* was “*simple to use*” and usually came up with “*loads of information*”. This knowledge meant that participants had the confidence to find “*almost any information you want to*”:

If I go into Google and just type something in the information will come up. (WMIS7)

At times it appeared that the term *Google* and information were almost synonymous:

On the Internet you have got Google and that is information. (RFIS7)

In this category of description participants also centred their focus of attention on print sources of information:

*I'll give you an example in Unit two of history at the moment we are doing Nazi Germany and there are two textbooks that we have got. They are good, all the information is there you just look at the contents page and it is easy to find but I also have Ian Kershaw's book on Hitler, which is quite good, called *The Hitler Myth* and then I have also started to read *Mein Kampf* as well to read around the subject a little bit but that book is the hardest book to read ever. (SMIS12)*

The first thought of this participant on hearing the word information was of a book as illustrated in his drawing (Figure 6). He states:

Often when you read you acquire more information than you would in any other way even searching online. (RMIS7)



Figure 6: RMIS7 drawing

Another source of information participants referred to was people. People were described as useful sources of information. Knowledge about the person was an important factor when it came to determine whether or not they were appropriate sources of information. This participant talks about her trust in her parents:

Yes well at home your parents are a good source of information, you can trust them like when I was little they told me how to cross the road safely. (CFCS7)

In the following quote a participant describes a friend she relied on to give her information:

I don't see a couple of my friends from my old school very often now but because someone else who goes to their school now lives just down the road from me I rely on her to tell me how they are doing.(RFIS7)

The natural environment was another source of information that was a focus of attention in this category of description, “*just being outside and feeling the*

rain fall on my face tells me something". Information could be accessed via the senses from the natural environment. Two participants describe how they experienced information in this way:

If you see the trees blowing and feel the wind you know it is windy and if the clouds are dark you know it will probably rain...and like when I am playing out and it starts to get dark I know it is time to go home. (LMCS7)

As an artist I think I am open to gaining something from everything. Just walking up to a tree and looking at it and touching it you can learn a lot. (AFCS12)

Objects found in the natural environment were also referred to by participants as sources of information. The quote given here is an example of reference to objects as a source of information:

Like say someone had a bracelet and say it fell off and they didn't realise and then earth came over it and then years later archaeologists went and digged it up well that bracelet can tell you a lot of information like how big it is and how many jewels are in it can tell you if it belonged to a child or a rich person. (ZMCS7)

Knowledge of characteristics of sources of information

The focus of attention in this way of experiencing information is on knowledge of a range of sources of information and their characteristics. The first part of this section considered young people's knowledge of a range of sources of information. The next part of the section considers young people's knowledge of the characteristics of sources of information. A range of characteristics were referred to and will be outlined in this section. It is important to stress that whether the participants viewed the characteristic of a source of information positively or negatively is not what is of import; it is the fact that participants who experienced information as it is described in this

category knew and understood what the characteristics of sources of information were.

Participants thought about the characteristics of sources of information to determine which was most appropriate to retrieve information from:

When it comes to looking for information I guess it depends on what I am doing. In English I would use books but for business I would use the Internet more because the information is more up to date and for politics I use newspapers a lot because some of the newspapers are quite political and you get different people's views. (SFIS13)

When asked to draw the first thing she thought of on hearing the word information participant JFIS7 drew a book (Figure 7) her explanation of why she had chosen to draw a book shows her consideration of the characteristics of the source:

I drew a book when you asked me what I thought of when I heard the word information because I think of books when I think of information. I will use books if I am doing a project, it is easy to look in the contents and find what you are looking for. (JFIS7)

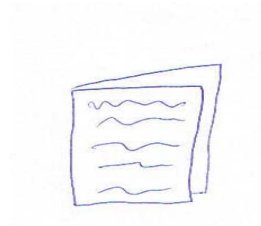


Figure 7: JFIS7 drawing

An important characteristic of sources of information referred to by participants was how easily information could be accessed. This participant describes the features of the Internet that allow for easy retrieval of information:

The Internet always has the information; it is easy I just type it in and it will like come up with answers what you are looking for, move the mouse down the list and click on one of them that you are looking for and it will tell you a load of stuff about it like the website for wrestling tells me the results. (ZMCS7)

Although the participant describes looking for information on the Internet his focus of attention is on the characteristics of the source of information. The following participant described how easy it was to access information from the Internet on his mobile phone, even when he was on the move:

Yeah I go on the Internet on my phone. Say I am on the school bus or something then if I need to check something out like something about a film then I can do that straight away, you just go click, click and there it is. (BMCS7)

Although the participant refers to finding information it is his knowledge of the source of information and its characteristics where his focus of awareness lies with finding information a secondary concern.

The following participant describes the characteristics of a book which afford him easy access to information:

I'll give you an example in Unit two of history at the moment we are doing Nazi Germany and there are two textbooks that we have got. They are good, all the information is there you just look at the contents page and it is easy to find (SMIS12)

Another important characteristic of a source of information was its ability to interact with the user. This participant appreciated the Internet for its interactive nature:

Despite everything I say about it being vast the Internet is still the best source of information there is. I'd struggle to find anywhere to equal it. It reacts to your input, it is interactive and that is good. (SMCS13)

Characteristics of sources of information and their ability to facilitate understanding of information were referred to by young people who experienced information in the way it is described in this category. Complexity of language was one such characteristic. The complexity of the language used on the Internet was cited by participants as a negative characteristic of this source of information:

The Internet is really hard for me because like if you do something it is not like kid's language, it is like really grown up language on there. (JFCS7)

This characteristic of books was viewed more positively:

In children's book the language used makes it easier to understand the information. (YFCS7)

With regard to the complexity of language human sources of information were also viewed favourably because people were deemed to be able to tailor information in such a way that it was interesting and easy to understand as exemplified in the quotes from these participants:

I like to know what is happening in the news. You can pick it up online or on the TV or newspapers but over Sunday lunch my mum and dad discuss the news with my granny and granddad and that is where I pick up most of the news. I suppose it is because they are so interested in it that I am interested in it and when they talk to me they talk in a way that I will understand. (WMIS7)

Depending on what you want to know you can sort of figure out who the relevant person is to ask. For me personally I tend to ask friends because I know they will tell me in a way that I understand. (KFCS13)

Another characteristic of sources of information that facilitated understanding of information was the volume of information provided by the source. The following two quotes illustrate how the participants were focused on this characteristic of the sources they are discussing:

Yeah I'd say with the Internet and this is a common criticism of it there's just too much information. It is too vast. (SMCS13)

Books bring it down to a lower amount of things you have to look through. On the Internet pages and pages come up so it is easier to find information in a book. (YFCS7)

Although participants viewed these characteristics of sources of information i.e. the complexity of language and the volume of information provided by the source with varying opinions depending on the source they were talking about what is of importance from a phenomenographical point of view is not their varying opinions but the fact that they were focusing their awareness on the characteristic of the source. It is the focus of awareness on the characteristic of the source of information that is a distinctive feature of Category One.

The ability of a source of information to provide current information was referred to by participants. The Internet was the source of choice for current information:

The Internet is more up to date than books say like for instance the Guinness World Record book well it could have been published in 2004 and it is 2007 now, well on the Internet the information would be about 2007 so it would be more up to date and accurate. (JMCS7)

Participants talked about wanting to keep abreast of what was going on in their social life. They described social network sites as “*up to date*” and providing them with current information:

Facebook is a good way to check things out and keep up with what your friends are up to. (SMIS12)

You just click on MSN and you get to read what your friends are saying to you instantly. (AFCS12)

An interesting characteristic of sources of information referred to by participants was their level of desirability. Social networking sites were used by participants and during the interviews mention was made of *Piczo*, *Bebo*, *MySpace* and *Facebook*. A characteristic of social networking sites was that they were considered desirable sources of information. They held a certain cachet for the young people in the study and even though there was a requirement for young people to be thirteen years and over to access a site many younger participants overcame this hurdle:

I have Piczo and I think a few of my friends have MySpace and stuff but Bebo and stuff like that I think well it is starting to get our age but most sites you have to be thirteen like Piczo and stuff but you just say you are thirteen cos they don't know. You have to enter your date of birth so if you just put it a year above then you can get in. (EFIS7)

Participants said the sites were sources of information that were relevant to “*our age group*” and contained information that “*we are interested in*” and “*we want to know about*”. Although participants talked about the information on the site the focus of awareness was on the site itself.

One of the prime concerns of participants who experienced information as described in this category related to how well information was organised in a

source of information. Social network sites were described as “*up to date*” and “*comprehensive*” with a well organised store of information:

Facebook is quite informationy. It is set out so that you can see a person’s profile, their personal information like their name, when they were born, their religion and political views, things like that. Facebook is a good way to check things out.
(SMIS12)

Textbooks were cited by participants as valuable sources of information. They were described as well organised. The use of contents and index pages made them easy to navigate and the information in them could be easily understood as it was aimed at a certain age range:

Well for a subject like history textbooks that are specifically aimed at students are good in terms of giving information you know where everything is. You can look at the contents and index pages and go straight to the information you want and also they are easier to understand because the language is aimed at your level. (SMCS13)

The way information was organised within textbooks was an important feature when it came to revision:

Textbooks give you a good baseline of the syllabus. Teachers give you information but textbooks are very good for revision. All the information is there and you know where it is. (EFIS12)

These participants also focused on the organisational aspects of books and the Internet:

I prefer the Internet. When you look at a book you don't know whereabouts the information you need is going to be whereas on the Internet you can pretty much go straight to it but with a book it is sometimes quite intimidating, books can be thick and you are thinking I only want something little where am I going to find it? (SFIS13)

You have hyperlinks on the Internet it is all organised. You don't have hyperlinks in books. You do have a contents page but they can be misleading sometimes. On the Internet you get search engines and you can try different ones each time and they have got different organisation systems so you can do it the way you want to but you can't reorganise a book. (JMCS7)

Again opinions of the characteristic of the source of information under scrutiny varied but what is important from a phenomenographic perspective and is a distinctive feature of this category is the focus on the characteristic of the source of information.

Characteristics of sources relating to reliability and accuracy of information were deemed to be important:

If you didn't have a book you might look for information on the Internet but books are more reliable because on some websites anybody can write down the information and it might not be true. (RFIS7)

If they gave you a book full of information you might not understand it but if a teacher went through it with you then it becomes clearer and they know more about it and they can explain it to you so that you understand it. (AFCS12)

This participant thought that it was an additional benefit if the source of information provided information in a written form with references, which could provide evidence of credibility:

If you have the information there in your hand it has obviously been gotten from somewhere like a book or a website, or whatever and it has got the names for you to look up. I suppose it is more useful written down as well because it is something that you can always refer back to. Where if somebody is telling you and you forget it well it is gone! (KFCS13)

One characteristic of this way of experiencing information that did get mentioned frequently was time, how long it took to access information from a source of information. Even though books were perceived to be more reliable these participants favoured using the Internet:

I probably prefer to use the Internet to books because although it is sometimes less reliable if you are short of time and flicking through books and trying to find where the bit of information you need is then it can take a long time. On the Internet you just type it in and it comes up. (RFIS7)

The Internet is more accessible and quicker. I should think that books are probably more accurate but if I can find lots of pieces of information on the Internet in less time then that is better. (EFIS7)

One further characteristic of sources of information that was described by young people who experienced information in this way was the permanence of the information. A source of information that could be referred back to, where the information was going to be found again was considered important especially in the case of academic information. This participant described information from people as ephemeral:

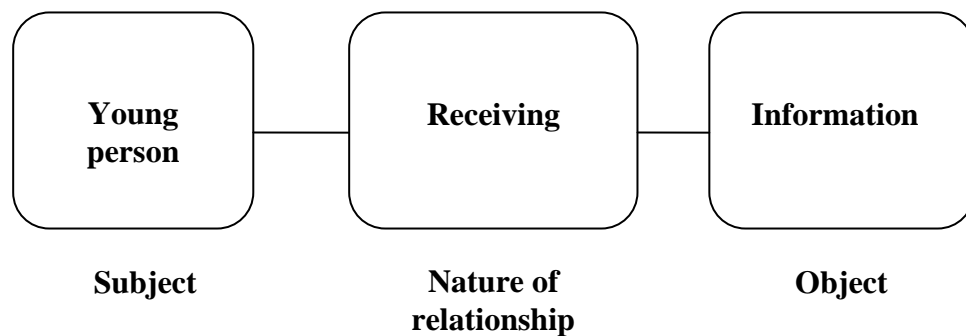
I would probably focus on the teacher but I suppose with the book and the webpage the information is not going to disappear. It is still going to be there on the screen or the page. They are not going to stop giving you the information. Once the teacher stops talking the words are gone. (JFCS7)

Summary

The first category of description is knowledge of sources of information. In this category information was experienced by individuals as residing in sources of information; it was viewed objectively as something external to the individual. Knowledge of a range of sources, what they contained and how they were organised and arranged was the focus of awareness. This knowledge afforded individuals a view of an information landscape from which they were able to access information.

4.4.2. Category Two: Receiving information

In Category Two the relationship between young people and information can be expressed in terms of receiving information.



Description and focal point of way Category Two

In this category of description the emphasis was on receiving information. In both the meaning structure and the structure of awareness the focus of this category was on receiving information:

Obviously as a student you get told lots of information everyday of your life but I mean you get told things at home too and in the workplace or whenever you walk into a shop and you see posters with offers and prices on them. (SMCS13)

Information in this category was viewed objectively as something external to the individual.

The structure of awareness

Receiving information was the distinctive character of this category. What happened to the information after it was received i.e. the construction of a knowledge base was a secondary concern. Knowledge of the sources where information was encountered was situated on the periphery of the structure of awareness. The structure of awareness for **Category Two** is shown in Figure 8:

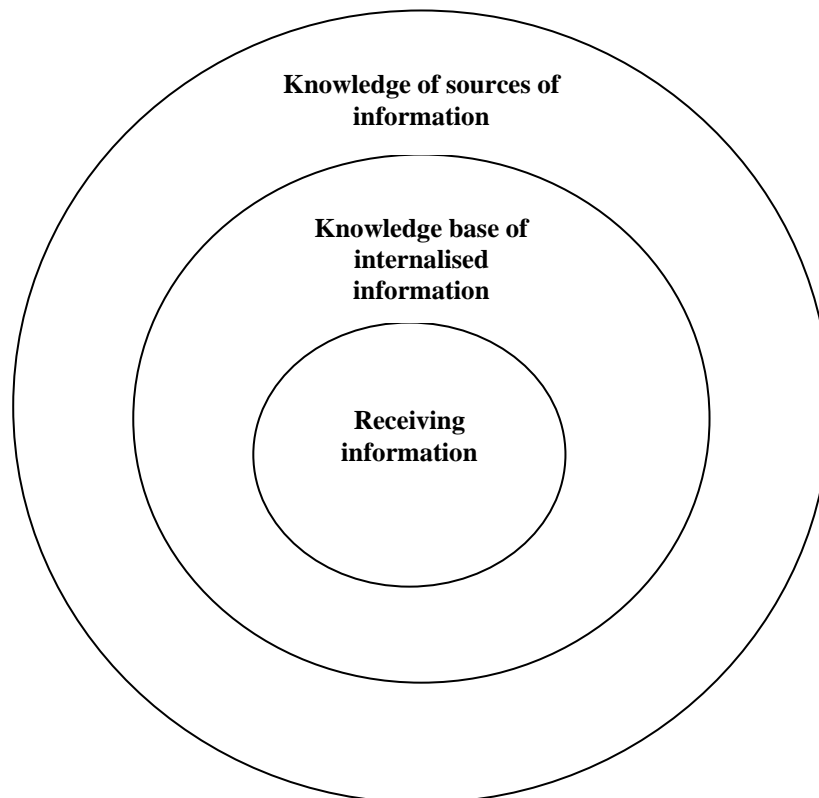


Figure 8: Category Two: The structure of awareness

The meaning structure

The relation between people and information was described in terms where individuals viewed themselves as receptacles of information. Individuals received information, which was sorted and either rejected or retained to construct a knowledge base. Constructing a knowledge base was the outcome of this experience of information.

The meaning structure of this category (with the *essential parts* highlighted)

Information was experienced in terms of being received. ***Information is received from a range of sources*** and may be ***used to construct a knowledge base***. There follows a detailed account of Category Two. Each of the sub categories is described and the essential parts of the meaning structure are outlined making clear what is distinctive about the category. The description is furnished with illustrative quotes.

Category Two differs from the other five categories in that it has been divided into two distinct sub categories. The structure of awareness and the meaning structure i.e. ***Information is received from a range of sources*** and may be ***used to construct a knowledge base*** are central to both sub categories and for that reason they are not presented as separate categories. The reason why Category Two has been divided into two sub categories is because the meaning structure for the category consists of two essential parts ***Information is received from a range of sources*** and may be ***used to construct a knowledge base*** (essential parts in bold). In each sub category the nature of the first essential part of the meaning structure varies. In other words the way in which information is received varies. In sub category A information is received knowingly and in sub category B information is encountered. It is the difference in how information is received that lends distinctiveness to the sub categories. The meaning structures of the two sub categories are now given:

Sub-category A

The meaning structure of the first subcategory is:

- ***Individuals receive information knowingly from a range of sources which may be used to construct a knowledge base.***

Sub-category B

The meaning structure of the second subcategory is:

- ***Individuals encounter information from a range of sources which may be used to construct a knowledge base.***

Subcategory A: Individuals receive information knowingly from a range of sources which may be used to construct a knowledge base

In this subcategory the individual's focus of awareness was on the act of receiving information knowingly. Receiving information knowingly means to receive consciously and with intention. When information was received knowingly the individual was conscious that they were in a position and context where information could be received, however there was not necessarily an expectation that it would be received. Participants reported receiving information knowingly by "being told", "being given" and "being shown", information was "shared" and it was "passed on". It was acknowledged that information could be received in a variety of ways:

Yeah we are always getting information but it is not always verbal sometimes it can be written or it might be pictures or even just numbers. (SMIS12)

Yes they tell us what to do and also they show us. My dancing teacher always does the dancing with us and helps us. Our trampolining teacher sometimes gives us an example. In swimming our teacher makes the movements to show us. (CFC7)

Information could be received from a range of sources as exemplified in one participant's drawing (see Figure 9):

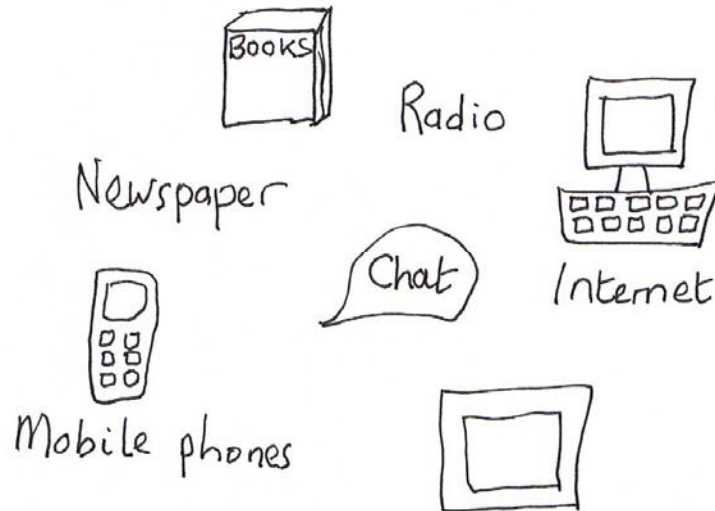


Figure 9: AFCS12 drawing

Although the drawing outlines a variety of sources of information in the discussion about the drawing the participant emphasised the fact that she was thinking about receiving information from the sources. She states:

Well I have just drawn things that give you information; you know like books, newspapers, the radio, the Internet, the TV, phone and people chatting. When you are given information it is nearly always useful for something, like knowing the name of a piece of music or information that teachers give you that can be used for homework. When I think of information that is the first thing I think of getting information from different places.
(AFCS12)

There was often little process involved in receiving information. The process involved might extend to an individual placing themselves in a context where information could be received. This was not the same as the process involved

in finding information where a need or want of particular information was identified before the process began. In this subcategory individuals did not necessarily identify a need or want of information prior to receiving it. It was more a case of recognising that there was a need to construct a knowledge base and as such they were alert to the possibility of receiving information in order to do so. One participant described how, as a young person, he was particularly receptive to receiving information:

I think it is because at a young stage we are probably, as a human race more able to absorb information we are given better so that we can go on to use it...because we are so young and our minds are so spongy. (SMIS12)

Participants, whilst not necessarily seeking specific information but nevertheless recognising the need to construct a knowledge base, recognised that in certain contexts they were in a position to receive information. In these contexts there could be an expectation that information would be received. Contexts such as:

- A place of learning e.g. in school, at piano lessons and attending gymnastics club;
- During social interaction with others e.g. with friends and family;
- Whilst listening to and watching media whose role was to impart information e.g. news programmes on television and radio.

In school there was an expectation that information would be received. The following drawing (Figure 10) revealed the participant's first thoughts on hearing the word information. She drew a teacher writing information on a whiteboard:

It is a teacher teaching information to children...he is writing it on to a whiteboard and the children copy it into their books. (RFIS7)

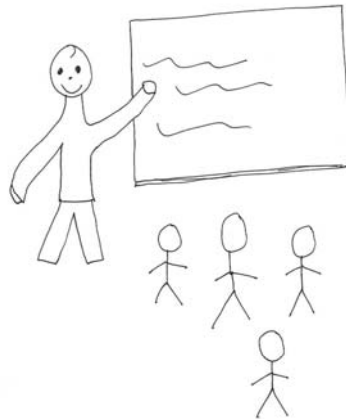


Figure 10: RFIS7 drawing

In the quote below the source of information, i.e. the teacher is mentioned but remains on the periphery of the awareness structure. Information being received was the focal point of attention. The use of information to construct a knowledge base was in the next level of awareness:

I've always thought about being given information in school which is needed to help you with your work because teachers will email you and tell you. They will give you information you need to remember and say this needs to be done or we need to meet at this time to discuss this. (SFIS13)

Akin to receiving information from teachers in school information was also received from instructors out of school:

Well I get information from my coach and that helps me to improve. He will look at me and say you need to stretch your hamstrings more and then he will show me how to do it. (JMCS7)

Information was commonly received during social interaction with others:

Well like today we are going out to dinner for somebody's eighteenth birthday and they had to tell me the time and place so that I would know. (SFIS13)

It was recognised that media such as the television regularly imparted information:

I suppose you get information from the TV. It is always telling you something...as in the news, information about places, people, what's happening in the world that sort of thing or the weather so you are always getting information about the sort of things you need to know to get through life. (KFCS13)

The previous quote illustrates the meaning and focus structure for this category. Of primary concern in the quote was the fact that information was received. Of secondary concern was the fact that the information would contribute to a knowledge base. Television as the source of the information was on the boundary of awareness.

In addition to recognising that information was being received because of the context they were in another way individuals recognised they were receiving information was because it was something that was previously unknown:

Well they [teachers] are always telling us information...basically it is something that you didn't really know. (WMIS7)

Reflecting on his early school life one of the participants who experienced information as it is described in this subcategory used the term “*spoon fed*” to describe how he had been used to receiving information in school:

Sometimes now I do wish I had been given more information especially at the start of this year because it is a very different type of learning in sixth form to that in main school where basically you are spoon fed and everything is given to you. (SMIS12)

It is not true however to say that receiving information was always viewed as effortless. Participants reported having to “*concentrate hard*” on what they were being told or “*look carefully*” when being shown how to do something. Receiving information could require effort:

Yeah at school you get information from the teachers but it is not always easy you have to listen carefully or you might miss something. (EFIS7)

The following quote illustrates aspects of the structure of awareness for this category. In the quote the construction of a knowledge base is important but the focal point of awareness is receiving information:

Well she (gymnastic instructor] tells you... 'cos one of the rules is you are not allowed to go out of the floor area when you are doing a routine and if you do she says you will get deducted marks and you need to know that so you don't have points deducted. (CFCS7)

Subcategory B: Individuals encounter information from a range of sources which may be known or unknown and may be used to construct a knowledge base

In subcategory B information was encountered. This was different from subcategory A where information was received knowingly. In subcategory A information was received consciously and with intention. Individuals were conscious that they were in a position and context where information could be received. In subcategory B information was encountered. When information was encountered there was no expectation that information would be received.

The individual was not conscious of being in a position and context where they would receive information. In this subcategory where the focus of awareness was on information being encountered information could be encountered in a number of ways. Information could be overheard:

Everyone has mobile phones now and sometimes you overhear something and you think oh that is interesting (JFCS7)

It was at times referred to as something that “*caught my eye*” or “*grabbed my attention*”. Information was noticed:

When I was walking home there was a notice up on the gate of one of the houses about free puppies. I noticed that, I like puppies and I asked my mum if I could have one. (HFCS7)

The term “*discover*” was also used by a number of participants when describing how information was experienced in this subcategory:

You watch television; documentaries and stuff and get information from them. I am not looking for it. I am just discovering information on the television. (LMCS7)

Information was encountered in different places and from a range of sources. Participant RFCS7 drew a notice board to depict her first thoughts on hearing the word information (see Figure 11).

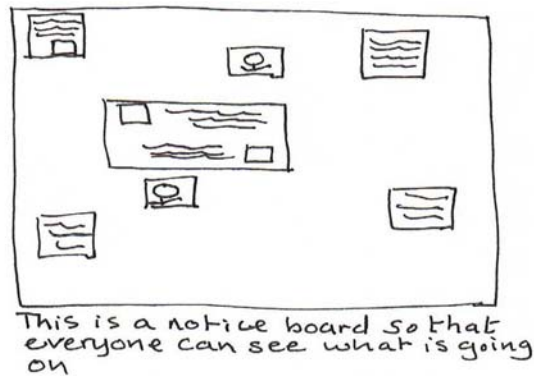


Figure 11: RFCS7 drawing

She explained:

Information can be anywhere really like in school sometimes you will see a leaflet on a notice board and you will remember it. (RFCS7)

The quote demonstrates how information that is encountered is used to build a knowledge base.

Participants described encountering information in adverts in a number of places including newspapers, magazines, television and radio and sometimes they were just noticed when walking down the street:

Sometimes if you are going along and there is like billboards I sometimes notice them if it is an advert for a film or something I might look and think oh that looks good I might want to go and see that. (EFIS7)

Fictional works were another source of encountered information:

Ehmm...OK the Da Vinci Code by Dan Brown. I never knew that the triangles...the Star of David is actually two symbols fused together one standing for fertility of females and the other standing for the male. I never knew that and I picked that up from Dan Brown's Da Vinci Code, which was quite interesting. There's lots of stuff like that because unless it is like madly fiction you are always going to have to have some facts and some information in there otherwise it is not going to make sense. (SMIS12)

This participant describes how she encountered information on the Internet:

Sometimes I am on the Internet looking for a subject and I come across something else when I am doing that and I jot it down like the other day I came across some information about Paris and I stopped and read it because I am going there next year. (HFCS7)

Individuals who encountered information were not consciously alert to the fact that they might receive information. There was no process involved in encountering information. They neither engaged in an act where they set out to find information nor had they consciously placed themselves in a position or context where they expected to receive information. In contrast individuals who experienced information as described in subcategory A Receiving Information Knowingly did engage in a process. They were conscious of the fact that they might receive information and placed themselves in a position or context where they expected to receive information. This required an effort on their part. No such effort was made by individuals who encountered information. Nevertheless encountering information could not be construed as a totally passive act because when information was encountered there was recognition at some level that the information was relevant to the individual; the information was recognised as something that “*could come in handy*” or “*be of use later*”. A connection was made by the individual, in the sense that the information was recognised as being significant or of interest to them:

Well if I am walking past someone and they make a comment that I hear and if it was relevant to me it would register but I wasn't looking for that information, I just happen to hear it.
(JMIS12)

Information was reported by one participant as being encountered as she reflected on the mistakes she had made; she describes how information was encountered on reflection:

You don't think about it at first but you learn from your mistakes. It is just like looking at a screen really, thinking about mistakes you see that was not how to do it; by thinking about the mistakes you get the information. (HFCS7)

Interestingly information was also reported as being encountered via the senses:

When you are younger you pick up a lot of information because you are not scared to experiment you discover things with your body like touching and feeling and stuff you pick up information. (HFCS7)

As in subcategory A the focal point of awareness in subcategory B was on receiving information. The outcome of encountering information was the construction of a knowledge base as exemplified in the following quote:

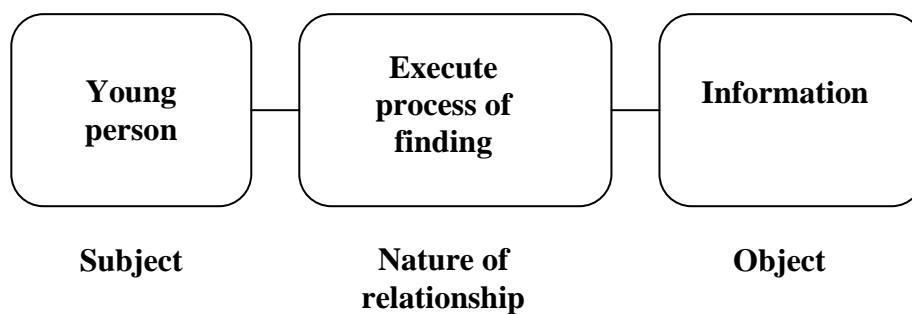
Well one day we were watching the television and we saw an advertisement for Warwick Castle, like the whole family saw it and it showed you things that they do there like eagle flying, the javelin and things like that and I remembered about it and one day in the holidays when mum said we could go out for the day I said we should go to Warwick Castle and we did.
(ZMCS7)

Summary

In this category of description the emphasis was on the act of receiving information. Information that was received was sorted and either rejected or retained, the outcome of this experience of information was the construction of a knowledge base. Information itself was viewed objectively as something external to the individual. Information that was experienced in this way fell into two distinct subcategories: information that was received knowingly and information that was encountered.

4.4.3. Category Three: Process of finding information

In Category Three the relationship between young people and information can be expressed in terms of executing a process to find information.

***Description and focal point of Category Three***

The focal element of this category centred on the process of finding information. Individuals recognised a gap in their knowledge and engaged in a process to find information to fill that gap. The focus of attention in both the meaning structure and in the structure of awareness for this category centred on the process of finding information:

Well I needed to know the times of the buses so I needed a bus timetable simple as it sounds so I went on the Internet and typed the key words into Google and it was the first hit that came up so I went on there and found out the times. (SMCS13)

Information in this category was viewed objectively as something external to the individual.

The structure of awareness

Finding information and critically the processes involved in finding information were at the heart of this category. A process to find information was executed in response to recognition on the part of the individual that they lacked information. This lack of information is itself recognised in response to a desire and/or a need for information. Knowledge of sources of information was a notable element in this experience however it was not of prime concern and therefore it formed the second level of awareness. Knowledge base construction was found on the outer edge of the structure of awareness because although the information that was found might be used in the construction of a knowledge base it was not the central focus of attention at the time of finding information. The structure of awareness for **Category Three** is shown in Figure 12:

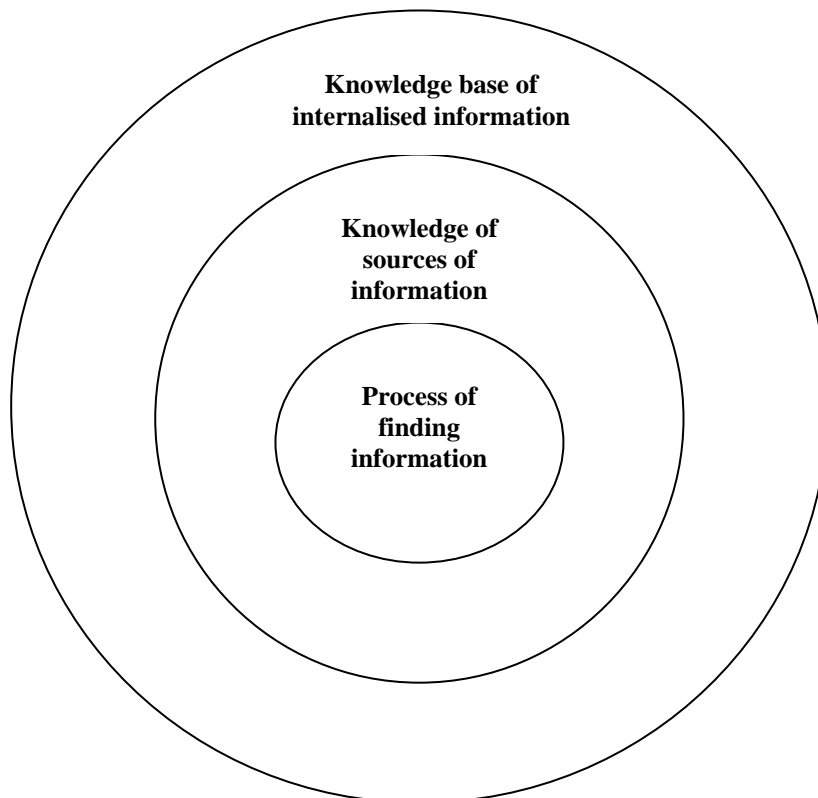


Figure 12: Category Three: The structure of awareness

The meaning structure

In this category of description the relation between people and information can be described in terms of individuals engaging in a process to find information in order to fill a knowledge gap. The information which may be wanted and/or needed was found in sources of information held within their personal information landscape. The outcome of this experience of information was possession of a knowledge base that enables the knowledge gap to be filled and satisfies curiosity and/or resolves an information need.

The meaning structure of this category (with the *essential parts* highlighted)

Information is seen in terms of a *process of finding information*. When *a gap in knowledge is recognised* individuals turn to *a range of sources of information* and execute *a search process* to find information in order to fill that gap. There follows a detailed account of Category Three. Each of the essential parts of the meaning structure is described making clear what is distinctive about the category. The description is furnished with illustrative quotes.

The process of finding information

Individuals who experienced information as it is described in this category centred their focus on the search process. This process which was employed to find information was not uniform; a variety of approaches were taken, however the following elements were common to the approaches taken:

- Recognising a gap in knowledge;
- Knowledge of information sources;
- The search process.

The process of finding information: Recognising a gap in knowledge

Individuals who experienced information as described in this category used terms such as “*I wanted to find it out*”, “*I had to look it up*” and “*I needed to research it*” to relate that they recognised a gap in their knowledge. For the

following participant a gap in knowledge became apparent as a result of curiosity:

Sometimes if something is happening on the news you want to find out more about it so then you look it up in books and on the Internet...earlier on there was a tornado and I thought I want to look up more about this, I want to find out what is really happening. Well first of all I looked in one of my books but there was nothing so then I went to the library but the library person couldn't find anything there so I went home and went on the Internet and looked up tornado and got some information about what happened on the BBC website.
(CFC7)

For this participant the gap in knowledge arose because there was a need to know how to do something:

Well I, my mum and my sister went to the library and we tried to find a cooking book we wanted to make these nice cakes but they didn't have a book so we went to my nanas and had a look at her books and we found one. (ZMCS7)

In this case the participant recognised a gap in his knowledge when the need to solve a problem arose:

My mum was making this thing because we got a new kitchen and we got this base top thing. My dad was at work and my mum says we needed to look it up in a book or something so I got the book that came with it but that was no good so we had to go to the shop and ask the man and he told us what to do.
(LMCS7)

The process of finding information: Knowledge of sources of information

Knowledge of sources of information was one element that made up this experience of information however it did not have the same position in the structure of awareness as it did in **Category One** where its position was the central focus of awareness. In **Category Three** the focal element of awareness was on the process of finding information and knowledge of what sources could be used in this process formed the next level of awareness. Use of a wide variety of sources of information was reported:

I looked in books first. (CFCS7)

I just asked around basically, using the phone to ring people up to find out. (AFCS12)

I walked around and looked. (CFCS7)

This participant's drawing was of a source of information; a computer but as he explains in the quote below his focus of attention was on the process of finding information and not on the source itself (see Figure 13):

The Internet is really big. To find the information you put in search terms and then click and scan and you find the best information. (WMIS7)



Figure 13: WMIS7 drawing

Knowledge of sources of information was a notable element in this experience of information but as illustrated in the descriptions of finding information in the following quote the degree of awareness focused on sources is less than that focused on the process of finding information:

I'm into music and I spend a lot of time finding out about bands you know the members and the music...if they are well known bands I will go on iTunes and search because that is a pretty comprehensive site and it is easy to search, I am used to using it but if it was one of my friends' bands or a local band I wanted to know about then I would search on MySpace as they are more likely to be there and they are easy to find. (JMIS12)

Participants described using multiple sources of information in the process of finding information. The reasons for looking for information in multiple sources included capturing a greater breadth and depth of knowledge, a means of evaluating the information found, not having a clear idea of where the most appropriate source to look was and because individuals thought that information was scattered and had to be gathered from different sources as in the case of this young person:

Yeah when I was looking for a new mobile I looked on the Internet for ones that were on offer then I asked my uncle cos he knows a lot about phones and he told me they had some in Asda so we went to Asda but they was out of stock and the person there rang the other Asda and told us they had some in the other Asda. (LMCS7)

The process of finding information: The search process

The first thought of this participant when asked to draw what came into her head when she heard the word information illustrates her thoughts about the search process (see Figure 14):

Yeah it is like a busy workspace where you are researching and trying to find information for something like if you need information about a particular subject you look it up and search for it. (SFCS12)



Figure 14: SFCS12 drawing

There was no standardised process for finding information; however participants usually described the search process as a set of steps:

We were going away to a cottage last Christmas and I found it on the Internet...with my dad we worked out how many people were going and how many bedrooms we needed. We worked out whereabouts we wanted to stay and dad told me how much he wanted to pay so then I went on the Internet and went on Google. I typed in cottages and how many people we wanted it to sleep and where it would roughly be and it came up with these good suggestions. There were little pockets of information you look through and you see which one sounded good and then you looked at it and at the pictures. (JMCS7)

This participant when discussing her drawing explained that she usually relied on using *Google* as the first step in her search process (see Figure 15):

Well the first thing that came into my head was how to access information and Google came into my head because that is where I usually start my search. You can find a lot of other websites on Google and they are all linked together so you can find a lot of information over the Internet. (KFIS13)

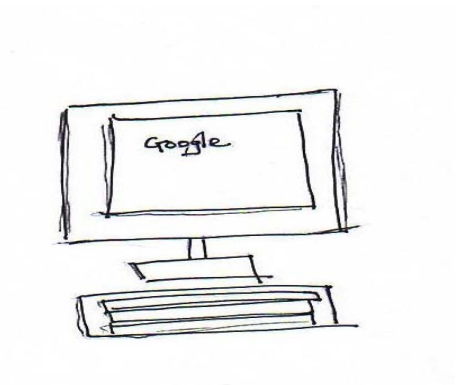


Figure 15: KFIS13 drawing

The number of steps described and the emphasis placed on each of them varied from person to person. This young person described the steps in his search process with an emphasis on the initial stage of planning:

We had to do research and write down the story of ourselves for English. First I kind of planned what I was going to do. I did a mind map thing and then I wrote down all the years I had been alive. I was going to do it in yearly diaries like something that happened each year then I made a note of who could tell me all that information. I asked my mum and dad and my granny. My mum was able to tell me most of it so I was able to write it all up. (JMCS7)

Whereas this participant described the search stage of the process in more detail:

When I bought my computer I found out the best one. I looked on the Internet on my home computer. I just typed in computers and PC World and all these computer sites came up.

I looked through them some were a bit difficult to understand cos you had to find which one was the best and the one that you needed...I did that by comparing the different computers on the different sites like which was best and how much they cost. Then I found it on PC World so I printed it off and showed it to my dad and took it to the shop and got the computer. (BMCS7)

As they focused their awareness on the process of finding information participants referred to difficulties they encountered during the process. Information could be “*difficult to track down*” or “*hard to find*” as exemplified in the following quote:

At scouts we had to find something out about the Red Cross. It was quite hard finding a website. I went on to Google and typed in red cross but there were pages came up with England like cos they have a red cross on the flag so then I put the word charity in brackets and it came up with loads of charities and it came up with Red Cross in the end so it meant I could do the work for my badge. (ZMCS7)

With his focus centred on the process of finding information this participant described how he employed a strategy to deal with to a difficulty encountered in the process:

For a history project I am doing at the moment I've got this book, which is about five hundred pages long it is difficult to know where to start so I skim through it all and if catch something which I think is relevant I just sort of put a little post-it on the page. (SMCS13)

At the end of the search process a number of participants expressed the satisfaction they felt on having gathered the relevant information and reaching the end of the search process as exemplified in the response of this participant:

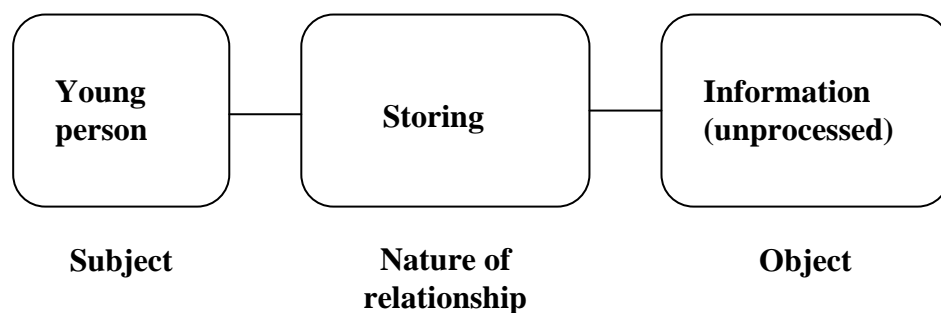
Mum likes me to be independent. The other week I went down to Norwich to see my friend and she told me that I had to go and sort it out for myself so I went to the station and checked out information for a young persons railcard to see whether it would be worth it and it would have got me ten pounds off and then I checked out the train times and costs and changes and stuff. I sorted it all out and got to see my friend and that was good I felt I had achieved something. (SFIS13)

Summary

In the third category of description individuals experienced information in terms of people engaging in a process to find information in order to fill a knowledge gap. Participants' descriptions of the search process varied but it was usually described as a set of steps taken in order to find information to fill a knowledge gap. Knowledge of sources of information, as described in **Category One**, was an important, though not central, element in this category and knowledge base of internalised information was on the periphery of the structure of awareness. Information in this category was viewed objectively as something external to the individual.

4.4.4. Category Four: Store of unprocessed information

In Category Four the relationship between young people and information can be expressed in terms of storing unprocessed information.



Description and focal point of Category Four

In this category of description and all those that follow information was experienced as something held within the individual. It was internalised and no longer viewed as something external. Individuals who experienced information in this way used terms such as “*you put the information in your mind*”, “*you keep it in your head*”, “*you store it*”, “*you remember the information*” and “*it is put in the back of your memory*”. The focus of attention in both the meaning structure and in the structure of awareness for this category centred on storing information within the individual:

When I was told where all the classrooms were I had to take it in and remember it so I could get to my lessons. (YFCS7)

Once information was acquired a decision was made to either retain or reject the information based on its value to the individual. Information that was retained was stored without any further processing. The term ‘no further processing’ meant that the information was not subjected to any further thought, consideration or analysis. It was accepted as it was and stored.

The structure of awareness

Storing unprocessed information was the distinctive feature of this category. Information was remembered and underwent no further processing. Information that was experienced in this way had the potential for use in the future therefore use of information formed the second level of awareness. Participants who experienced information as described in Category Four recognised that unprocessed information that was stored in a repository was, in its own right, part of a knowledge base. It was known information with the potential for future use. There was also some awareness that it might at some point in the future, link up with new information but this was focussed on to a lesser degree and therefore lies on the periphery of the structure of awareness. Acquiring information and knowledge of sources of information were referred to and comprise part of the meaning structure but there was not enough emphasis on either for them to make up part of the structure of awareness. The structure of awareness for **Category Four** is shown in Figure 16:

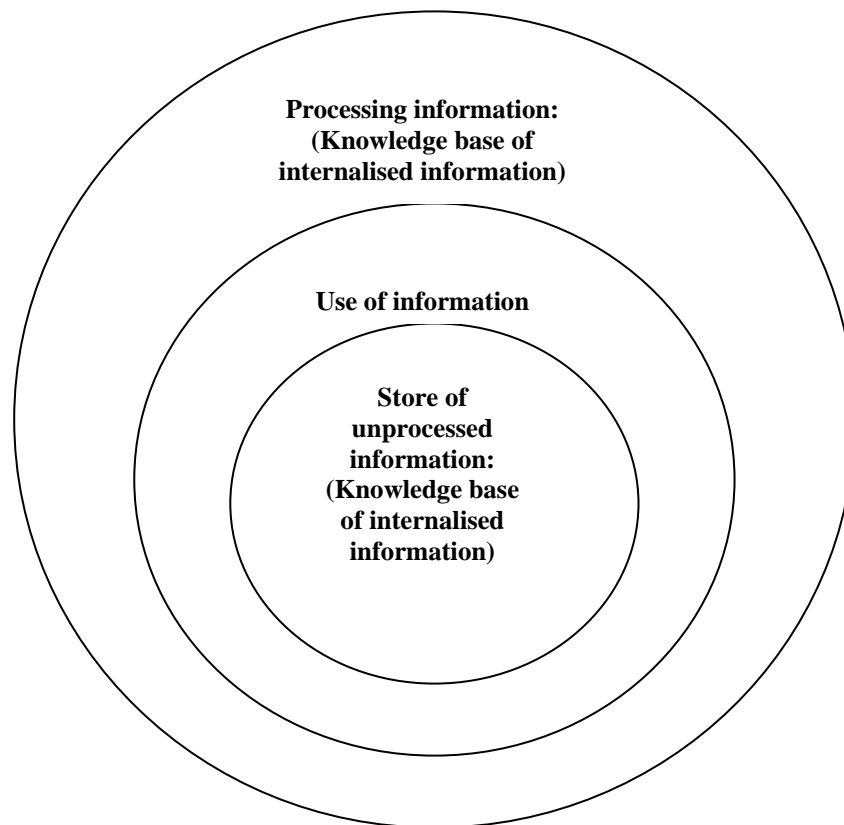


Figure 16: Category Four: The structure of awareness

The meaning structure

Individuals who experienced information as it is described in this category viewed information as being stored within themselves. Information had been acquired from a range of sources and internalised. After a process of sorting, if it was to be retained with no further processing, it was stored for potential future use or connection with new information. The outcome of this experience of information was that individuals stored information in a repository, which was housed in the knowledge base, for possible future use or to connect with new information.

The meaning structure of this category (with the *essential parts* highlighted)

Acquired information is internalised: Information is sorted, taken in and then stored. In this category of description the ***information that is stored is unprocessed.*** Information is stored in a repository, which forms part of the

knowledge base with the potential for future use or connection with new information. There follows a detailed account of Category Four. Each of the essential parts of the meaning structure is described making clear what is distinctive about the category. The description is furnished with illustrative quotes.

Acquired information is internalised: Information is sorted and taken in

At the point when information was internalised the individual sorted the information. All information that was internalised went through this process. When information was acquired either by receiving it, as described in **Category Two** or finding it, as described in **Category Three** participants described “*taking it in*”:

*Well being taught to talk and walk I got information on that
and I took it all in and I still remember it now I am older.
(CFCS7)*

Once the information was taken in it was sorted and was either deemed fit for retention or it was rejected. If it was deemed fit for retention it followed one of two paths:

- The information underwent no processing. It was stored in a repository of information which formed part of a knowledge base in the sense that it was known information. This stored information had the potential for future use or connection with new information;
- The information underwent some degree of processing; it was thought about, considered, analysed and formed part of a knowledge base with the potential for future use.

Information as it was experienced in **Category Four** follows the first path. The experience of information as described in the second path is described in **Category Five**.

This participant described how he experienced the sorting process; it was a process that could occur consciously or sub-consciously:

I suppose you sort of categorise things don't you? It's difficult to say really because sometimes well you just do it naturally and you don't think about how you're doing it other times you stop and think. (SMCS13)

Referring to adverts on the television, this participant's quote is an illustration of sub-consciously sorting information out:

Well at the end of the day they do stick in your head cos I board and in my lunch hour I will go back to my house and sit and watch television and the adverts are on there and you are like watching them and subconsciously taking them in so say I was shopping and needed something to clean my bathroom I would think of an advert I had seen and buy that because you think that it will work. It is just that that would be in my head. (SFIS13)

As information was sorted decisions were made to store it. The information was taken in and remembered because it was needed and/or it was wanted:

I guess some sorts of information you just kind of know you have to remember so you keep that up there and some things are memorable so you will remember those as well, not always that they will help you but like it is just good to remember them. (AFCS12)

The level of importance attached to information was an important factor in determining whether it should be stored or not:

Some information can go in one ear and out the other and some information can stay in my head. If it is important it stays up there but if it is not it just goes straight through.
(ZMCS7)

This young person described the process of deciding which information should be remembered. One major reason cited for storing information was in order to refer back to it:

I would be able to remember where we went, what we did but I wouldn't remember the times or anything like that...I don't feel as though I have to remember the time or date I am not going to be asked for them afterwards. I remember I went to a Cantonese restaurant for someone's birthday recently and I can remember exactly what happened and everything. I remember that because it might be good to go back there. For a casual day it wouldn't be remembered that much. I guess you are sort of categorising it really. (AFCS12)

The previous quote demonstrates how the focus of awareness was on storing unprocessed information with awareness of the potential for future use resting further in the background.

If information was “*interesting*”, if it “*grabs my attention*” then it was also taken in and stored. The following quote suggests that “*interesting*” information meant information that might be actively used at some point in time:

Well information that I see in adverts sticks if it is something I am interested in like for instance a new film I might go and see otherwise I will just glance and then forget about it.
(JMIS12)

There was a divergence of opinion on whether or not information needed to be understood to be taken in and stored. This young person thought that it was a prerequisite that it should be. When asked why she thought some information was remembered and some was not she replied:

If it is easily understood you remember it. If it is something complicated you are not going to remember it because there is too much to remember, it is too much effort but if it is broken down into simple ways so that you can remember it, it will be easier to remember. (EFIS12)

This young person however took the opposite viewpoint and did not think it necessary for information to be understood in order to be taken in and stored:

Well sometimes you don't need to understand the information because like people can say it to you again and again and you kind of get it into your head like sometimes when I am learning things for a test I say it over and over so I know how to answer the questions. (CFCS7)

It should be stated that although participants had different opinions on whether information that was taken in and stored needed to be understood what is of importance from a phenomenographical perspective is not their varying opinions on whether the information needed to be understood but the fact that they were focusing their awareness on information being internalised and stored. It is the focus of awareness on this that is a distinctive feature of Category Four.

As described in this section all information that was internalised went through a sorting process where a decision was made to either retain or reject the information based on its value to the individual. Individuals who experienced information as described in this category focused their attention on storing unprocessed information.

Stored unprocessed information which forms part of the knowledge base

Information as it was experienced in this category of description was sorted and stored without any further processing. Processing as understood by participants meant further thought, consideration, and analysis. In other words information, in this category, was taken in and retained in the form that it had been accessed. That is the crucial difference between this category and **Category Five**. In **Category Four** no personal slant was put on the information, as described by this participant:

Well say you are at home making the breakfast and the breakfast news is on...some of it sinks in but you don't always process it if you see what I mean. (SMCS13)

The following participant described the differences between stored, unprocessed information and stored processed information:

If it is basic information that you don't really have to think about, you just know what it is and know what to do with it you just remember it but if it was more complicated then you would probably need to think about it a lot more and you would need to process it and put it in terms that you would understand. (JMIS12)

Once taken in information was reported as being stored in a variety of places for instance “*the brain*” or “*the head*” and it was referred to in a variety of ways as “*recorded information*”, “*memories*”, “*past information*”, and “*thoughts*”:

In his drawing (Figure 17) one participant illustrated how he experienced information as described in this category. He drew a picture of a football and a goalpost and he wrote 8-0.

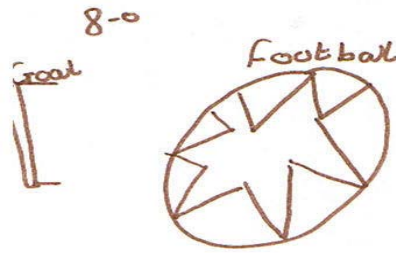


Figure 17: AMCS7 drawing

When asked to explain why he had drawn this in response to the request to draw the first thing he thought of when he heard the term information he stated:

When you said the word information the first thing I thought of was football. I am a Liverpool fan and last night I saw on the news that they had scored eight goals so when you asked me to draw something I thought of the information in my head. In my head I had a picture of a football and the score and I drew what I could see in my head. (AMCS7)

As described in this category information was experienced as unprocessed and stored in a repository. The repository of unprocessed information was seen as part of the knowledge base. For individuals who experienced information as described in this category the main criterion for information to be part of a knowledge base was not that it was processed but that the information was known; it was “*knowledge*”. The fact that it was processed or unprocessed did not make a difference:

My friends always rely on me for information like knowing what number bus goes where and what time things start. I have a good memory and my head is full of that sort of knowledge. (CFCS7)

Well I like quizzes and I have a good head for facts I remember things like historical dates and kings and queens...so I have a good store of knowledge for things like that. (WMIS7)

Participants referred to the fact that information could be stored sub-consciously and it was only on reflection that they realised they had internalised the information. In the quote below information was encountered and stored but it was only with reflection prompted by a question that the participant remembered the information:

Well I was walking down the road with my dad and we saw some flowers and he said oh they are called something and then in school there was a question in science like what is the flower called and I thought about it and thought oh yes I can actually answer it. You reflect on seeing the flower and dad telling me what it is called. (HFCS7)

Potential future use of information or connection with new information

One reason for storing unprocessed information was for its potential future use. Use of information formed the next level of awareness. Participants referred to how their store of information might be used. One potential outcome was the use of information at a future date:

You store information right at the back of your brain and if a subject is mentioned something along the line well it just pops into your head again. (HFCS7)

Another potential outcome of storing information that was referred to was the possibility of linking the stored information with new information. It is important to note here that it was only the potential to link stored, unprocessed information to new information i.e. to process information, which was referred to and not the actual processing of information which is the focus of awareness in **Category Five**. The following quote illustrates this and in addition illustrates the awareness structure for this category where the central focus of attention is on storing unprocessed information with information use and processing information on the outer levels of the structure of awareness:

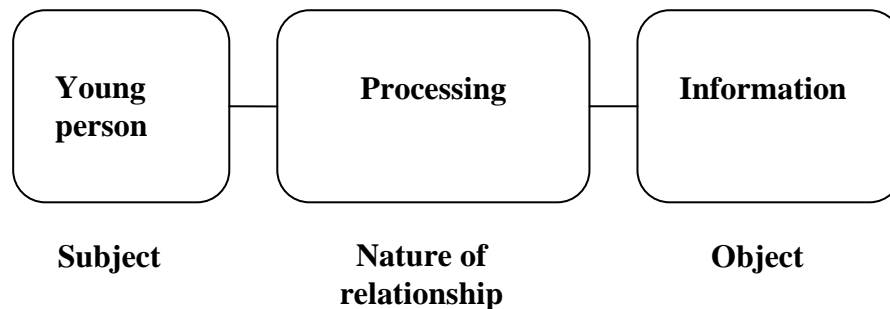
If someone tells you something you take it in and remember it. Sometimes it is useful straight away and sometimes you can link it up with something you already know and you become knowledgeable about the subject. (KFCS13)

Summary

In this category of description focus centred on stored unprocessed information. Information was no longer experienced as external and objective; it was internalised. Information was taken in and underwent a process of sorting, which determined whether it was to be retained or put to one side. If it was to be retained with no further processing it was stored in a repository which was housed in the individual's knowledge base for potential future use or connection with new information.

4.4.5. Category Five: Processing information

In Category Five the relationship between young people and information can be expressed in terms of processing information.



Description and focal point of Category Five

In this category of description processing of information was the focus of attention. This category differs from the **Category Four** (store of unprocessed information) in that information was processed. Precise descriptions of what was meant by the term 'processed' will follow but in general 'processed' meant that information had been considered and thought about; in other words it had been analysed. This processed information was part of the knowledge

base. The focus of attention in both the meaning structure and in the structure of awareness for this category was on processing information:

When I was doing research for my vet interview I went on [the Internet] and got all the pages about bluetongue and BSE and foot and mouth and all that kind of thing and highlighted the important bits then I looked in the papers and made notes and then I thought about what all this meant for farming, what the implications were so hopefully I am now prepared for any questions I might get. (SFIS13)

The structure of awareness

The focal element of this category was the processing of information. As described in **Category Four** information was internalised and sorted. In this category the internalised and sorted information was then processed and could be linked with information already internalised. Individuals were aware that this processed information that had been retained formed part of a base of knowledge that had the potential to be put to future use; therefore information use formed the next level of awareness. Acquiring information (either receiving or finding information) was referred to by participants but was not a major element of this way of experiencing information and for that reason rests on the periphery of the structure of awareness. The structure of awareness for **Category Five** is shown in Figure 18:

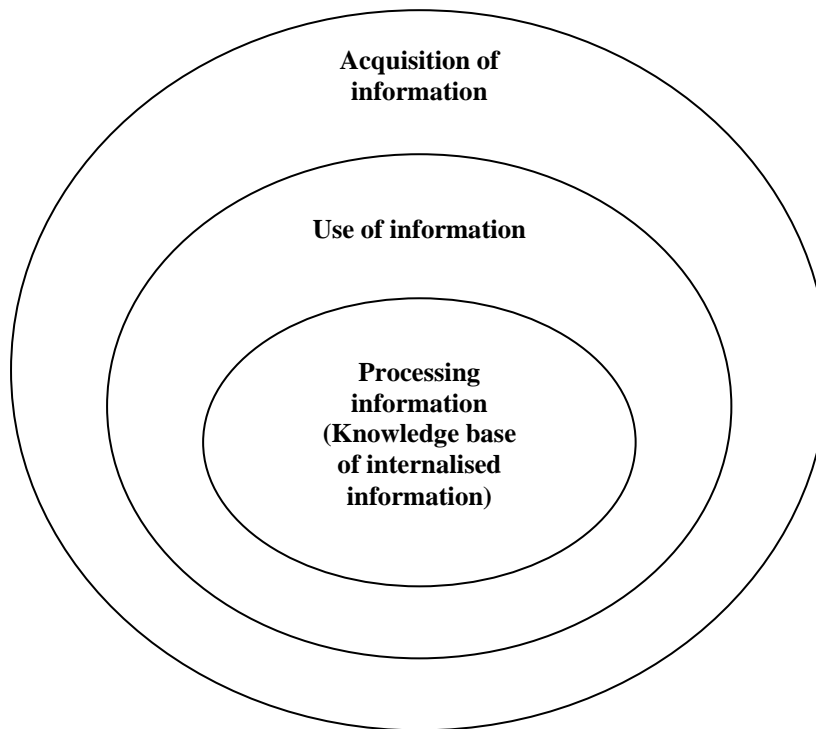


Figure 18: Category Five: The structure of awareness

The meaning structure

In this category information was processed. Once acquired information underwent a process of sorting. If it was deemed fit for retention it was thought about, considered and analysed. Once analysed it could directly form part of the knowledge base however prior to this it might also connect with information already internalised i.e. information stored in the repository of information as described in **Category Four** or information previously processed and internalised in the knowledge base as described in **Category Five**. It was then held in the knowledge base and retained for possible future use. The outcome of this experience of information was information was processed to construct a knowledge base.

The meaning structure of this category (with the *essential parts highlighted*)

Acquired information is processed and is either used directly to build a *knowledge base* or it *connects with previously internalised information* and is used to build a *knowledge base where it awaits possible future use*. There

follows a detailed account of Category Five. Each of the essential parts of the meaning structure is described making clear what is distinctive about the category. The description is furnished with illustrative quotes.

Acquired information is processed

All information that was acquired was internalised and underwent a process of sorting, as described in **Category Four**. In this category information had been sorted and deemed fit for retention however, unlike the information in **Category Four**; in this category information was processed. The difference between the experience of information described in **Category Four** and this category was expressed by this participant:

Yeah if it is simple information you don't think about it you just take it in then it just stays there instead of being processed.
(SMCS13)

The term “*process*” was used by the young people in the study repeatedly to describe what happened to information as it was experienced in this category:

I take it in better if I am told information because then I can process it and remember it. (EFIS12)

Although they used the word “*process*” readily many young people when asked to expand on what they meant by the term were hesitant in replying. They were aware that they processed information but did not appear to have very much experience of relating how this was done. One participant summed up the difficulty:

It is not something we usually talk about. (KFCS13)

Participants required time for reflection in order to describe more fully what they meant by the term ‘*process*’. The young people who experienced information as described in this category revealed that they understood the

term “*process*” to mean that some form of cognitive activity was applied to the information:

Information is anything that is description, detail, fact or opinion that has to be processed by someone. It needs conscious thought. (SMIS12)

You pick out the key points and you process it so that you can understand it. The thought processes you go through to understand it, thinking about the information and what it means. (EFIS12)

References were made to processed information as information that was “*learnt*”. “*Learnt*” information implied information that was processed and remembered. This participant described information that she encountered in her school life:

If it is information that you have learnt, I mean thought about and taken it in then it will probably be information that you think you are going to need to live life well in the future. (KFCS13)

This experience of information was expressed in a number of participants’ drawings; two are shown in Figures 19 and 20. The young man whose drawing is shown in Figure 19 stated:

I drew a thought bubble and question mark because it shows that you have to think about information. (CMIS12)



Figure 19: CMIS12 drawing

Figure 20 illustrates one participant's response when asked to draw the first thing he thought of when he heard the term information. When asked to explain what he had drawn in response to the request he replied:

Someone sitting at a desk and there is a bubble coming out saying hmm. The information is what he is thinking about; he has to think about information when it is in his head. (ZMCS7)

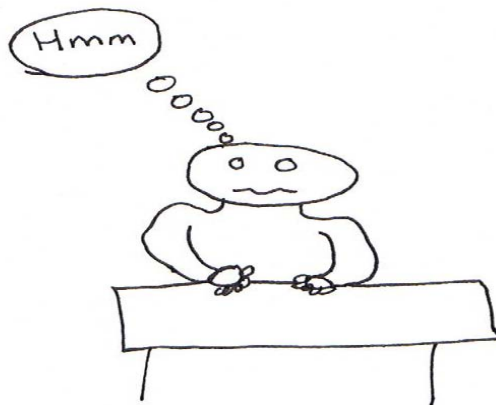


Figure 20: ZMCS 7 drawing

Another word used to describe what processing information meant was “*interpret*” as in the case of this participant:

When I had found it on the Internet I had to read it through and when I had thought about it I had to produce my interpretation of it. (JMIS12)

This participant described the process similarly but used the term “*put into my own words*” to denote interpretation:

Yeah well you use the information you get off the different sites. You compare it and put it into your own words. (EFIS7)

One element of processing information as described in the quote above was the comparison of different pieces of information. Thinking critically about the information, weighing up the value and the relevance of it were other elements mentioned:

Well you sort of had to find the information and sort of try to understand it... you look at it and weigh it up. You think is this useful will it help to explain the answer and then you put it into your own words. (WMIS7)

As well as “*thinking*” about information in order to process it participants referred to “*discussing*” and “*talking*” about information with others as an important factor in the processing procedure:

I take economics and me and my dad talk quite a lot about it. We read the newspapers on a Sunday morning and then we discuss them over dinner. My dad is quite knowledgeable so talking to him helps me to understand what I read. (EFIS12)

The fact that individuals could interpret information differently from each other was also referred to by other participants. Creating their “*own version*” of information was seen to be an outcome of the processing procedure:

You have to get the information and then process it so that you have your own version of it. (SMCS13)

One young person when describing what happened when she thought about the information she had found stated:

You sort of think about the information you have got and when you do you sort of see it in a new way, a way that means something to you. (SFIS13)

Processing was described as a procedure which leads to an understanding of information. It is notable that when information was processed it was often referred to as knowledge:

I think knowledge is almost just another term for processing information but you have to convert that information into something you can understand. So if I went and read a PhD philosophy paper on the meaning of life and why we are here I have to convert all the information I took from that into something that I can actually understand. (WMIS7)

In the following quote the participant talked about gossip in terms of knowledge and not information precisely because it has been processed:

Gossip is something that you have to think about. You don't just take it on board like other things. Say like celebrity gossip is what I would call knowledge rather than information. Information I would class as more like data, facts and figures that you can just take in whereas things that can be varied upon like people could have different perceptions of it...of a celebrity gossip story. You read it and then you make a decision whether to believe it or not. (EFIS12)

This young person echoed the idea that gossip was information that needed to be processed in order to reach a decision as to whether it was to be believed or not. Interestingly she emphasised the need to evaluate the information received especially if it came from multiple sources:

Well gossip is information in that you gain what people think about them and how they are viewed which I think can be quite important so you can judge for yourself especially if different people know different things about the person you are talking about and then you can gain that and make your decision from it. (AFCS12)

Connection with information already internalised

When information was processed it could be incorporated into the knowledge base straight away or it could connect with information already internalised i.e. information that was stored in the repository of information as described in **Category Four** or information that had already been processed and was in the knowledge base. This young person described such a process:

In French last week you had to do homework about a French person and I needed some information from the Internet so I got the information from the Internet but you needed to put it in your own words so I put it in my own words and then I put down what I knew about this person myself. So I kind of got some information from the Internet, got information from my own brain put it together and it makes your own information. (JMCS7)

Although reference was made to the potential use of the processed information, completing a homework assignment, it was the processing of that information that was the focal point in the structure of awareness. The quote above illustrates the structure of awareness in this category where the focus of attention was on processed information in a knowledge base with the next

level of awareness on the use the information will be put to and the acquisition of information on the periphery of the structure of awareness.

This young person reflected on the information she acquired when she was younger which now formed a knowledge base to which new information connected:

Yeah as you get higher up the subjects and you are doing it for A Level things that you have been told in Year 10 are going to be explained in more detail but the basics, the foundations if you like have been laid before you can understand it later on and make the links. (KFCS13)

In the following quote the participant described how he took information in as described in **Category Four** and remembered it. He explained that it was remembered at the time rather than processed because he didn't really understand what he had been told but it was sufficiently interesting to remember. Then at a later point in time when he received some more information on the topic he was able to link the two pieces of information and process them into something that was understood:

He was saying he caught the snake and talking about a chemical thing I didn't really understand what he was on about but it was cool to think of him holding a snake and then later I was watching a programme and this man was talking about snakes and what they did with them and I remembered what my teacher had said and I made the connection and knew what he meant. (LMCS7)

Knowledge base with potential for future use

Individuals who experienced information in the way it was described in **Category Five** were aware that the processed information that was retained formed a base of knowledge that had the potential to be put to use in the future. Although reference was made to the potential use of information in the

future it was the processing of the information that was the focal point of awareness:

Well yeah there is lots of information around like I said some you just take in and remember like times and dates but other information you need to consider so that you grasp it like how to deal with money and things like that so that you know how to look after yourself when you have left home and gone to university. (SFIS13)

As well as referring to their knowledge base in holistic terms participants also referred to two distinct types of knowledge base an “academic” or “things I have learnt” knowledge base and a “social” or “casual” knowledge base. The quote from this young person expressed this way of thinking:

I suppose there is information that I would use in school sort of academic knowledge but then there is social information that is not necessarily useful but is nice to know like things about different people and what they are into. (JMIS12)

Information in a social knowledge base consisted of, among other things, “maps of relationships”, “who is in friendship groups” and “a timetable of my social life”:

You want to know about things happening around you and information you get from friends keeps you up to date. (KFCS13)

Information held in the academic knowledge base was considered by this participant as an investment for use in the future:

In school I don't know it is not like you are using it yet I think it is things that you should know so that when you start work you will know what you need to know...it is like you are accumulating it to be used in the future. (KFCS13)

The necessity of accumulating information for future use was a commonly held view. A knowledge base was seen as a requirement “if you want a really good job and earn good money”, “to succeed in life”, “to do your job and know how to live”, “to pass exams and get a job”. In this category processed information, information that had been thought about, analysed, learnt and subsequently stored in a knowledge base was frequently seen as an investment for the future:

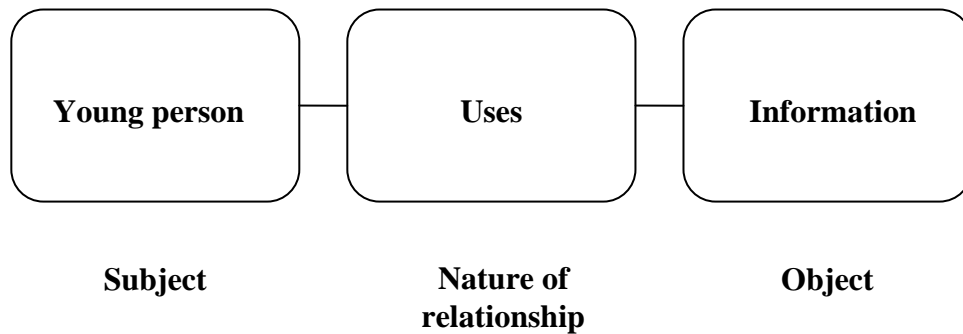
Information helps us to move on through life and helps you get better because you are learning about things and that becomes your knowledge that you keep with you to help you in life. (BMCS7)

Summary

In this category of description the focus of attention centred on the processing of information. Information was internalised and processed i.e. it was thought about, considered and analysed. After it was processed the information either directly formed part of the knowledge base or it linked with previously internalised information and then formed part of the knowledge base.

4.4.6. Category Six: Use of information

In Category Six the relationship between young people and information can be expressed in terms of putting information to use.



Description and focal point of Category Six

At the heart of this category of description was use of information. Young people who experienced information as it is described in this category focused their attention on how information was used. Information which had been internalised (as described in **Category Four** and **Category Five**) was now applied. The focus of attention in both the meaning structure and in the structure of awareness for this category centred on the use of information:

Well thinking about my life at the moment I use a lot of information. You use information to do certain things. I'm going back to playing an instrument you use information to do that and you use it to get your marching right. You have information on how to do things and you put it into action when you need it. (KFCS13)

The structure of awareness

Using information was the distinctive feature of this category. Information which had been internalised was “*put into action*”; it was used. Information that was used had either been stored, unprocessed in the young person’s repository of information within their knowledge base or it had been processed and constituted part of their knowledge base therefore knowledge base of

internalised information formed the next level of awareness. In this category acquiring information appeared on the periphery of the structure of awareness because although references were made about receiving and finding information they were not prominent. The structure of awareness for **Category Six** is shown in Figure 21:

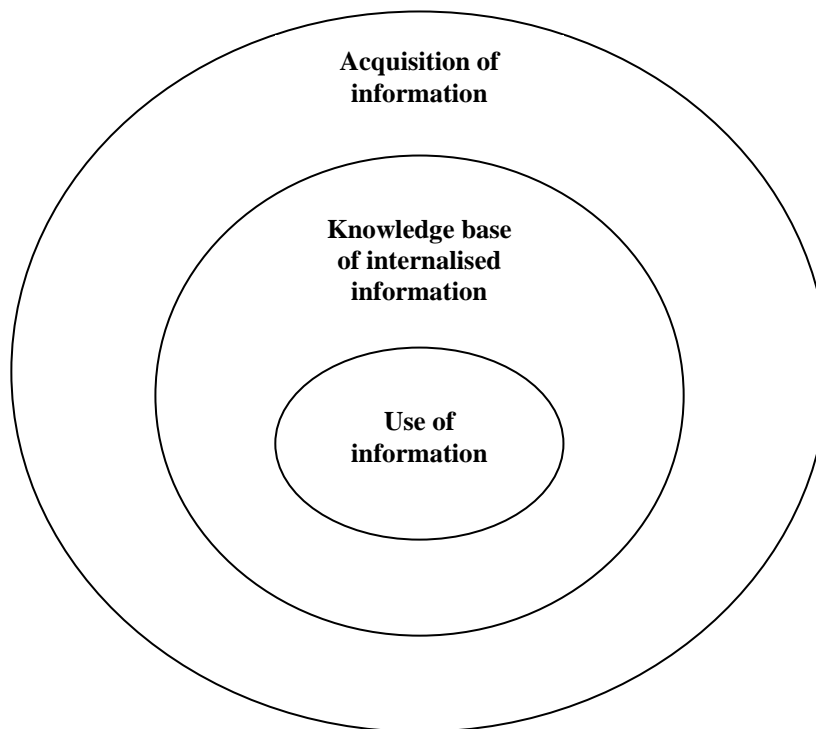


Figure 21: Category Six: The structure of awareness

The meaning structure

In this category information was used. Young people had acquired information which now made up their knowledge base. Young people who experienced information in this way were aware of putting information to use. Information that had been acquired and internalised was used for a range of purposes. It might be applied to problems that needed resolving or tasks that needed addressing or it could be passed on and shared with others for a range of purposes. The outcome of this experience of information was information was used for a variety of reasons.

The meaning structure of this category (with the *essential parts* highlighted)

Internalised *information is used* by young people for a range of purposes. There follows a detailed account of Category Six. Each of the essential parts of the meaning structure is described making clear what is distinctive about the category. The description is furnished with illustrative quotes.

Information is used for a range of purposes

When talking about information as it is described in this category of description participants used terms such as:

We all use it [information] everyday. (KFCS13)

At the end of the day everyone has to use information.
(LMCS7)

This participant expressed his belief that any information which he sought would be put to a use:

Well all information would be used. If I was looking up a university it would be because I eventually wanted to go to university so I would be motivated to look. There is nothing that I would research that wouldn't have a use. (JMIS12)

One of the ways that information was reported as being used was when it was applied to a problem or task that needed addressing. Information that had been internalised in the knowledge base was used. Information as experienced in both **Category Four** and **Category Five** was used. This participant described using information as experienced in **Category Four** i.e. information that had been stored without processing:

You have to use the information you have in lessons. You get it and then regurgitate it word for word. (SMIS12)

In the next quote the participant described using processed information. He described finding the information, processing it and retaining it in his knowledge base but it was the “use” of information that was the focal element:

I had gone onto Google and looked at the price of boxing gloves in different shops and me and my dad worked out which were the best buy so then we went to the shop and looked at a pair. I tried them on and they were good. We didn't see any others that were better so we bought them. So because I had got the information I was able to buy the best pair. (LMCS7)

Figure 22 is an illustration of the way in which one participant experienced information as described in this category:

I have drawn information inside a bubble type thing with all these lines flowing out because when I think of information I think about all the ways I can use it. (SFIS13)

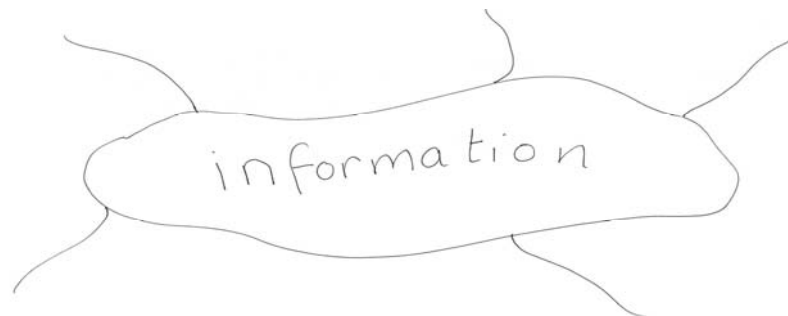


Figure 22: SFIS13 drawing

When undertaking various tasks participants described how information, that had been acquired at some point in time either currently or at some point in the past, was used. It was the use of information that was central in the structure of awareness:

I was talking earlier about using a recipe book well you get the information from the recipe book about the ingredients, what to do with them and how to cook your stuff and then you use that to make ginger biscuits. (WMIS7)

You get taught what to do and how to do it and that information is important to what you are doing in the band, which is trying to play the tune and to play the tune right and get the performance done ready for contest. (KFCS13)

Information was also experienced within this category as something that could be passed on to others or shared with them. The terms “pass on” and “share” were used synonymously by the participants:

I share things with my friends. (CFIS7)

When I tell my friends things I am passing on information. (EFIS7)

Information was widely experienced as something to be shared. The two quotes which follow are representative of those of a number of participants:

If someone tells me something like gives me some information I would go and tell someone else. I wouldn't just keep it to myself I'd share it with my friends. (RFIS7)

When I go to gigs it is much more me giving information because I will speak to my friends I will talk about what I have done at school or what I have been doing recently. (SMIS12)

This participant explained that she had drawn a mobile phone because she was aware of exchanging information with her friends (see Figure 23):

If people say information I just think of using a phone to pass information on to my friends. That is what I do most on my phone swapping information with each other really.
(AbFCS12)

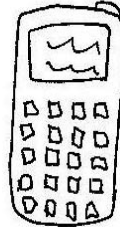


Figure 23: AbFCS12 drawing

As in the case of addressing a problem or task when passing on or sharing information both unprocessed and processed information was used. This young person described passing on unprocessed information in a science lesson at school as “*regurgitating the information*”:

Yes it is because science is much more fact based, it has been proven and you can't really add anything else to it. Even though I don't always understand everything it is not a problem because when you do work in a science workshop and you tell each other information it is much more a regurgitation of information. (SMIS12)

The following participant explained how information which had been processed was passed on:

Well you pass information on. A friend might tell you some gossip about someone you know in common and you choose...you make a decision whether to believe it or not, you choose to make it information based on whether you believe it or not and then you pass it on to other people. (EFIS12)

When talking about using information two young people talked about the importance of using it wisely. The first quote comes from a young man who is describing the different ways in which information (knowledge) can be used:

When information has been processed then I would call that knowledge and then you have wisdom I think that is almost an emotion inside you ...so that you can actually possess knowledge the right way and use it. I suppose a bit like well I suppose you'd say people who are clever but don't use it the right way are not very wise and people who are clever and do use it the right way are wise. (WMIS7)

In the following quote the young person described a time when she was conscious of thinking carefully about how she used the information she possessed:

Like recently a girl in my boarding house got anorexic and I caught on and I think she assumed that I knew because I used to be in her friendship group and she was talking to me about it and so it kind of clicked and then everyone kept on offering her food and you could see it getting to her and so I told people who wouldn't gossip about it and would make sure that everything was OK around her. (SFIS13)

Summary

In this category of description the focus of awareness was using information. Information which had been internalised and used to construct a knowledge base was “*put into action*”. Both processed and unprocessed information was used. Two main ways of using information were referred to by young people. It could be applied to a problem or task that needed addressing or it could be passed on or shared with others for a variety of purposes.

4.5. Summary

The outcome of a phenomenographic study is an outcome space consisting of a finite set of categories of description which, with their relationships, explain the different ways individuals experience phenomena in the world. Chapter Four has presented the findings of the phenomenographic investigation into the different ways young people experience information. The outcome space was presented in the form of two diagrams which mapped the different ways young people experienced information based on meaning structure and structures of awareness. A total of six categories of description emerged from analysis of the data. Each category was described in detail. The descriptions included drawings and quotes from participants, extracts from interviews and words from participants woven into the text. Chapter Five presents a discussion of the research findings.

Chapter Five: Discussion

5.1. Introduction

The purpose of this research study was to contribute to the knowledge and understanding about the ways young people experience information. As outlined in Chapter One the aim of the study was to investigate and document the variety of ways in which young people of secondary school age experience information in all aspects of their lives. Four research questions were addressed:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

The study used a phenomenographic research approach which allowed experiences to emerge from the data and also showed the variation in the experiences and how the experiences were logically related to each other. The Findings Chapter reported the qualitatively different ways that young people experienced information. These different ways of experiencing the phenomenon were reported as logically related categories of description in an outcome space (see Figures 3 and 4). The six categories of description addressed the first research question:

- What are the qualitatively different ways young people experience information?

The outcome space presented the essential parts of the meaning structure and the structure of awareness of each experience of information and outlined their relationships with each other. The outcome space together with the categories

of description provided an answer to the second, third and fourth research questions:

- What is the variation between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

In this chapter consideration will be given to what the findings reveal about young people and information and how their experiences of information relate to the ideas and issues in the literature discussed earlier in the thesis. The chapter comprises:

- Discussion arising out of the phenomenographic analysis: What is learnt from the categories of description and the relationships between them;
- Young people's experiences of information: What is learnt about young people and their relationship with information;
- Young people's experiences of information: How they relate to the ways in which information is understood by LIS scholars

Reflections on the use of the phenomenographic research approach; the implications of the findings for professionals in the fields of education and library and information science and recommendations for further research will be addressed in Chapter Six.

5.2. Discussion arising out of the phenomenographic analysis: What is learnt from the categories of description and the relationships between them

There follows a discussion of issues arising from the phenomenographic analysis of the data. The study found that young people experienced information in six different ways. Each experience is described in a category of description:

- **Category One:** Knowledge of sources of information;
- **Category Two:** Receiving information;
- **Category Three:** Process of finding information;
- **Category Four:** Store of unprocessed information;
- **Category Five:** Processing information;
- **Category Six:** Use of information.

In each category young people described in detail how they experienced the phenomenon of information. Each category will now be discussed individually with consideration given to what we learn from each category about how young people relate to information and how this relates to the literature surveyed earlier in the thesis. Consideration is also given to what is learnt from the relationship between all of the categories in the outcome space. The structural relationships between the categories of description reveal how information is experienced by young people; they give an insight into young people's awareness when they deal with information. An understanding of the relationships between the categories of description is an important element in comprehending how young people experience the phenomenon of information and in particular is important in enabling LIS professionals and educators to understand and facilitate more efficient handling of information. For instance it will be seen later in this section that young people who experienced information as described in Category Three (Process of finding information) reported no awareness of information use. This is a finding that educators could address in the light of the study by Moore (2000) where she found that having an understanding of how information was going to be used supported students in evaluating information. The outcome space presented in the Findings Chapter and reproduced here (Figures 24 and 25) maps the structural relationships between all the different ways information is experienced by the young people who participated in the study.

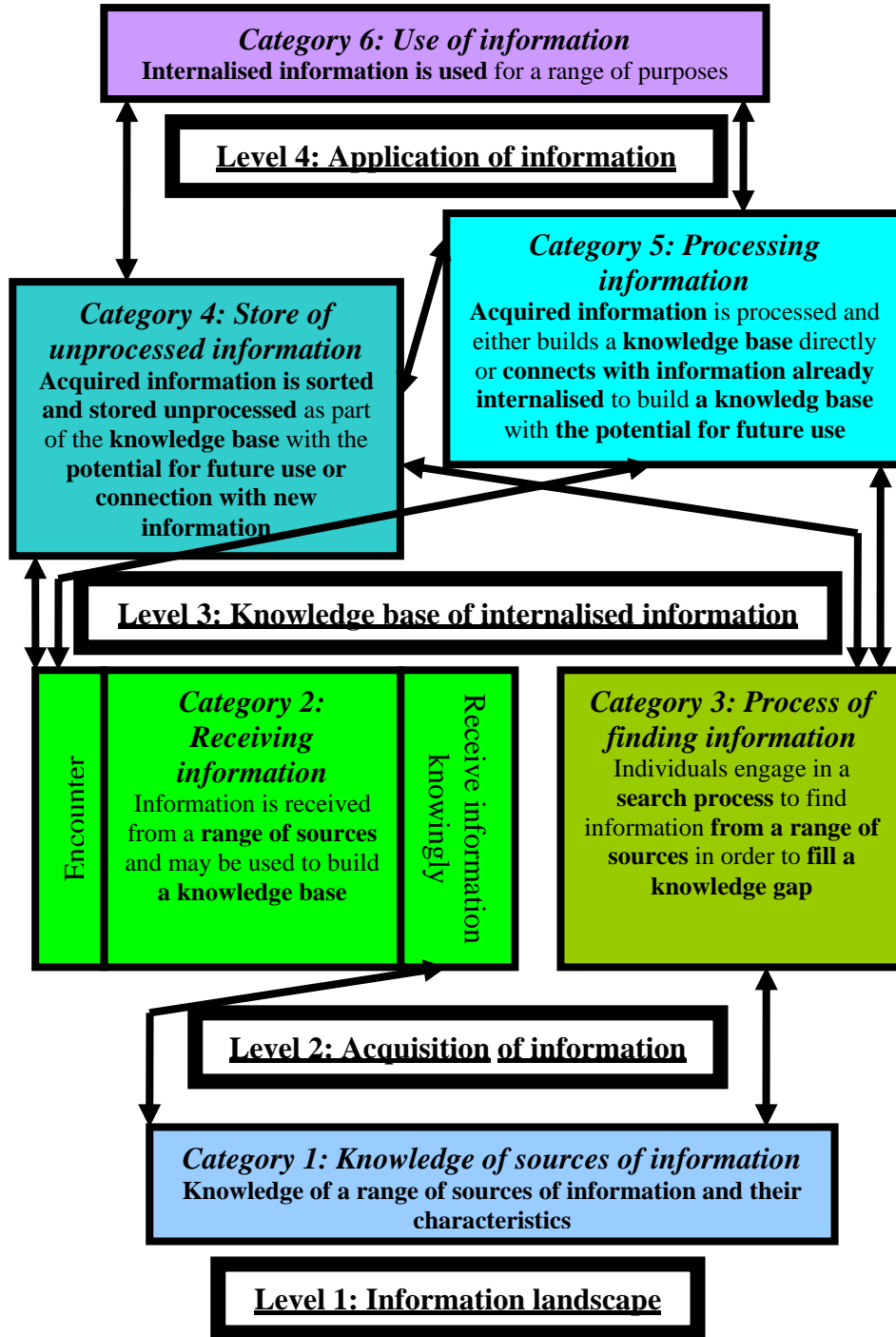


Figure 24: Outcome space showing the relationships between the categories derived from meaning structures

➔ Arrow indicates the inclusive hierarchical nature of the outcome space.

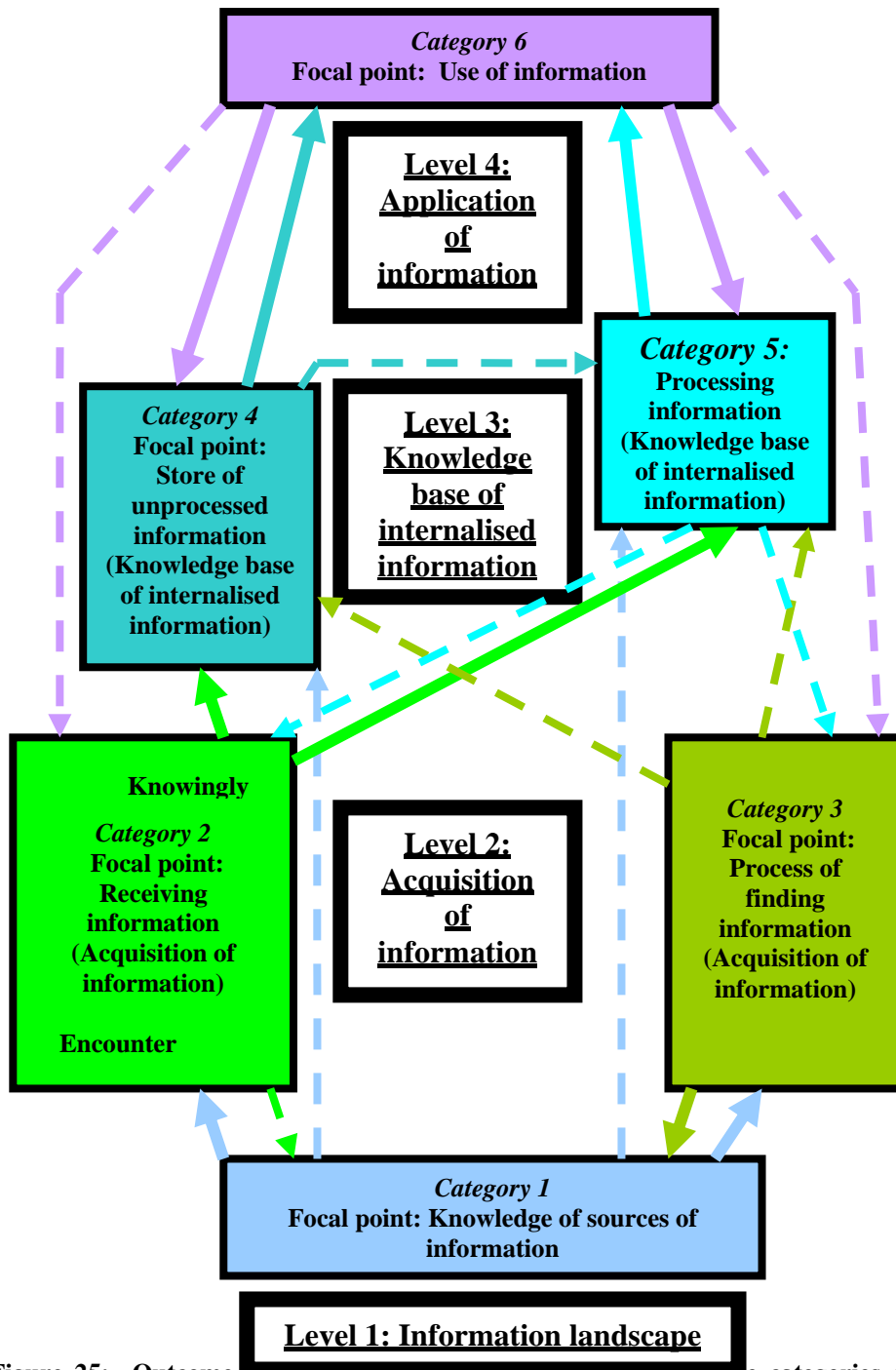


Figure 25: Outcome space showing the relationships between the categories derived from structures of awareness

Key



Second level of awareness



Periphery of awareness

5.2.1. Category One: Knowledge of sources of information

One of the ways in which young people in this study were found to relate to information was through the sources where it was held. In Category One information was experienced as something which was observed this was a distinct feature of Category One. One dimension of variation which was identified in the study was how information was experienced in relation to the individual, i.e. experienced as an external, objective phenomenon or an internalised, subjective phenomenon. In Category One information was experienced as an external, objective phenomenon that resided in sources of information. Buckland (1991a, p.352) stated that with the evolution of language and the expansion of information technology it was becoming more common to refer to the sources of information as 'information'. This was evident amongst participants who experienced information as it is described in Category One (Knowledge of sources of information). Comments such as "*You have got Google and that is information*" exemplify this. Also supporting this assertion is the fact that in this study, when asked to draw the first thing they thought of when they heard the word information thirteen of the forty one participants drew sources of information.

Although technology made up part of the way information was experienced as described in Category One it was not found to be a stand alone category. This supports the work of Shenton (2002, p.178) who found that young people did not associate the word information with information technology. In contrast Bruce (1997, p.131) found that one conception of information literacy amongst higher educators participating in her study was the information technology (IT) conception. Similarly Webber, Boon & Johnston (2005) also found that participants in their study about academics conceptions of information literacy conducted between March 2003 and February 2004 had an IT conception. Possible reasons for this difference in findings could be the lapse of time between the studies being conducted with technology more embedded in society today than at the time when Bruce (1997) and Webber, Boon and Johnson (2005) conducted their studies or the age differences in the study populations.

In Category One young people described how they experienced information through their knowledge of sources of information. This experience of information has much in common with the information sources conception in the studies into conceptions of information literacy by Bruce (1997, p.122) Webber, Boon and Johnston (2005) and Maybee (2006, p.82). It also supports findings in the studies by Shenton (2002, p.166) and Shenton, Nasset and Hayter (2008, p.154) where in each study one of the strands defining the word information was the sources driven strand.

Some of the main sources of information and their characteristics as reported by the participants will now be discussed. One source used universally was the Internet. Participants reported feeling at ease when using various technologies to access the Internet. All participants reported accessing information from the Internet. This supports the findings of Livingstone (2006, p.5) and Macgill (2007) who report widespread use of the Internet by young people. The findings reported in Category One also highlighted the fact that young people accessed a range of social and academic information from the Internet. This supports studies by Oblinger & Oblinger (2005); Project Tomorrow (2006) and Livingstone & Bober (2005) where young people were found to use the Internet to access information for a range of purposes.

The focus of young people's experience in Category One was on knowledge of sources of information and an understanding of their characteristics. The Internet was frequently viewed by young people in the study as a single source of information, which was used more than any other source. Indeed it was often seen as the biggest source of information available. Young people's understanding of the Internet described in this finding is in line with the findings of Julien and Barker (2009, p.14). Participants in their study viewed *"Google as being "the" Internet"*. This finding also supports the findings of Lukin, Rimmer and Lloyd (2001) cited in Large (2005, p.355) who found that nine and ten year old children in their studies often failed to perceive the Internet as a collection of networked resources from different providers. In contrast Bruce (1997, p. 131) found that higher educators in her study did perceive the Internet in such a way. They viewed the use of the Internet as a

means to execute a process to find a source of information. The implication here is that the young people who experienced information as described in Category One did not have a clear understanding of how information was organised and therefore were less likely to use the Internet effectively. This finding clearly indicates the need for an information literacy training intervention at an early age to address this problem.

In school all participants reported experiencing information through their use of books. Information supplied by textbooks in school was highly valued not least because the textbooks were supplied by teachers and therefore the information was deemed to be accurate, reliable and credible. This supports the findings of Julien and Barker (2009, p.14). Students in their study valued textbooks provided by the school to accompany courses studied for the same reasons. Information within textbooks was deemed by young people to be accessible because of retrieval aids such as contents and index pages. Textbooks in particular were recognised as providing information more specific to the different age ranges and therefore avoiding the problems of complex language encountered on the Internet. These findings echoed those reported by Large and Beheshti (2000, p.1075).

A characteristic of books which was particularly valued was the physical presence of information. Participants who experienced information as it is described in Category One deemed the ability to refer back to academic information in books important. Academic information was considered to be an investment to be retained for use in the future. Participants reported that they liked being able to “*hold the information*” they liked to know where it was. Sources of information that facilitated easy recall were valued. Books were considered especially useful for this purpose.

People were deemed by all participants to be a universally popular source of information. Similarly Edwards (2005, p.150 & p.160) found that in her study of experiences of web based searching students used people as sources of help when searching. Young people are social animals living in an age of technology; they learn in a social way therefore experiencing information

through interaction with people is not surprising. A range of people were referred to as sources of information, family, friends, teachers and experts in various fields. This finding supports the findings of Krikelas (1983); Poston-Anderson and Edwards, (1993); Latrobe and Havener (1997); Shenton and Dixon, (2003b); McNicol, (2003) Agosto & Hughes-Hassell, (2005) and Smith and Hepworth, (2005; 2007).

Characteristics of people as an information source explain why information from people was valued for a number of reasons. Participants deemed that information from people was easier to understand. In common with Latrobe and Havener's study (1997, p.197) participants talked about people filtering information and presenting it in an interesting and understandable way. Meyers, Fisher and Marcoux (2009, pp.222-228) found that trustworthiness was deemed to be a significant factor in choosing a source of information by nine to thirteen year olds. Many participants in this study felt that information from people was more trustworthy than information from other sources. Shenton and Dixon (2003b, p.230) found that children appeared to lack the skills to evaluate people as information sources. In contrast the participants in the present study did indicate some evaluative skills in this area. They reported finding it easier to trust information from a person but stipulated that trust was more forthcoming if the person was known to them. Young people were wary of information received from strangers. Known individuals were easier to evaluate, as explained by one participant "...you can sort of figure out who the relevant person is to ask...". This is in line with the assertion by Krikelas (1983, p.16) that a source is used based on convenience and known individuals are always preferred.

Previous literature and research has made little reference to accessing information from the natural environment however in Category One the natural environment was cited as a source of information. For instance one participant explained how he could ascertain what the weather was going to be like by looking at the clouds. This supports the view espoused by Brookes (1974, p.142) that the observation of the physical environment should be considered just as much a source of information as a document. When

considering sources that young people might use to access information LIS professionals and educators should be aware that some young people view the natural environment as a source of information.

The structural relationships between Category One and the other categories

The structural relationship between Category One (Knowledge of sources of information) and other categories demonstrates that, compared to all the other categories, young people who experience information as described in Category One have the least complex relationship with information. Relating back to the outcome space (Figure 25) it can be seen from the findings that Category One does not feature in the structure of awareness of the categories where information is internalised i.e. Category Four (Store of unprocessed information), Category Five (Processing information) and Category Six (Use of information). Although the inclusive, hierarchical nature of the outcome space means that knowledge of sources of information (Category One) is embraced by all categories higher up the hierarchy it only features in the structure of awareness or is an essential part of the categories where information is viewed externally i.e. Category One (Knowledge of sources of information), Category Two (Receiving information) and Category Three (Process of finding information).

In Category One the central focus of young people was on knowledge of sources of information, on their characteristics, relevance and functionality. Young people considered their ability to interact with a source of information in terms of its characteristics i.e. how information is organised within a source, how to access information from a source, knowledge of the time and effort required to do so and also about the appropriateness of a source for the information they required. As noted above this finding is in line with the findings of Bruce (1997, p.122); Webber, Boon and Johnston (2005); Maybee (2006, p.82); Shenton (2002, p.166) and Shenton, Nasset and Hayter (2008, p.154).

Given the environment that young people live in today, where sources of information are much in evidence both in the home and in the academic environment, it is not surprising that they experience information in terms of their relationship with sources of information. Information can be seen as an abstract phenomenon and some young people may find it easier to refer to a concrete representation of information in the form of an information source. Case (2002, p.62) makes the point that information in contrast to knowledge is often represented by something tangible such as physical objects and Buckland (1991a, p.351) talks about “information as thing”.

Young people who experience information as described in Category One assessed the usefulness of the source for acquiring information. Thoughts about the information itself, about internalising it in the knowledge base lay on the periphery of their structure of awareness and there was no apparent awareness of how information was going to be used. This was in contrast to the findings by Bruce (1997, p.122) and Webber, Boon and Johnston (2005, p.10) who found that participants in their studies who had a conception of information literacy where the central focus was on information sources did have an awareness of information use. The relationship between young people and information was simple. Information was experienced objectively as something external to the individual. Individuals related to information through the sources of information.

5.2.2. Category Two: Receiving information

In Category Two young people experienced information as something received. Experiencing information in this way was the distinctive feature of Category Two. With regard to the dimension of variation relating to how information was experienced in relation to the individual information was experienced as an external, objective phenomenon. Receiving information refers to the cognitive process of becoming informed. Category Two is divided into two subcategories, subcategory A (Receiving information knowingly) and subcategory B (Encountering information). The findings outlined in this category are significant. A significant number of LIS studies refer to

information seeking however fewer LIS studies refer to information as something that is received. One notable exception is the study by Beverley, Bath and Barber (2007, p.22) who report that some of the visually impaired participants in their study viewed information “solely in terms of the information they received.”

Individuals acquire information in a number of different ways. Wilson (2000, p.49) recognised that information seeking can range from active to passive seeking. Bates (2002) in her integrated model of information seeking and searching also recognised the different ways individuals acquired information, ranging from active to passive seeking, describing active information seeking as searching and browsing and passive information seeking as monitoring and being aware. Erdelez (1999) argues that the use of the term “information-seeking”, by LIS researchers, for all sorts of information acquisition is a misnomer because it does not take account of passive and opportunistic information acquisition.

Erdelez (2005) introduced the concept of information encountering (IE) to the information behaviour literature. IE is broadly defined by Erdelez in her initial research as “a memorable experience of an unexpected discovery of useful or interesting information” (Erdelez, 2005, p.179). Subsequently Erdelez (2005, p.180) has refined the definition of IE as “an instance of accidental discovery of information during an active search for some other information”. It should be noted that encountering information as it is described in subcategory B of this study is defined as “a memorable experience of an unexpected discovery of useful or interesting information” (Erdelez, 2005, p.179).

Encountering information cannot be described as a passive activity in the sense that when information was encountered by individuals there was recognition at some level that the information was relevant to them. Nevertheless individuals who encountered information as described in subcategory B engaged in no process at all; they just “*bumped*” into information. Information was encountered in a number of ways. It was

described as being “*overheard*”, “*noticed*” or “*discovered*”. It was considered to be interesting information that “*grabbed my attention*” or “*caught my eye*”. Participants thought that the information which was encountered had some relevance to their lives or had the potential to be useful in the future. This finding is in line with the definition of information encountering given by Erdelez (2005, p.179) as “a memorable experience of an unexpected discovery of useful or interesting information”.

Unlike young people who described receiving information knowingly (subcategory A) young people who encountered information (subcategory B) made no conscious effort to place themselves near an information source. When they talked about an episode of encountering information they described their reaction as one of “*surprise*”, as something they had not been expecting however the fact that information was something that was encountered in the course of everyday life was not in itself considered surprising. Young people expressed awareness that the environment in which they lived, both academic and social was an information rich environment. They were aware of the information landscape.

The findings make apparent that there is an evident awareness amongst young people that they are at a stage in their life where information can be understood as something that they receive. The findings highlighted in subcategory A (Receive information knowingly) describe how young people experience information as something that is received knowingly. These findings are important as they offer a new insight into information behaviour of young people. This subcategory describes individuals who fall somewhere between those described in subcategory B who engage in no process to encounter information and those described in Category Three, who actively engage in a process to find information. A comparison can be made here with the receiver of information outlined in Shannon’s theory of information (1948). In Shannon’s theory the transmitter selects and sends the information to the receiver who passively receives it. Receiving information knowingly was not described by the participants in this study as a passive activity. Receiving information knowingly required some effort on the part of young

people. They had to use their knowledge of the information landscape to place themselves in positions where information could be received such as the correct lesson or the appropriate friendship group. They were required to “*listen carefully*” or “*concentrate hard*”. One of the questions raised in the literature review (section 2.4.4) was whether young people always experienced information as something that was needed. The findings from this study have demonstrated that the young people who experienced information as it is described in subcategory A (Receive information knowingly) did not necessarily have a known information need or gap. In other words they did not necessarily, consciously identify a need or want for specific information but they did recognise the need to acquire information to place in their knowledge base for future use and in the process they had to recognise and identify what was relevant to them. What they experienced is better described as an awareness of the need to acquire information in order to garner the skills and knowledge that would be required in their future lives. They used their knowledge of the information landscape to place themselves in positions where information could be received. This behaviour falls somewhere between passive information behaviour and active information seeking. This type of information behaviour is not acknowledged in LIS literature. Erdelez (2004, p.1013) referred to opportunistic acquisition of information (OAI) and described it as “interesting and useful information” that users often find “without purposeful application of information searching skills and strategies”. Erdelez (2005, p.180) described information encountering (IE) as one type of OAI. At the same time Erdelez (2005, p180) recognised that in addition to IE there are other types of OAI that need to be identified. The findings of this research suggest that the information acquisition described in subcategory A constitutes a form of opportunistic acquisition of information previously unidentified.

In Category Two information which was received was viewed as something which could be used to build a knowledge base, as outlined in the structure of awareness diagram for Category Two (Figure 8). This applied in both the academic and social context. Information was considered to be an investment

for the future. This finding supports the findings of Sandfort and Haworth (2002).

The findings presented in Category Two (Receiving information) have implications in terms of teaching young people to become independent learners and critical thinkers. Educators need to recognise and address young people's need:

- To invest in information for future use and not just to meet a current need;
- For good knowledge of sources of information and the information landscape;
- To move away from a mindset that understands information to be something that is received readily tailored and evaluated to a mindset where they make independent use of critical thinking skills.

There is a place within the secondary education system for LIS professionals to contribute their knowledge and understanding and work collaboratively with educators to ensure that young people are well prepared to live in an information rich environment.

The structural relationships between Category Two and the other categories

The structural relationship between Category Two (Receiving information) and the other categories demonstrates that the relationship between young people and information is more complex than that seen in Category One (Knowledge of sources of information). Young people who experienced information as described in Category Two focused their attention on receiving information. Information was either received knowingly (subcategory A) or it was encountered (subcategory B). As in Category One information was still experienced objectively as something external to the individual but hierarchically this category is placed on the Level Two (Acquisition of information) above Level One (Information Landscape) because young people who experienced information as something received had knowledge of the information landscape. Knowledge of sources of information was on the

periphery of their awareness. At the second level of awareness was internalising information in their knowledge base.

Information that was received was placed in the knowledge base and kept there until it was needed. When young people received information they needed to be competent to make decisions about whether to store it for future use or to reject it. Participants who experienced information as it is described in Category Two (Receiving information) had knowledge of the information landscape. Young people who experienced information as described in subcategory A (receive information knowingly) were alert to the possibility of receiving information within certain contexts and had knowledge of the sources of information within those contexts i.e. they had knowledge of the information landscape. Sources of information are on the outer edge of awareness because in most cases the experiences of young people were in contexts where they knew and trusted people who were giving them information e.g. information which came from parents or from teachers in school so they were not necessarily inclined to question it.

5.2.3. Category Three: Process of finding information

In Category Three (Process of finding information) the relationship between young people and information is expressed in terms of people engaging in a process to find information from sources of information in order to fill a knowledge gap. Experiencing information in this way was the distinctive feature of Category Three. This way of experiencing information echoes the findings in studies by Bruce (1997, p.128); Shenton (2002, p.171) Edwards (2005); Maybee (2006, p.82) Williams and Wavell (2007, p.203) and Lupton (2008, p.405). With regard to the dimension of variation relating to how information was experienced in relation to the individual information was experienced as an external, objective phenomenon.

Reflecting on findings in the literature (Minudri 1974, pp.155-161; Fourie & Kruger 1995, pp.227-244; Shenton & Dixon 2003a, p.10; Agosto & Hughes-Hassell 2005, p.160) a range of social and academic needs gave rise to young

people engaging in a search process. Young people who experienced information as described in this category described the process of finding information in a number of different ways but all of the descriptions of the process had at their core a set of steps comprising an information problem in the form of a need or want; action taken to satisfy the information need or want and a resolution of the information problem. The stages of the process of finding information that the participants described echo the stages referred to in a number of models of information seeking including those of Krikelas (1983), Wilson (1997) and Kuhlthau (1988). The participants in the study by Bruce (1997, p. 130) who experienced information literacy in terms of information processes also described the process in a number of different ways but with the same core set of steps.

No two searches are necessarily the same. Participants who experienced information as described in Category Three reported a process involving a number of different search strategies. Sometimes there was an element of planning involved but this was not always the case. When searching for information on the Internet young people reported little planning instead they employed a more exploratory way of searching. The interactive nature of the Internet meant that searching was often hit and miss with youngsters clicking on hyperlinks and moving from page to page. This confirms what was previously posited by Valentine (1993, p.302) that young people are reactive researchers and by Schacter, Chung and Dorr (1998) and Fidel *et al.* (1999) who found no use of systematic planning and searching amongst young people. It also supports the assertion by Frand (2000, pp.17-18) that young people today are less inclined to follow a logical approach to problem solving.

A range of difficulties which young people experienced when searching for information such as appropriate use of search terms and information overload are well documented in the literature (Large 2005). Participants who experienced information as it is described in Category Three reported encountering similar difficulties during the process of finding information. Nevertheless it was evident that a lot of thinking was taking place when conducting a search. There was an awareness of various search options and

different search strategies were used. Young people when faced with difficulties tried hard to find solutions. They developed strategies such as attempting to refine search terms or turning to friends for help. It is, however, concerning that the majority of participants described conducting searches for information alone, out of school and without any support. The Information Search Process (ISP) model developed by Kuhlthau (1988) demonstrates that individuals commonly experience a dip in confidence once they have initiated a search and begin to encounter conflicting information. In order to help young people become more effective information seekers steps should be taken, within the school environment, to offer young people the opportunities to conduct searches with support and guidance provided. Rowlands *et al.* (2008, p.303) indicate the need for information skills to be developed during formative school years citing research from the US which suggests that intervention at university age is likely to be ineffective as young people will have developed “ingrained coping behaviour” by then.

The structural relationships between Category Three and the other categories

The structural relationship between Category Three (Process of finding information) and the other categories places Category Three on the Level Two (Acquisition of information) of the hierarchically ascending structure of the outcome space alongside Category Two (Receiving information). In Category Three the relationship between young people and information was expressed in terms of people engaging in a process to find information from sources in order fill a knowledge gap. This concurs with the view of information as something that fills a gap or reduces an uncertainty in existing knowledge (Atkin 1973; Belkin, Oddy & Brooks 1982 and Dervin 1983). This experience of information also echoes the findings in studies by Bruce (1997); Shenton (2002) and Maybee (2006). As in Category One (Knowledge of sources of information) and Category Two (Receiving information) young people who experienced information as it is described in Category Three (Process of finding information) experienced information objectively as something external to the individual.

Information resided in sources of information. Knowledge of sources of information is at the second level of awareness. This has some commonalities with the first three categories in Edward's (2005) phenomenographic study of students' experiences of web based information searching where, though not the central focus of attention, there was nevertheless an awareness of the information environment. In Category Three (Process of finding information) young people related to information by interacting with it in a mechanical rather than a cognitive way. The relationship with information was more active than the relationship in Category One (Knowledge of sources of information) and Category Two (Receiving information). Young people had to execute a process of finding information. They needed to have knowledge of sources of information and know how to locate and access information. The structure of awareness for Category Three (Process of finding information) differs from the awareness structure Bruce (1997) found amongst participants in her study who perceived information described in the information process conception. In her study of higher educators Bruce (1997) found that the higher educator's second level of awareness was on information use. Indeed information use is present in all seven conceptions found by Bruce. As previously stated Moore (2000) in her study of primary school children in New Zealand observed that having an understanding of how information was going to be used supported students in evaluating information. In Category Three of this study (Process of finding information) young people showed no awareness of what use the information was going to be put to. Even at the peripheral level of their structure of awareness there was no awareness of information use. Instead at the periphery they were aware of internalising information in their knowledge base once it had been found. One possible explanation for the difference between the participants' structure of awareness in this study and that of Bruce (1997) could be that compared to the higher educators in Bruce's study (1997) the young people in the present study had not had enough training or practice in the use of sources of information to have achieved the necessary level of confidence to allow them to move their attention away from the sources and onto the way in which the information was to be used. Thinking beyond internalising information in their knowledge base and considering the use information will be put to could

support young people in evaluating information effectively. Having an awareness of how information is to be used could also facilitate the decision on how to internalise information appropriately into the knowledge base, whether or not it should be processed.

Within the school environment there was little mention of information being experienced in the way it was described in Category Three (Process of finding information). In school information was more often experienced as something that was received. This was especially so in the case of the younger participants. That is not to say that young people did not have to find information relating to school work. Indeed a large volume of information that needed to be found was school related. Given the restrictions of the timetable participants said they often had to find information as part of a homework task to be completed out of school alone and unsupported. Educators should be aware of this finding and its implications for young people's ability to be effective searchers of information.

5.2.4. Category Four: Store of unprocessed information

In Category Four (Store of unprocessed information) young people experienced information as something that was stored, unprocessed. Experiencing information in this way was the distinctive feature of Category Four. In contrast to the first three categories information was experienced as an internalised, subjective phenomenon. Participants referred to storing a range of unprocessed information such as times and dates, information for use in school assignments, and exams and also information that could be used at some point in the future. Although there are no direct similarities some correspondence can be drawn between this category and categories in the studies by Bruce (1997) and Maybee (2006; 2007). In her study Bruce (1997, p.132) referred to storing information in the Information Control Conception where the emphasis was on the human brain storing and controlling information. The Information Control Conception, however, differs from Category Four (Store of unprocessed information) as described in this study in that information was viewed as something external to the individual and not

part of the knowledge base. There were, nevertheless, three categories in the study by Bruce (1997, pp.137-151) where the emphasis was placed on a knowledge base (the knowledge construction conception, the knowledge extension conception and the wisdom conception). Some similarities exist between these categories and Category Five (Processing information) in this study. Maybee (2006, p.83) does not refer directly to storing unprocessed information but does have a category with emphasis on the knowledge base. Having established that there are some commonalities between the studies it can nevertheless be stated that the experience of information described in Category Four (Store of unprocessed information) of this study is one that has not been referred to in previous studies. Young people described information as it was experienced in Category Four as knowledge. The only criterion necessary for it to be knowledge was for it to be information that was known. This finding is significant as it demonstrates a difference in the understanding of knowledge described by young people in this study and that outlined in the LIS literature (Machlup, 1983, pp.642-644).

Information needed to be remembered but whether or not it needed to be understood by them depended on how it was to be used. Some factual information might be understood and stored in the knowledge base awaiting future use or it might be understood and stored in the knowledge base and await connection with new information as described in Category Five (Processing information) but if information was not understood that was not seen to be a problem by young people as long as the fact was remembered and could be recalled for future use. One participant exemplified this when he referred to using information he had acquired during science lessons. He described science lessons as more “*fact based*” than some other lessons and said that although he sometimes had problems understanding all of the information it was more a matter of remembering the information and then regurgitating it, when required to do so at a later point in time. This correlates to Marton & Säljö’s description of a surface approach to learning (Marton 1994; Marton & Booth 1997, p.22). In their studies in the 1970s Marton & Säljö found that students with a surface approach to learning concentrated on the text itself rather than the bigger picture, identifying isolated facts which they memorised in

the belief that this is what was expected of them. This was in contrast to students with a deep approach to learning who focused on the meaning and understanding of the text. A number of participants made the additional point that information as printed in a textbook, which the teacher had directed them towards, was the “*right information*”. It was exactly what the teacher wanted and any attempt by them to alter it in any way would be wrong. Lupton (2008, p.402) in her analysis of the qualitative variation in students’ experiences of information literacy lists ‘Finding the right answer’ as one conception. This conception is associated with a surface approach to learning. Interestingly this reason was also given for copying and pasting from web pages and copying information from books rather than paraphrasing or summarising it. This generation of young people are often referred to as a “cut and paste” generation (Rowlands *et al.* 2008, p.300) and the assumption is made that they are lazy in their approach to using information. This finding is therefore significant as it explains that young people feel the need to “cut and paste” in order to produce the “*right information*”.

Some information which participants referred to in Category Four (Store of unprocessed information) was understandably information that could be stored without the need to engage with it too deeply, information such as pin numbers, times and dates. It was not information that they considered needed to be analysed, it needed to be remembered and recalled at the appropriate time. It could be argued that this was also the case for some of the factual information which participants referred to storing, unprocessed, in the school environment; however the frequency with which participants, particularly the younger participants, experienced information in the school context as described in Category Four is concerning. The findings reported in this category highlight the fact that a number of young people understood that they were being asked by their teachers to find “*the right information*”. They understood “*the right information*” to be factual information which must not be altered. This meant that they were reluctant to think about information and evaluate it in any way. They were satisfied in the knowledge that if a teacher had directed them to information then the teacher had evaluated it and it did not need any further evaluation. In a sense this stripped the young people of

the need to personally evaluate information, described as a more advanced skill in Bloom's taxonomy of thinking (Bloom, 1956). As a result of this young people are acquiring a mindset where they are failing to engage with, and in some cases, even understand the information they are storing. This means that learning is taking place only at a surface level and not at a deep level placing little emphasis on critical thinking skills and analytical skills. It could be argued that this might be a contributing factor to the finding by Rowlands *et al.* (2008, p.295) that young people in their study were failing to evaluate information. It is interesting to speculate whether young people's understanding of what teachers require of them i.e. storing "*the right information*" without processing it is the same as teachers' understanding of what they require the young people to do. At the moment young people are getting a message that they do not necessarily need to engage with all information. In terms of becoming an information literate individual dealing with information at a surface level like this is a missed opportunity and does nothing to equip young people with the skills they will need to deal with information as they go through life. Young people need to be made aware that as well as remembering information it is also important to understand and critically analyse information.

In both Category Four (Store of unprocessed information) and Category Five (Processing information) young people described how they sorted information that they had acquired and made a decision to either retain or reject the information and a further decision about whether or not the information should be processed. Deciding how information was to be sorted and retained could occur either consciously or unconsciously. Looking at the structural awareness of Category Four (Store of unprocessed information) and Category Five (Processing information) it can be seen that the second level of awareness is the use of information. Moore (2000) claims that an understanding of how information is going to be used supports young people in evaluating information. Reflecting on how information is to be used helps to facilitate the decision making process regarding how information is to be sorted and retained. Reflection is also important because sometimes information has been encountered and it is only with reflection that an individual realises that

they have taken that information in. Reflective practice can lead to metacognition. Information previously stored in an unprocessed form can be processed or linked with new information.

5.2.5. Category Five: Processing information

In Category Five (Processing information) the relationship between young people and information was expressed in terms of processing information. Experiencing information in this way was the distinctive feature of Category Five. This is in line with findings from studies into conceptions of information literacy (Bruce, 1997; Webber, Boon & Johnston 2005; Boon, Johnston & Webber 2007; Williams & Wavell, 2007) and studies into information use (Maybee 2006; Maybee 2007) young people experienced information as forming a knowledge base. As in Category Four (Store of unprocessed information) information was experienced as an internalised, subjective phenomenon; a decision was made to either retain or reject information based on its value to the individual. A further decision was then made to process information. Young people thought about the information and its relevance to them. They considered how the information might be used. In the structure of awareness their second level of awareness was the use of information. In Category Five (Processing information) young people described the need to process information in order to understand it. This was not the case in Category Four (Store of unprocessed information). Information as it was experienced in Category Five had commonalities with the deep approach to learning as reported by Marton and Säljö (Marton 1994). Students who demonstrated a deep approach to learning placed an emphasis on engagement and understanding. Information as it was experienced in Category Five (Processing information) was retained; it was internalised and processed and became part of the knowledge base.

Participants did not find it easy to describe how they processed information. A number of different terms were used to illustrate what they meant by process: think about; learn; interpret; weigh up; put into own words. All of their descriptions involved some form of cognitive activity. This is in line

with the assertion by Machlup (1983, p.644) that cognitive processes lead to changes in a person's knowledge. It also corresponds to findings from a study of teachers' conceptions of student information literacy by Williams and Wavell (2007, p.204). They report one of the conceptions as 'Making Meaning' conception. In this conception teachers conceived student information literacy as encompassing cognitive processes that help students to make sense of information. Akin to the use of the word *learn* by participants in this study Shenton (2002, p.176) noted that the young people of high school age in his study talked about information in terms of the effect it had on one's state of knowledge and they used the word learning. Shenton also found an association between information and mental processes including knowing, thinking, learning, concentrating and using your brain amongst young people of all ages in his study. This association is supported by the findings of this study.

Barranoik (2001, p.43) stated that the most focused students "...were those who chose topics of interest and relevance to their current life situation". Seamans (2002, p.118) found that students "...choosing a topic already of interest to them seemed to help the students focus". It is worth noting that participants who experienced information as described in Category Five (Processing information) regularly referred to acquiring the information as a result of being intrinsically motivated to do so through interest or curiosity. This finding concurs with that of Heinström (2006) who found that students who were intrinsically motivated did not merely want to complete a task but wanted to learn. Heinström (2006) found that extrinsically motivated students regarded information seeking mainly as gathering enough facts to complete a task. It is interesting to speculate whether young people who experience information as described in Category Four may be less motivated, and engaged with the tasks they have been set than young people who experience information as described in Category Five.

The fact that young people find it difficult to describe the term 'process' implies that it is a stage in handling information that is not given much conscious thought. Comments made by young people suggested that they

adopted different strategies to process information. For some the entire process was solitary for others part of the process could involve discussion with others. Indeed for some young people it was important to have the opportunity to reflect and share thoughts with others. Being able to talk through complex information with others and listen to their viewpoints could lead to understanding. The reflective process helped the unconscious become conscious. Individuals became conscious of the thinking process. They developed metacognitive skills getting them to reflect about how they think.

In addition to processing new information young people who experienced information as described in Category Five (Processing information) described the connection of newly received information with information already in the knowledge base and the subsequent processing of the newly connected information. This echoes findings from the study by Williams and Wavell (2007, p.204) who found that teachers who conceived of students' information literacy as described in the 'Making and Meaning' conception understood information literacy to encompass the cognitive processes that help students make links between new information and knowledge of the topic under consideration. Once the information was connected and processed young people reported that information could be seen in a new way and information previously not understood could now be comprehended. This is in line with the statement by Machlup (1983, p.642) that the input of new information may have an effect on the knowledge base by causing it to change or restructure. Maybe allowing time for reflection and discussion particularly in the school environment would help individuals to recall information already internalised and assist in the processing of that information.

The structural relationships between Categories Four and Five and the other categories

In common with a number of other studies (Bruce, 1997; Maybee 2006; Maybee 2007) young people experienced information as forming a knowledge base. This was exemplified in Category Four (Store of unprocessed information) and Category Five (Processing information). This view of information as something internalised was in contrast to the view of

information in Categories One (Knowledge of sources of information), Two (Receiving information) and Three (Process of finding information) where information was viewed as external to the individual. The structural relationships between Category Four (Store of unprocessed information) and Category Five (Processing information) and the other categories are not the same but have commonalities and will be considered together. In the first three categories of description information was viewed objectively as something external to the individual in the remaining three categories information was viewed subjectively; it was internalised. Reasons for internalising information were varied but generally it was internalised if the individual perceived it to have some value. Young people in the study frequently saw information as an investment, something that had the potential for future use; either used directly from a store of unprocessed information (Category Four), or used after it had been processed and possibly connected with new information (Category Five).

Information in both Category Four (Store of unprocessed information) and Category Five (Processing information) was experienced as constituting a knowledge base. Both categories are placed together on Level Three (Knowledge base of internalised information) of the hierarchically ascending structure of the outcome space. Young people in this study understood knowledge to be information that was known. Whether information was processed or unprocessed was of no import, all that mattered was that it was known.

Participants who experienced information as described in Categories Four and Five described how information, once it had been acquired, was sorted. The sorting process could take place consciously or sub-consciously. Sorting information involved deciding whether to retain it or reject it. The decision to retain information was made based on its value to the individual. Information that was retained was either processed (as in Category Five) or was stored without any further processing (as in Category Four) i.e. it did not undergo any further thought, consideration or analysis. It was accepted as it was and stored. It should, however, be noted that individuals who experienced

information as it was described in Category Four (Store of unprocessed information) did think about the potential of the information they were storing. They were aware at the periphery of their structure of awareness that as part of the sorting process information which was stored had the potential to link up with new information and be processed as described in Category Five (Processing information). At the second level of their awareness they were aware of the use of information use of information.

Young people who experienced information as a knowledge base i.e. as it is described in Categories Four and Five demonstrated that they thought about information. They evaluated it both in terms of its relevance, determining whether or not it should be internalised and in terms of how it should be internalised, unprocessed or processed. The structure of awareness in both categories demonstrated that they thought about how information was going to be used. The second level of awareness in both Category Four and Category Five was use of information. As reported previously Moore (2000) observed that having an understanding of how information is going to be used helps in the evaluation process. In the study by Webber, Boon and Johnston (2005, p.11) one of the conceptions of information literacy held by marketing academics was 'Becoming critical thinkers'. This conception had similarities with Category Five (Processing information) in this study with a focus on becoming a critical thinker and an awareness of skills such as understanding and interpreting information.

When young people internalised information whether it was to be stored or to be processed it was apparent that their awareness of the use of the information was very important. It was also apparent that in both Category Four (Store of unprocessed information) and Category Five (Processing information) young people were describing information experienced in two very different ways. In Category Four they were describing a type of information that did not require a great level of engagement on their part. They experienced it as simple, factual information that was remembered. It did not necessarily need to be understood. It just needed to be remembered. It became part of their

knowledge base and could be recalled from there in a state ready for future use.

In the case of Category Five young people described information experienced in a different way; information was processed. They described information as something that they needed to engage with at a deeper level, that they needed to think about; to consider; to weigh up and to interpret. Processing information led to understanding. This way of experiencing information echoes Marton and Säljö's description of a deep learning (Marton 1994; Marton & Booth 1997). As stated earlier in this chapter young people did not consider that all information necessarily needed to be understood. They thought that some information could be stored unprocessed and regurgitated in exams where the only requirement was to produce a correct, factual answer. Understanding information was, however, often necessary and young people described how processing information led to understanding. This processed information then became part of their knowledge base awaiting future use.

Some criticism has been made of young people displaying a lack of thought when finding and using information to complete a task. They have been called a "cut and paste generation" (Rowlands *et al.* 2008, p.300). It is evident from the findings reported here that young people did think about information. In both Category Four (Store of unprocessed information) and Category Five (Processing information) information was sorted and a decision was made to either retain or reject it. A further decision was then made to either store the retained information in an unprocessed form or to process it. Young people who experienced information as described in Categories Four and Five also thought about how the information was going to be used. Use of information was placed at the second level in the structure of awareness for both Category Four and Category Five. It is important that young people fully comprehend the task or problem that they require information for, particularly in the case of imposed tasks, this not only aids their search for information (Herring 1997; Small & Ferreira 1994; Moore 2000) but it also means that they have a clear understanding of how information is going to be used in order to make the correct decision about whether information is to be stored or processed before

becoming part of their knowledge base. As stated earlier Moore (2000) observed that having an understanding of how information was going to be used supported students in evaluating information.

5.2.6. Category Six: Use of information

In Category Six (Use of information) the relationship between young people and information is expressed in terms of putting information to use. Experiencing information in this way was the distinctive feature of Category Six. With regard to the dimension of variation relating to how information was experienced in relation to the individual information was experienced as an internalised, subjective phenomenon. In Category Six information was accessed from the knowledge base at a point in time when it was needed. Information was used to address a variety of situations and problems that required information in both the academic and social context for example information from the knowledge base was used to play a musical instrument; to arrange a birthday party; to make decisions and to complete homework assignments.

Young people appeared to take for granted that people use information on a regular basis but they were not always aware of doing so. In some situations young people were more aware of using information than in others. This was the case when information was used in school. Young people who experienced information as described in Category Six reported being aware of the need to retain and recall information for use in school. Using information in school was considered to require some effort. Out of school this was not always the case especially in social situations such as chatting or making arrangements with friends. In the social context using information was not viewed as requiring the same degree of effort that was required in school.

Information as well as being used to address a variety of situations and problems was shared with others. This could be done face to face or through the use of technologies such as instant messaging or social networking sites on the Internet or mobile phones. This supports the assertion by Howe & Strauss

(2000, p.4) that young people tend to prefer to work together rather than alone and gravitate towards group activity. This tendency was also noted by Oblinger and Oblinger (2005, p.2.11) who highlighted young people's need to be socially connected.

The structural relationship between Category Six and the other categories

The structural relationship between Category Six (Use of information) and the other categories places Category Six on Level Four (Application of information) of the hierarchically ascending structure of the outcome space. The relationship between young people and information is expressed in terms of putting information to use, of applying information. In Category Six information was viewed subjectively.

In Category Six (Use of information) young people focused their attention on how information was used, how it was applied. This echoes the findings of Shenton (2002, p.173) who noted that one of the strands identified in young people's definitions of information was the 'use related strand' where information was defined on the basis of its utility either actual or perceived. Participants in this study reported using information that had been internalised as described in Category Four (Store of unprocessed information) and Category Five (Processing information). In the structure of awareness of Category Six (Use of information) the second level of awareness was knowledge base of internalised information and the third level of awareness i.e. the periphery of awareness was acquisition of information. As information was used young people recognised where that information came from. In the first instance it came from their personal base of knowledge and prior to that it was acquired from a source. The structure of awareness for this way of experiencing information suggests that when young people use information for whatever purpose they go through a period of reflection which involves them in a procedure where they conduct a search. They search their knowledge base for the information they need and then they evaluate that information when they consider where the information was acquired from. This procedure implies the need for individuals to be aware of the importance of managing the storage of information in their knowledge base in an efficient manner. In

order to help achieve this it is important for individuals to think about how information is to be used before it is internalised. Reflection and thinking about how information may be used before it is internalised in the knowledge base will facilitate the cognitive storage and management of information and may help with information retrieval. In the academic environment it may be possible for teachers to facilitate this process. It is, however, accepted that it is not always possible to know how information is to be used.

5.3. Young people's experiences of information: What we learn about young people and their relationship with information

Section 5.2 discussed issues arising out of the phenomenographic analysis and what is learnt from the categories of description and the relationships between them. This section draws on data from the phenomenographic study that has been described in detail in the findings which deals with how young people relate to information and addresses more directly research question three: What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information? The discussion is organised under the following headings:

- Young people's relationship with sources of information
- Young people's information behaviour
- Young people: The knowledge base
- Young people: Information and aspects of learning

5.3.1. Young people's relationship with sources of information

Prensky (2001a; 2001b) and Project Tomorrow (2006) amongst others report that most young people of this generation are surrounded by an array of digital technologies which they use regularly. The findings from this study support this. It was evident from the findings that information technology was an integral part of young people's lives. Young people were familiar with

various technologies and comfortable using them. All participants had home computers and all but one of the participants had access to the Internet at home. The findings from the study support the assertion by Merritt (2002, p.46) that young people today do not see the Internet and technology as tools that they have to think about using rather they see them as integral parts of their lives. A study by De Rosa *et al.* (2006, p.5-1) found that US college students used electronic resources more readily than older respondents. This claim is supported to some extent by Rowlands *et al.* (2008, p.299) but they assert that the older generation are catching up fast. Young people's sense of confidence when using technology was borne out to a large degree in the findings from this study.

In their study of teachers' conceptions of student information literacy Williams and Wavell (2007, p.204) report that students' ability to search the Internet was a recurring theme in discussions because of the challenges it posed. To some degree this reflection on the challenges posed by searching the Internet is evident in the findings of the present study although it is true to say that there was some variance in opinion as to whether or not information could be easily accessed from the Internet. For many, though not for all, the Internet was considered an easy way to access information, requiring little effort. This echoes the finding of Fallows (2005, p.24) who found that young users had more confidence than older users when searching the Internet. Several participants stated that the only requirement to find information was the ability to type in a key word and click although knowing which keywords to enter proved to be an issue for some young people who reported using familiar books from collections in their homes to locate key words. This suggests that they did not have a good understanding of what information was required and supports the statements of Rowlands *et al.* (2008, p. 295) that young people have poor understanding of their information needs. In the academic context more time allocated to the planning stage of a research task, defining the information need would be beneficial to address this problem. The confidence of young people in the ability of the Internet to be forthcoming with the required information with little need for any planning reflects the findings of Schacter, Chung and Dorr (1998, p.847), Fidel *et al.* (1999, p.27) and

Valentine (1993, p.302). Favourable comments were made about use of search engines and hyperlinks but in line with the findings of Large and Beheshti (2000, p.1077) and Akin (1998) some participants talked about too much information being available on the Internet. They also referred to difficulty accessing information that was tailored to their understanding citing complex language as a problem. The implication here is that young people have not received sufficient training to enable them to search for information on the Internet effectively.

A number of participants described accessing information from the Internet as “*fun*”. One of the findings from the study highlighted a preference for sources of information which were interactive i.e. for sources that provided them with a response. Interactive websites were used to access both academic and social information. These were sites that interacted with the young person either through a text-based or graphical user interface. *EarthPulse* (EarthPulse, 2008), a website dedicated to informing individuals about global trends was one example of an interactive website used by participants to access academic information. Examples of interactive websites which were widely used by young people to access social information were MSN Messenger and social networking websites such as *MySpace* and *Facebook*. This finding that young people enjoyed using interactive sources of information and preferred more entertaining packages of education confirms what was previously posited by commentators such as Tapscott, (1998a); and Prensky (2001b).

One of the attributes of young people as described by Frand (2000, p.22) is zero tolerance for delays and a desire for round the clock services. It was evident from the way young people experienced information in Category One that time spent accessing information was an important characteristic of an information source for young people. Pressure of time in relation to accessing information was an issue that was repeatedly referred to and was a factor when it came to choosing the source of information. In some cases information from books was considered to be more accurate but accessing information was often seen as time consuming. In contrast and in line with the findings of

Julien and Barker (2009, p.14) the participants who experienced information as it is described in Category One viewed the Internet as a faster means of accessing information. This implies that young people may not have confidence in their ability to use tools such as library catalogues to access information speedily in books. The ability to access information at any time of the day or night was important to young people. Using the Internet meant this was possible and mobile phones provided the means to access information from the Internet even when they were on the move. Accessing books from school or public libraries was only possible at certain times of the day. Many of the participants said that they appreciated the speed with which they were able to find information on the Internet. This supports the findings of Fidel *et al.* (1999, p.32) and Large and Beheshti (2000, p.1077).

Currency of information was an issue that young people were aware of in all areas of their life. Currency was seen to be a particularly important attribute of social information. Within the academic context currency was perceived to be more of an issue for some subjects than others, for instance in subjects such as business and politics but not for a subject such as English language. Compared to books the Internet was considered to provide the most up to date information. This was the case in both the school and out of school environment. This echoes the findings of Lorenzen (2001, p. 157) who reports that participants in his study preferred to search on the Internet for information on current events.

It has been stated that all participants had home computers and access to the Internet except for one. All of the participants reported using the Internet on a regular basis at home. This finding echoes those of Mumtaz (2001, p.352) and Selwyn (2006, p.8). Accessing information from the Internet in school was reported to not always be straight forward particularly for the younger participants who encountered curriculum and timetabling limitations and reported less provision of computers for their use. Again this echoes the finding of Selwyn (2006, pp.7-13). Participants in Years 12 and 13 reported using the Internet regularly in school. There was good provision of computers and Internet access in sixth form study areas and sixth form libraries. Year 12

and 13 participants had more independent study time and fewer timetable restrictions.

Echoing the findings of Mumtaz (2001, p.352) it is clear from comments made by the participants that use of the Internet was commonplace in their home environment. More information appears to have been accessed by young people from the Internet at a younger age in the home environment than in the school environment. The younger participants repeatedly stated that they would like to have more access to the Internet in school. The search for information on the Internet at home was often motivated by interest and curiosity. Widespread use was made of *Google*. This implies that young people familiarise themselves with use of the Internet in their home environment and it is there that their searching habits are established. There was little evidence of any attempt to offer training and support in the use of the Internet within school.

Young people referred to books as a source of information almost entirely in the context of school however when appropriate, for instance in the case of recipe books, participants did refer to information found in books out of school. In school all participants reported using books to access information but this was more prevalent amongst the younger age group who tended to favour information found in books, in part because in the early years of secondary school they were often directed to use textbooks by their teachers. It was, however, the case that all participants reported having a personal collection of books at home. They reported that they often used their collection as a starting point in a search for instance to find key words to put into a search engine. In particular this was the case for the younger participants. This finding supports the findings of Smith and Hepworth (2007, p.9) that school students like to have a familiar starting point when searching for information.

Information in textbooks was perceived to be well organised and focused, relating directly to the school curriculum. This contrasted with the Internet where participants frequently reported finding too much information. As

noted many favourable comments were made by young people regarding their experience of using book as a source of information particularly textbooks which were deemed to be accurate, reliable and credible sources of information providing age specific information, well organised and focused and relating directly to the curriculum. It should be noted, however, that some negative comments were made regarding the use of books. Some participants said that books lacked the interactivity that was available on the Internet and some found it an effort to locate information within a book. A number of participants also said they found it difficult to read books because it meant that they were required to read lengthy pieces of text and the idea of sitting still and focussing on one text was not looked upon favourably.

As noted in section 5.2.1 the physical presence of information was valued. Participants considered the ability to refer back to academic information in books important. Academic information was deemed to be an investment for use in the future. Books were considered an important source of information useful for this purpose. The Internet was often seen as ephemeral with web pages disappearing over time. In order to overcome this problem some participants did report printing information off web pages thereby creating a reliable physical object. As far as social information was concerned there was not the same concern about needing information to have a physical representation in order to refer back to it.

5.3.2. Young people's information behaviour

Acquiring information

The information behaviour of young people has been investigated from a range of perspectives including how information is acquired (Chelton & Cool 2004; Chelton & Cool 2007; Large 2005; Meyers, Fisher & Marcoux 2009). In Category Two (Receiving information) and Category Three (Process of finding information) the relationship between young people and information is expressed in terms of acquiring information. The two categories rest on Level

Two of the hierarchical structure of the outcome space. The behaviour of young people when acquiring information will be discussed in two parts:

- Receiving information;
- Searching for information.

Receiving information

The behaviour of young people when receiving information is described in Category Two. Interestingly one participant described her internal information environment. She had the insight to realise that she encountered information whilst reflecting on her mistakes. It is worth repeating the quote here:

You don't think about it at first but you learn from your mistakes. It is just like looking at a screen really, thinking about mistakes you see that was not how to do it; by thinking about the mistakes you get the information. (HFCS7)

It is all too easy for mistakes to be viewed in a negative light but mistakes have the potential to be an informative way of learning; mistakes contained information. There is perhaps a tendency when thinking about an individual's internal information environment to think of it in terms of being a place to search for information however it also appears to be a place where information can be encountered. Recognising that information can be acquired from reflective practice is important. Educating young people to reflect on mistakes made is an area which educators should be addressing.

The experience of information presented in subcategory A (Receive information knowingly) was evident both in school and out of school. Out of school information could be received from a number of sources including family and friends and the media. A number of participants reflected on the fact that their first memory of 'information' was receiving some from their parents at a young age, for instance being told how to cross the road safely. Information that was received outside of school was usually information that

was of interest and relevant to the young person. They understood this information to be important for building a knowledge base of social information. Knowledge of networks of friends, profiles of people, times and dates were all important to young people. This echoes findings made by Hughes-Hassell and Agosto (2007, p.41) that part of teenagers' everyday life information seeking behaviour supports the development of the social self. In the social context information was not easily trusted and young people recognised the need to evaluate information as in the case of gossip.

Information which was received at school could come from various sources. Teachers could give information verbally or in written form. It is worthy of note that information that was received in a written form was considered to be of great value because, within the academic environment, it was deemed important to be able to refer back to information and young people were reassured by the physical presence of information.

Young people placed a high value on information received at school. They deemed the information received to be specific because it was tailored by the curriculum and the teachers. They deemed it to be relevant, authoritative and current because it had been evaluated by the teachers. Information received in school was also valued because, as previously stated, it was seen as an investment for the future. One participant talked about receiving information in school in terms of being "*spoon-fed*" but it needs to be reiterated that receiving information knowingly was not a passive undertaking. Participants had to ensure that they were in school and in the correct class or teaching group where the relevant information would be. Information received in school was an investment and therefore had to be remembered sometimes they were required to "*listen carefully*" or "*concentrate hard*".

A report by Haldenby *et al.* (2008, p.21) for the independent UK think-tank, Reform argues that there is a skills shortage in Britain which is fuelled by an over burdened education system which has led to "...a spoon-fed generation that wants to receive education passively and without effort". Young people who experienced information as described in Subcategory A recognised, in a

critical way, that to a certain extent they were spoon-fed information but as subcategory A demonstrates information was not received “passively and without effort” (Haldenby *et al.* (2008, p.21). In addition, given that receiving information (Category Two) is not the only way young people in this study experienced information such a generalised statement cannot be seen as fair and equitable.

Searching for information

Young people frequently reported that finding information for school related tasks occurred outside school when they were alone and unsupported. Tasks that involved the need to search for information did not appear to sit comfortably within the school timetable and were often assigned as homework tasks.

When conducting searches for information young people used a range of sources this was in line with both the broader conceptualisation of information that made allowances for alternative sources of information such as personal memory, observations and informal conversations, which was outlined by Krikelas (1983) and also in line with Case (2002, p.40) who defined information as anything significant that makes a difference to people. Supporting the work of Krikelas (1983, p.16) this study found that young people chose a source based on convenience even though it might not necessarily be the best or most accurate source. Very often this was a person whom the young person had identified as someone who knew about the subject and could save them the effort of searching. Julien (1999, p.47) in her study of young people found that they perceived information to be scattered in different resources. In a similar vein young people who experienced information as described in this category regularly chose to search multiple sources in order to capture a greater breadth and depth of information. Akin to the statement by Machlup (1983, p.642) they frequently viewed information as something fragmented.

Using information

Both academic and social information was shared. Participants described sharing information in lessons at school and also sharing information, for instance, about homework tasks out of school usually via instant messaging sites or through use of their mobile phones. Social information was also exchanged both in and out of school. Although social information could be exchanged in a number of ways the most widely reported ways of sharing were face to face, using mobile phones and especially, in the case of the younger participants, by the use of instant messaging. Social information that was shared or passed on could relate to topics such as people, social arrangements and leisure interests. Frequently young people referred to gossip as social information. Exchanging information with others was seen as a means of establishing and maintaining friendships. Participants talked about information getting passed on and spreading. This finding demonstrates that young people who experienced information as described in Category Six (Use of information) experienced it as something that could be shared. Recognising this view of information as something that can be easily passed around may have implications when it comes to plagiarism. It is interesting to speculate if taking a piece of information from a book or a website may be seen by a young person as no different from accepting a piece of information from a friend on an instant messaging site.

Young people reported that information could be used in both positive and negative ways. Negative information such as nasty rumours could be used to hurt or harm people. One participant talked about withholding information from a loved one because to divulge it would, in his opinion have been very hurtful to them; he cited this as an example of information having the potential to be very powerful. This supports the view of Derr (1985, p.497) that information can empower an individual. Two participants also talked about using information wisely this echoes the finding of Bruce (1997, p. 147) who described the most complex conception found in her study as the Wisdom Conception where wise use of information was the distinguishing feature of the conception.

5.3.3. Young people: The knowledge base

Reasons for internalising information were varied but generally it was internalised if the individual perceived it to have some value. Information pertinent to life both in and out of school was internalised in the knowledge base. Young people in the study frequently viewed information that was internalised as an investment, something that had the potential for future use; either used directly from a store of unprocessed information (Category Four), or used after it has been processed and possibly connected with new information (Category Five). Young people understood knowledge to be information that was known. Amongst other things participants referred to details, facts and dates as knowledge. Whether information was processed or unprocessed was of no import, all that mattered was that it was known.

The knowledge base: Academic and social information

Young people experienced information that was internalised in their knowledge base as unprocessed and processed. They also referred to information within their knowledge base as two distinct types. They referred to academic information and social information. The following comment demonstrates this:

There are two types of information, information I would use in school, sort of academic knowledge that I would use and then there is social information that is nice to know, like stuff about different people and what they are doing. (JMIS12)

Academic information

Academic information was accumulated by young people for future use for example in exams or in a future career. This supports the finding of Sandfort and Haworth (2002) that young people “believed their generation viewed education as a catapult into professional careers”. Often currency was not an important issue. Academic information was deemed to be a long term investment with future benefits. Young people indicated that information in the academic knowledge base needed to be remembered for future recall. In

fact young people reported feeling under pressure to remember academic information in order to succeed in school examinations. Participants referred to the need to remember all academic information. They were reluctant to let go of any information received from teachers in other words they were reluctant to evaluate academic information that had been received from teachers because they believed it was the “*right information*”. They also reported a reluctance to evaluate academic information because of the pressure to remember everything. They reported being encouraged by teachers to remember everything “*in case it came up in the exam*”. In other words it would appear that in the case of academic information young people were reluctant to evaluate for fear that they might lose a golden nugget of information in the process. This highlights the fact that there is a danger in assuming that when evaluation of information does not take place it is solely because individuals do not possess evaluative skills.

Frequently participants reported experiencing information as described in Category Four (Store of unprocessed information) in the school context. One of the reasons for this was because they regularly referred to information in school in terms of factual information which needed to be remembered in its original state. This supports the finding by Shenton (2002, p.161) that in many cases young people understood the use of the word information invariably to mean factual knowledge. Frequently participants reported that it was their impression that teachers, when asking for information, wanted a fact. For many of them it was simply a case of finding factual information, storing it and then regurgitating it with no perceived need for interpretation or analysis. In fact some young people were of the opinion that it was not even necessary to understand the information. It depended on how the information was to be used. For some examinations and assignments information only needed to be recalled and regurgitated. This was particularly the perception of younger participants. This finding echoes the finding in the study by Bent (2008, p.28) that students did not recognise the need, within the school environment, to demonstrate any higher level information literacy skills and this was reinforced by teachers who acknowledged that students’ basic level of information literacy was just a response to the way in which they were taught

and the demands put upon them. This situation needs to be recognised and addressed by educators.

Of course young people reported that much information held in their academic knowledge base did need to be understood and this information was experienced as described in Category Five (Processing information). It was information that needed to be thought about and interpreted in order to reach an understanding. Young people frequently reported that information that was experienced in this way was information that had been acquired as a result of undertaking a task that they had chosen. Where information had been acquired and internalised as a result of interest or curiosity there appeared to be a greater chance of that information being thought about critically. This suggests that motivation plays a role in encouraging critical thinking.

Social information

Young people talked about a knowledge base of social information. Usually it was information that was wanted. Sometimes it was also needed but not always. Social information was summed up by one participant as information that *“keeps you in the loop”*. The social knowledge base contained information about people, knowledge of friendship groups and networks. Information about people was frequently experienced as processed information (Category Five). It was information that was often received from human sources such as friends and family either face to face, on the phone or over the Internet via instant messaging or social networking sites. Young people talked about social information spreading from person to person *“...sometimes someone will say it [information about what a friend had done] and then you use it and tell someone else and it will go on and on”*. The information needed to be evaluated and thought about. Young people did not report feeling under pressure to remember social information in the same way that they felt under pressure to remember academic information because in the social context current information was more widely used.

Gossip was an important constituent of the social knowledge base. Gossip was perceived as information that had to be processed (Category Five). It was

evaluated according to how trustworthy and reliable the source who imparted it was. Information about people that participants had processed was deemed very important. It facilitated building and maintaining relationships with others.

Another important type of information contained within the social knowledge base was information about times and dates and places. Often this type of information was experienced as stored, unprocessed information (Category Four). It did not require processing; it could just be recalled in the state it was acquired. Sometimes, however, this type of information which was stored could connect with new information and be processed. Information about times and dates and places was viewed as very important information for young people. As one participant commented *“it gives us a framework for leading our busy lives”*.

The academic and social knowledge bases

It is interesting to consider how young people related to the two distinct types of information held within their knowledge base. Young people appeared to experience less pressure when dealing with social information. They did not view finding social information as much effort as finding academic information. One participant commented *“...out of school information is just there you don't need to look for it”*. Young people also reported less need to remember social information. Remembering academic information was deemed important. It was information with the potential for future use. The content of the social knowledge base was reported to change very rapidly and information was more likely to be current. In the academic knowledge base this was not the case. Information was stored as an investment for the future. Information in the social knowledge base was seen as more transient than that held in the academic knowledge base. Information was remembered only for as long as it was necessary e.g. details such as the time and place arranged to meet friends for an evening out would be remembered until the meeting took place. After that there was no particular reason to remember the information.

It is interesting to compare the approach taken by young people to judging the relevance of information in the academic and social knowledge bases. In the case of social information they appeared more able to distinguish between that which needed to be retained and that which could be discarded. This did not appear to be the case with academic information. In other words they did not appear able to judge the relevance of academic information in the same way as they were able to judge the relevance of social information. As has already been stated in this section there is a danger in assuming that when evaluation of information does not take place it is solely because individuals do not possess evaluative skills. As the participants in this study indicated they possessed and used evaluative skills when dealing with social information but often chose not to use them in regard to academic information because of their uncertainty about its future relevance to them. That being the case participants frequently reported storing academic information, which they had received, in an unprocessed form.

5.3.4. Young people: Information and aspects of learning

Although Piaget suggests that eleven year olds have reached the formal operations stage research (Lutz & Huitt 2004, p.8) has shown that not all young people of that age have attained that stage of cognitive development. Some young people aged eleven and over may still be operating at the concrete operational stage of cognitive development only capable of applying their ability to manipulate information mentally to concrete objects and stimuli and incapable of hypothetical and deductive reasoning with an ability for more abstract and critical thinking. This might contribute to explaining why some of the participants in the study experienced information as it was described in Categories One, Two and Three where it was experienced as an external phenomenon, as something that could be observed, received or found rather than an internal phenomenon residing in the knowledge base as described in Categories Four, Five and Six. The different experiences of information could equally be related to Bloom's taxonomy of thinking skills (Bloom 1956). Bloom's taxonomy indicates that higher ranked thinking skills such as evaluation have to be developed and therefore some young people may not

have reached the stage where they could experience information as described in Category Five for instance.

Equally the approaches young people take to learning i.e. surface and deep approaches may contribute to explaining why some young people experienced information as described in Category Four and others experienced information as described in Category Five. Those who experienced information as it is described in Category Four experienced it as a phenomenon that is stored but remains unprocessed. This is akin to surface learning where isolated facts are identified and memorised and not as information as it is described in Category Five as processed information which is akin to deep learning where individuals read for meaning and understanding and seek to integrate the different facts found in the text.

The focus of phenomenography is to elicit variations in the ways a phenomenon is experienced. Stemming from phenomenography is a theory of learning known as variation theory. The focus of variation theory is to bring about learning situations in which individuals can learn by experiencing the various understandings of a phenomenon. The learner's ever changing structure of awareness is fundamental to variation theory:

The point of departure for variation theory is that learning is characterized in terms of the learner's dynamic structure of awareness, and is related to discernment, variation and simultaneity...Learning is associated with a change in discernment, which entails a change in the aspect(s) of the phenomenon in the focal awareness of the learner. (Pang and Marton 2005, p.162)

Variation theory is founded on the understanding that learning can occur by widening the range of experiences of a phenomenon and thereby revealing the variations (Pang & Marton 2005, pp.162-164). By using the findings of a phenomenographic study such as the one discussed here the application of variation theory may be very relevant to teaching young people information literacy.

5.4. Young people's experiences of information: How they relate to the ways in which information is understood by LIS scholars

The findings of this study demonstrate that the phenomenon of information is understood in a number of different ways by young people who participated in the study. This multi-faceted understanding of information is in line with the range of understanding of LIS scholars evident in the literature and outlined in Chapter Two where an examination of the literature revealed that there was no consensus within the field of Information Science as to how information is understood (Fox 1983; Machlup & Mansfield 1983; Derr 1985). The different ways young people participating in the study experienced information demonstrated some correspondence between their understanding of information and the understanding of information of LIS scholars however it should be stated that the findings of the study indicated that young people had a broad and more blurred understanding of information.

Section 2.2 outlined the different understandings of information amongst LIS scholars ranging from understandings based on an objective view of information (for example Shannon 1948) to understandings based on a subjective view of information (for example Bateson 1972; Buckland 1991a and 1991b; Hjørland 1997). In line with this divergence in understandings expressed by LIS scholars the research study found a dimension of variation in the ways information was experienced by young people. Information could be experienced as something objective and external to the individual and information could also be experienced as something subjective and internalised. Young people described an objective experience of information in Categories One, Two and Three. In these categories of description young people experienced information as something that is external to the individual. In Category One information is experienced as residing in sources of information. In Category Two it is experienced as something that is received and in Category Three it is experienced as something that is found as a result of engaging in a process. In Categories Four, Five and Six young people described a subjective experience of information. In all three categories

information was internalised. In Category Four it was stored in an unprocessed form. In Category Five it was internalised and processed and in Category Six the focus of the individual's experience of information was on how internalised information was used.

In Category One young people related to information in terms of their knowledge of information sources. Those who experienced information in this way viewed it as having a physical form in terms of the source where it resided. This view concurs with one of the three meanings of information identified by Buckland (1991a, p.352) that is to say "*information as thing*". An example of what Buckland refers to is found in the comment made by the participant who stated:

On the Internet you have got Google and that is information.
(RFIS7)

Similarly Case (2002, p.62) recognised that data and information were often represented by tangible, physical objects.

In line with the views espoused by Brookes (1974, p.142) several participants understood the natural environment to be a source of information. Information could be accessed through observation or generally via the senses. This is in contrast to the view held by Machlup (1983, p.645) who drew a distinction between information and observation rejecting the notion that an object of observation is able to tell an individual anything.

Machlup (1983, p.645) restricts his view of information to intentional communication, to what is 'told'. This view of information was evident in the way young people experienced information in both Category Two (Receiving information) and Category Six (Use of information). There was a similar correspondence between these two categories and one of the three meanings of information identified by Buckland (1991a, p.351) namely "*information as process*" which describes how "when someone is informed, what they know is changed".

In Category Two young people experienced information as something received. A substantial number of LIS scholars refer to information seeking but fewer discuss the receiving of information. The description of receiving information knowingly (Subcategory A) has not been previously recognised in the literature nevertheless there are some aspects of correspondence with the view of information expressed in Shannon's theory of information (1948) where a message was selected by an information source from a set of possible messages and transmitted into a signal that is sent over a communication channel to a receiver. According to Shannon's theory of information in the process of travelling along the channel the message moves through noise (interference). This may be internal noise (such as the receiver's own attitudes and beliefs) or external noise (from other sources). This may lead to the signal received being different from the signal which was sent. It is interesting to note that young people, who experienced information as described in Category Two, sub category A perceived that they receive information in the original form as it was sent by the sender (e.g. teacher or parent or instructor etc.).

There was some association between the broad views of information demonstrated by young people in the study and some of the LIS scholars. In his model of information seeking Krikelas (1983, p.17) broadened the view of information, moving away from understanding information as the use of literature to two categories of information source 'internal' (personal memory, personal files and direct observations) and 'external' (personal resources such as conversations with people who know the information and impersonal resources such as the literature). This view of the source of information is reflected in the accounts of the ways in which information was experienced by young people in Category One. Two decades later Case also espoused a broader view of information:

...information is whatever appears significant to a human being, whether originating from an external environment or a (psychologically) internal world. (Case, 2002, p.40)

It was evident from the findings that young people in the study also understood information in similarly broad terms. Case (2002, p.60) advocated a broad view of information as whatever appears significant to a human being but this view did contain at least one restriction, that in order to exist information does require a conscious mind to be present. This restriction was also noted by a number of young people as exemplified by the participant who stated that information “*needs conscious thought*”.

Buckland (1991a, p.354) also advocated a broader view of information. He stated that the literature on Information Science focused on data and documents as information resources and he argued that objects and also events should be considered information resources. Participants in this study supported Buckland’s argument for a broader view of information. In Category One (Knowledge of sources of information) objects found in the natural environment were referred to by some participants as sources of information and throughout the different categories participants referred to being informed by events and incidents.

In line with Fox (1983, p.3) the findings of this study indicate that young people participating in the study were aware of the presence of information in all areas of their life. They talked about information being “*in a lot of places*” and “*all around us*”. Perhaps as a result of this and in order to cope with information overload young people talked about two categories of information; information that existed within the external environment but had no relevance in their lives and passed them by and information that was meaningful and relevant and was retained by them:

Some information can go in one ear and out the other and some information can stay in my head. If it is important it stays up there but if it is not it just goes straight through.
(ZMCS7)

This awareness of information as a phenomenon that is pervasive in their lives is far removed from the view of information Buckland (1991a, p.354) referred

to where the literature on Information Science focused on data and documents as information resources.

In the review of literature in section 2.2.2 a broader more subjective view of information is referred to (Belkin 1978; Brookes 1980; Buckland 1991a & 1991b). The cognitive turn approach to information theory which developed from the mid 1970s onwards, where there is a move away from information systems toward the state of mind of the user is evident in Categories Four, Five and Six. In Category Five 'Processing information' the claim of Luhmann (1995) is reflected "information is an internal change of state, not something that exists in the external environment" (Luhmann 1995 cited in Cornelius 2002, p.399). There is correspondence between the way young people experienced information as it is described in Category Five and the claim represented in Brooke's equation that information "when operating on a knowledge structure... produces an effect whereby that knowledge structure is changed" (Cornelius 2002, p.407).

In Category Four young people experienced information in a way that was not apparent in the literature. Information was experienced as an internalised phenomenon but it was internalised and stored; it was not processed as it was in Category Five 'Processing information'. Some of this stored information might at a later point in time be processed but there was no expectation that it should be. In Category Four young people experienced the phenomenon that they had internalised which had not been processed i.e. interpreted; thought about; created their own version of as information but they described information experienced in this way as unprocessed information. This differs from the understanding of unprocessed information as described in some of the literature. For example Hey (2004, p.5) states that:

...Information Science defines data as unprocessed information and other domains leave data as a representation of objective facts.

The review of LIS literature outlined in section 2.2 revealed a range of views about how data, information and knowledge were understood by LIS scholars.

There was some consensus that data and information were similar in nature (Machlup 1983; Hey 2004) but that knowledge was different from data and information (Machlup 1983; Hey 2004; Case 2002). In the present study there were instances where participants also made a distinction between the terms. One participant viewed the terms data and information to be interchangeable whilst knowledge was something entirely different. Whilst yet another distinguished between the terms information, knowledge and wisdom. The findings of the study, however, indicate that overall young people tended to use the terms data, information and knowledge interchangeably.

Whilst the terms knowledge and information were often used interchangeably young people made clear that knowledge was information that was known i.e. information that had been internalised. This information could be either processed information or unprocessed information. Unlike Machlup (1983, p.642) young people in the study did not generally make categorical distinctions between information and knowledge. It should, however be noted that there is a close correlation between the way young people experience information as outlined in Category Five (Processing information) where new information connects with information already internalised in the knowledge base and the description of knowledge given by Machlup (1983, p. 642) where "...information may affect the stock of knowledge by adding to it, restructuring it or changing it in any way".

Whilst it is evident that young people's understanding of information had some correspondence with the understanding of information demonstrated in LIS literature it is also apparent that their understanding of information is broad and more blurred than that of LIS scholars.

5.5. Summary

Chapter Five has presented a discussion of the findings of this research study. The chapter has examined what the categories of description and the relationships between the categories of description reveal about young people and their relationship with information. In addition consideration was given to

the relationship between the ways young people experience information and the understanding of information within the LIS domain. Throughout the chapter the findings were explored in relation to the literature reviewed in Chapter Two. Chapter Six draws the thesis to a conclusion.

Chapter Six: Conclusion

6.1. Introduction

The final chapter considers how the findings addressed the research questions and reflects on the findings arising from the study. In the light of the findings a number of recommendations are made for educators and LIS professionals. The use of a phenomenographic research approach to address the study is also reflected upon as well as limitations of the study. Finally suggestions for further research are made.

6.2. Research questions

The purpose of this research study was to contribute to the knowledge and understanding about the ways young people experience information. Four research questions were addressed:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

A phenomenographic research approach was used to investigate the ways young people experience information. The use of such a research approach allowed the ways in which information was experienced to emerge from the data and also showed the variation in the experiences and how the experiences were logically related to each other. The Findings Chapter reported that young people who took part in the study experienced information in six qualitatively different ways. These were reported as logically related categories of description in an outcome space (see Figures 24 and 25).

The research questions were addressed thus:

- What are the qualitatively different ways young people experience information?

The six categories of description explained the qualitatively different ways young people experience information.

- What is the variation between these experiences?

The variation between the experiences was outlined in the outcome space where the essential parts of the meaning structure and the structure of awareness of each category were presented and the relationships between the categories were shown.

- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?

The categories of description together with the outcome space provide a holistic picture of young people's relationship with information.

- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

Taking account of the categories of description and outcome space it was possible to compare young people's experiences of information with the meanings given to information by LIS scholars

The categories of description and their logical relationships with each other were presented in the Findings Chapter and were discussed in detail in the Discussion Chapter. In the concluding chapter the findings arising from the study will be reflected upon.

6.3. Contributions to original knowledge and reflections on the findings from the study

The phenomenographic investigation into the variety of qualitatively different ways young people experienced information has made a number of robust contributions to original knowledge:

- The phenomenographic investigation reported here is novel in that it covers an area not researched before. It is the first research to investigate the ways young people aged eleven to eighteen years experience information using a phenomenographic approach;
- The findings offer new insight into young people's relationship with information. They highlight the fact that young people have a complex relationship with information and in the process of doing so a number of commonly held assumptions are challenged;
- New understandings of young people's information behaviour are recognized, in particular that reported in Category Two (Receiving Information Knowingly);
- There is new insight into the comparison of young people's understanding of information with that of LIS scholars;
- The study has resulted in a robust set of recommendations for LIS professionals and educators;
- Reflections on the phenomenographic research approach used adds to the body of knowledge about phenomenographic methodology;
- The study provides a baseline for future researchers who wish to conduct investigations into the different ways individuals experience information.

These contributions along with reflections on the findings of the study which were presented in Chapter Four and discussed in detail in Chapter Five are now considered.

6.3.1. Ways of experiencing information: Levels of sophistication and relationships between them

The phenomenographic investigation reported here into the ways young people aged eleven to eighteen years experience information is novel in that it covers an area not researched before.

The categories of description described the various ways young people who participated in the study experienced information. The outcome space

presented the structural relationships between the categories of description. The structural relationships showed that there was an inclusive hierarchical structure between the categories of description with categories placed on levels lower down the hierarchical structure being embraced by categories placed on levels higher up the hierarchical structure. Knowing the categories of description and understanding the relationships between them facilitates an understanding of how young people experience the phenomenon of information and gives a new insight into young people's thoughts and awareness when they experience information.

The ways in which young people experienced information varied in levels of complexity. At the least complex level young people focused their awareness on knowledge of information sources (Category One). Category One rests on the first level of the hierarchical structure (Information landscape). Information in Category One was experienced objectively as something external to the individual. Young people who experienced information as described in Category Two (Receiving information) and Category Three (Process of finding information) both resting on Level Two of the hierarchical structure (Acquisition of information) also viewed information objectively as something external to the individual however their relationship with information was more complex than that described in Category One. In order to acquire information individuals needed to have knowledge of the information landscape and in Category Three they had to execute a process in order to find information.

The structure of awareness for Categories Two and Three (Receiving information and Process of finding information) demonstrated that individuals with these experiences of information were aware of knowledge of sources of information and internalising information. Interestingly they had no awareness of information use. This finding contrasted with findings from the study by Bruce (1997, p.131) who found higher educators had an awareness of information use in all of the conceptions of information literacy. The implication here was that young people in the present study may not have had enough training or practice in the use of sources of information to have

achieved the necessary level of confidence to allow them to move their attention away from the sources and onto the way in which the information is to be used. When acquiring information (Categories Two and Three, Receiving information and Process of finding information) individuals were aware of internalising information but did not think beyond that to the use the information was going to be put to. Moore (2000) in her study of primary school children in New Zealand observed that having an understanding of how information was going to be used supported students in evaluating information. An awareness of how information was going to be used could also help individuals when deciding how information should be internalised.

Category Four (Store of unprocessed information) and Category Five (Processing information) described experiences of information where information was internalised; both categories rest on Level Three of the hierarchical structure (Knowledge base of internalised information). Looking at the meaning and awareness structures of these two categories it is evident that individuals experienced internalising information in very different ways. In Category Four they experienced information as simple and factual. It was information that did not require a great level of engagement on their part. It did not necessarily need to be understood; it just needed to be remembered. This way of experiencing information had commonalities with the surface approach to learning as reported by Marton and Säljö (Marton 1994). In Category Five (Processing information) information was experienced as something that they needed to engage with at a deeper level. Information needed to be thought about, to be processed. This way of experiencing information had commonalities with the deep approach to learning as reported by Marton and Säljö (Marton 1994). Possessing an awareness of how information was to be used at the point of acquiring the information would facilitate internalising information in a manner appropriate for its use.

Those individuals who experienced information as described in Category Four (Store of unprocessed information), Category Five (Processing information) and Category Six (Use of information) viewed information subjectively; information was internalised. The structural relationships outlined in the

outcome space revealed an inclusive hierarchical relationship between the categories of description with categories placed on levels lower down the hierarchical structure being embraced by categories placed on levels higher up the hierarchical structure. Category Six (Use of information) was the most complex of the six categories and rests on Level Four in the hierarchically ascending structure of the outcome space (Application of information). Category Six embraced all of the categories placed on the lower levels of the hierarchical structure of the outcome space. The meaning and awareness structures of Category Six demonstrated that when individuals applied information either using it or sharing it they went through a period of reflection, searching their knowledge base and evaluating the information found there. The fact that this reflection and searching took place emphasised the importance of developing awareness, insofar as it is possible, of information use in Categories Two and Three in order to facilitate the cognitive storage and management of information and to help with information retrieval.

6.3.2. Young people and information: A complex relationship

Reflection upon the findings of the study provides new insight into the relationship between young people and information revealing that the relationship is not simple. Young people who participated in the study demonstrated that they have a complex relationship with information. They think about information; they are aware of it in the environment in which they live and work and they develop strategies for dealing with that information.

Value of information

Young people valued information. They recognised that information helped them to live their lives fully and they recognised the need to acquire information as an investment for the future. In the social context information about people, times and dates and places, interests and hobbies provided “*a framework for leading our busy lives*”. Social information was summed up by one participant as information that “*keeps you in the loop*”. In the

academic context information was also valued by young people. They recognised the need to amass information for future use. They regarded academic information as an investment for future use in assignments, exams and future careers.

Thinking about information

Different attributes of information were considered important in different contexts. In the social context young people deemed currency of information important. The content of the social knowledge base was reported to change very rapidly and information was more likely to be current. Currency was not reported to be as important an issue in the academic context. The ability to remember information was considered very important in the academic context. It was information with the potential for future use. This pressure to remember information was not as prevalent in the social context.

It was not always deemed necessary to understand information that was internalised. Young people described two ways of experiencing information where it was taken in and internalised: Storing information (Category Four) and Processing information (Category Five). In Category Five processing information led to understanding. In Category Four information was stored unprocessed and it was not always deemed necessary to understand information. Information in the social context such as times and dates of events could just be recalled, when needed, in the state it was acquired. In the case of academic information young people described how information frequently only needed to be recalled and regurgitated in the state that it had been acquired to complete assignments and exams. In fact storing information in the state that it had been acquired was often reported to be important in the academic context particularly by some of the younger participants. Young people reported that teachers required the “*right information*”. The “*right information*” was understood to be information they were directed to by teachers e.g. in textbooks. Young people reported a reluctance to tamper with this “*right information*”. Tampering with information included altering it in any way. This meant that thinking about the information, evaluating it and presenting it from their point of view was not seen as an option by them. In

order to complete tasks and assignments correctly the “*right information*” i.e. information presented in the way it was produced in e.g. textbooks had to be used; for this reason young people reported, on occasion, not feeling the need to evaluate information they had been directed to. The fact that the teacher had directed them to the information meant that the teacher had evaluated it and it did not need any further evaluation. The information was “*right*”.

The fact that young people reported using information in the academic context which they had not processed in any way did not mean that young people never processed information. Young people did describe processing academic information. Interestingly young people who experienced information as described in Category Five (Processing information) were often participants who referred to information that they had been motivated to find through interest or curiosity. It is also interesting and of note that young people readily recognised the need to process information in the social context. Social information was not easily trusted by young people. They talked about the need to evaluate it. Gossip was recognised as social information. Young people described the need to evaluate gossip according to the source (usually a person) that it came from. The importance of social information to their lives and wellbeing appeared to motivate young people to consider information critically.

It was evident from this study that in the absence of support from the school environment young people applied a lot of thinking to problems that arose whilst dealing with information. When conducting a search for information young people reported experiencing a range of difficulties nevertheless they were aware of various search options such as use of books or online searching and developed different search strategies such as attempting to refine search terms or turning to friends for help. Often these attempts to deal with difficulties when conducting a search were done alone and unsupported outside school.

Assumptions challenged

A number of commonly held assumptions were challenged by the findings. The research highlighted the fact that young people thought about and considered information to a degree that has not always been acknowledged in the literature. In addition the findings challenged a number of assumptions that have been made about the ways in which young people relate to information.

In subcategory A (Receiving information knowingly) of Category Two (Receiving information) young people described in detail how they received information knowingly. Far from being a passive activity requiring no effort young people described the effort and thought needed on the part of the individual to receive information knowingly. They needed to have knowledge of the information landscape and they needed to place themselves in certain contexts where they were alert to the possibility of receiving information. In addition they needed to listen carefully and concentrate. This has not previously been recognised in the literature.

This study has allowed young people to elucidate the reasons for some of their actions regarding information which have, in the past, invited criticism. Young people have been called a “cut and paste” generation (Rowlands *et al.* 2008, p.300) and indeed young people do admit to cutting and pasting information on occasion but they also explain why they do so. Information was cut and pasted in order to acquire and present the “*right information*” in assignments, as they perceived they had been directed to do so by teachers. This was also a reason given for copying information from books.

In a similar vein young people discussed their attitude to evaluating academic information. Often they chose not to evaluate academic information in any way. This was usually information they had been directed to by teachers and therefore the young people considered that teachers had already evaluated the information and it was the “*right information*” and as such should not be interfered with by them. Contrastingly young people did describe evaluating social information as described earlier in this section.

Similarly participants explained that they printed off passages of information from web pages rather than make notes because they did not want to risk losing or changing any vital information. They often considered web pages to be ephemeral and cognisant of the need to refer back to information they wanted to have a physical copy of the information.

The different ways of experiencing information described in the study highlight the complexity of young people in the way they relate to information. Young people in the study were aware of information in their lives and they recognised the power of information in enabling them to live their lives and as an investment for the future.

6.3.3. Young people: Information seeking behaviour

The study has added to the body of knowledge on information seeking behaviour. Findings from this study offer new insight into the information seeking behaviour of young people.

Receiving information knowingly

One of the ways in which young people who participated in the study experienced information was as something that was received. The findings outlined in Category Two (Receiving information) are significant. A substantial number of LIS studies refer to information seeking but fewer refer to information as something that is received. The description of receiving information knowingly (subcategory A) has not previously been recognised in the literature. As described earlier in this section individuals who experienced information in this way needed knowledge of the information landscape so that they could place themselves in positions where information could be received and also effort was needed on their part in order to receive information.

The experience of information as something that is received knowingly rests somewhere between the experience of information that is encountered (subcategory B) and the experience of information described in Category

Three (Process of finding information). It is postulated that the type of information acquisition described in subcategory A (Receive information knowingly) constitutes a form of opportunistic acquisition of information (OAI) previously unidentified (Erdelez 2004, p.1013).

Awareness of the need to acquire information

The findings relating to information as it is described in subcategory A (Receive information knowingly) indicate that individuals who experienced information in this way did not necessarily have a known information need or gap. What they had could be described as an awareness of the need to acquire information in order to garner the skills and knowledge that would be required in their future lives. This awareness of the need to acquire information for future use differed from a known information need or gap and is something that should be recognised by LIS professionals and educators.

Information searching in the academic context

This study has provided an insight into the information searching behaviour of young people in the academic context. Young people talked about the need to find information to complete academic assignments however they reported that many of their searches for information took place outside school, often alone and unsupported. The participants reported that pressure of time within school meant that many of the tasks requiring information to be found were given as homework tasks. Also the younger participants reported that Internet access within school was limited. They stated that they would like more provision of Internet access. It was evident that more information was accessed by young people from the Internet at a younger age in the home environment than in the school environment. Young people described using the Internet from an early age in their homes and reported a widespread use of *Google* to find information. This contrasted sharply with the level of Internet use they reported in school. The implication here was that by the time young people arrived at secondary school their Internet searching habits had already been established in the home. This calls into question how much importance and attention is applied by educators within the school system to educating young people to become information literate.

6.3.4. Ways of experiencing information: Comparing the experiences of young people and LIS scholars

The study provides new insight into how the phenomenon of information is understood in a number of different ways by young people. This has some correspondence with the range of understanding manifest within the LIS domain however the findings indicate that young people have a broad and more blurred understanding of information than LIS scholars.

Data, information and knowledge

Within the LIS community of scholars there was a range of understanding about the phenomena of data, information and knowledge with distinctions drawn. In the research study there were also some instances where participants made a distinction between the phenomena however the findings indicate that overall young people tended to use the terms data, information and knowledge interchangeably. Nevertheless whilst the terms were often used interchangeably young people made clear that knowledge was information that was known i.e. information that had been internalised.

Knowledge

In common with a number of previous studies (Bruce 1997; Maybee 2006; Maybee 2007) young people experienced information as forming a knowledge base (Category Four: Store of unprocessed information and Category Five: Processing information). The composition of the knowledge base however was in contrast to the description of knowledge bases in previous studies in that the knowledge base described in Category Four consisted of a store of unprocessed information. Overall young people understood knowledge simply as information that was known. The only criterion necessary for information to be knowledge was for it to be information that was known. This finding is significant as it demonstrates a difference in the understanding of knowledge described by young people in the study and that outlined in the LIS literature (Machlup 1983, pp.642-644).

The study has highlighted that information was experienced by young people in many ways. There were some commonalities in understanding between

young people and LIS scholars but when compared to the understanding of information demonstrated by young people LIS notions of information, as exemplified in the literature, seem to be limited to some extent or at least partial. Young people had a wide-ranging and more blurred understanding of information. Generally they did not make categorical distinctions between information and knowledge.

6.4. Recommendations for LIS professionals and educators

The research study presented here has revealed new knowledge about the ways in which young people experience information. As a result of the study the following recommendations are presented for LIS professionals and educators:

Recommendation 1: Awareness of young people's experiences of information

In order to support young people becoming information literate educators need to be aware of the different ways in which young people experience information and, in turn, from a pedagogical viewpoint they need to make young people aware of the different ways that information can be understood. Young people need knowledge of the information landscape and the sources within it. It can be seen in the hierarchical structure of the categories of description that knowledge of sources of information provides the foundation for all of the other categories (see Figure 3 and Figure 4). Yet it can be argued that in perceiving information in this way the individual only engages with it at a surface level. Therefore, educators need to make young people aware that there are other ways to experience information if they are to engage with information at a deeper level.

The findings from this phenomenographic investigation into the ways young people experience information could provide the variations to structure teaching information literacy. Variation theory could be used as a tool for developing schemes of learning. The variation theory of learning is founded

on the understanding that people learn through experiencing variation therefore learning can occur by widening the range of experiences of a phenomenon and thereby revealing the variations (Pang & Marton 2005, pp.162-164). By using the variations from this phenomenographic investigation schemes of learning could be devised where learners develop a deeper and wider understanding of how to relate to information.

Variation theory centres attention on creating learning situations in which individuals can learn by experiencing the various understandings of a phenomenon. For instance teaching such a scheme could start with asking students to reflect on their own perceptions of information through the use of reflective diaries and group discussions. This may well reveal a number of common concepts. Following on from there the educator, by employing the findings from this study i.e. the ways young people experience information, could then create different learning situations where students could be made aware of the significant aspects of information and as a result potentially change their understanding of it. For example in a lesson focusing on 'finding information' the importance of focusing on how the information that is being looked for is going to be used, Moore (2000) observes that having an understanding of how information is going to be used appears to support students in evaluating information) could be addressed. Another example is the need for a thorough knowledge of the range of sources of information and their characteristics. If students had a good knowledge of these then they would find it easier, for example, when looking for information to focus their attention on how they were going to use the information rather than on the sources they were using. Teaching information literacy using categories from the phenomenographic investigation reported here could be appropriate because the categories may relate more closely to how students perceive information whereas currently educators tend to use information literacy frameworks which are based to some extent on librarians' understanding of information literacy.

Recommendation 2: Knowledge of the information landscape

Young people were conscious of information being all around them. As time goes by the information landscape changes with the introduction of new sources and new technology as do the information requirements of young people. Educators should be aware of this and ensure that young people's awareness of the information landscape and the sources of information within it are continually updated so that they know where it is possible to acquire appropriate information. It should be recognised that young people attach great importance to human sources of information therefore the finding by Williams and Wavell (2007, p.206) that teachers made no mention of people as a source of information used by students is concerning. Educators need to be aware of the possible mismatch in their understanding of sources of information and young people's understanding of sources of information. Young people need to be made aware of appropriate human sources of information as well as physical sources. It can be seen in the hierarchical structure of the categories of description that knowledge of sources of information provides the foundation for all of the other categories. Young people should be made aware of the range and appropriateness of sources of information; their functionality and characteristics should be explored in a supportive environment.

Recommendation 3: Need for support in information search process

Young people reported that much of their searching for academic information took place outside of school often alone and unsupported. The needs of the young information seeker should be addressed in school. Some suggested teaching interventions that could be pertinent are:

- Exploring how to recognise an information need and focus on the task – understanding the task will help individuals be more aware of how information will be used
- Training and support in searching for information. Planning a search – what are the benefits of this step.
- Knowledge of sources of information – which sources are appropriate

- Training in evaluation skills. from an information processing perspective and in line with Hirsh (1999, p.1281) who concludes that students need training in evaluating information on the Internet students must receive instruction that moves them from the knowledge and comprehension levels of Bloom's cognitive taxonomy to the higher levels of synthesis and evaluation (Bloom, *et al.*, 1956). This can be done with concrete objects for young people in the concrete operations stage and then connected to abstract concepts to help them move to the formal operations stage Lutz & Huitt (2004, p.9).

Support and guidance should be provided to young people in school.

Recommendation 4: Greater access to the Internet in school

All participants in the study accessed information from the Internet. Frequently it was viewed as a single source of information and often it was seen as the biggest source of information. Livingstone (2006 p.5) reports the findings of UK Children Go Online study, which found that 98% of nine nineteen year olds have used the Internet. Selwyn (2006 p.5) however found that over 50% of UK students interviewed in his study felt restricted in their use of the Internet at school. In contrast most students in his study reported using the Internet more extensively out of school (Selwyn 2006 p.8). This finding was echoed in the study reported here where participants frequently reported using the Internet out of school to complete school related tasks and assignments whilst alone and unsupported.

Although some participants viewed the Internet as an easy way to access information this was not the case for all with some participants citing the availability of too much information and complex language as problems. Participants did make efforts to develop strategies for coping with difficulties they encountered such as refining search terms or asking friends for help. This implies the need for more training at school to enable young people to search for information on the Internet effectively. Training and support in use of the Internet needs to be available to young people as soon as they start their school education so that they become familiar and efficient in the use of the

technology. This is in line with the request from the student's in Selwyn's study (2006 p.14) who called for the teaching of 'Internet literacy' namely being taught how to use the Internet properly. More provision and better access should be afforded to the Internet across the curriculum particularly to young people in the early years of education.

Recommendation 5: Processing information

Young people recognised that they processed information but found it difficult to describe what that entailed. This implies that this stage in handling information was not given much conscious thought. It would benefit young people if there were teaching interventions addressing the processing of information. Young people need to be equipped with the tools to process information. They need guidance and practice in a whole range of critical thinking skills, including, amongst others, how to properly analyse and evaluate information how to draw inferences from it; how to synthesise it. These skills need to be fostered in relation to both physical and social sources of information.

Young people described why they were often reluctant to analyse and evaluate information and indeed why they often copied or cut and pasted information:

- They feared that analysis or evaluation of the information could lead to the loss of a vital piece of information;
- They believed that information which teachers directed them to was the "*right information*" and therefore should not be tampered with in any way.

Educators need to recognise and address these issues.

Educators need to be aware of the two different ways of experiencing internalised information described by young people in Category Four (Store of unprocessed information and Category Five (Processing information). When assignments are set educators need to be explicit about the expected outcomes and clear about the information that is required. Where teachers are imposing tasks on young people a clear message should be given regarding what is

expected of them when dealing with the information. Are they expected to retain the factual information just as it has been acquired or are they expected to think about it critically? If young people are designing their own tasks then careful thought about what it is they are acquiring the information for needs to be encouraged.

The importance of knowing how information acquired for academic tasks is going to be used needs to be recognised by educators. Young people need to consider the use information is going to be put to in order to evaluate information effectively.

6.5. Reflections on phenomenographic research

At the outset of this research study an examination of different research methodologies was made to determine how best to proceed. The design of the study emerged from an interest in understanding the ways in which young people experience information. A phenomenographical research approach generates a theoretical model which identifies the variety of ways in which a phenomenon is experienced and also identifies how the different ways of experiencing the phenomenon are related. The research study undertaken to investigate the variety of ways in which young people experience information using a phenomenographical research approach has established that phenomenography is a reflective methodology that:

- Allows young people's experiences of information; their levels of sophistication and the relationships between them to be made known;
- Contributes to describing the complex relationship young people have with information;
- Contributes to explaining the thinking behind elements of young people's information behaviour.

Each stage of the phenomenographic research process should reflect and inform the aim of discovering the variety of different ways a group of individuals in a given population understand a phenomenon. It has been noted from the literature that often many phenomenographic studies do not adopt a

holistic phenomenographic research approach taking into account all the principles implied therein. Instead phenomenography is simply used as a method of analysis. The study described here was informed by phenomenographic principles at all stages of the process including sampling, interview schedule, and data analysis. This has resulted in a rigorous piece of research into young people's experience of information.

6.5.1. Challenges of a phenomenographic research approach

Conducting phenomenographic research was challenging in a number of respects including the need:

- To remember that the prime objective of phenomenographic research is to see the world from the participant's perspective;
- To be aware of power balance between researcher and participant;
- To have keen listening skills during interviews and to be alert to new lines of thought introduced by participants and be ready to follow the participant's course of reflection;
- To empathise with periods of silence during interviews;
- To seek diversity during analysis;
- To recognise the significance of all categories.

Seeing the world from the participant's perspective

When undertaking phenomenographic research it is necessary to remember that the prime objective is to see the world from the participant's perspective. An important consideration, therefore, is for the researcher to set aside any presuppositions they may have in order to engage with the lifeworld of the participant. Nevertheless it is recognised that the research interviews have to be introduced to the participants as being 'about' something:

The researcher and researched must begin with some kind of (superficially) shared topic, verbalised in terms which they both recognise as meaningful. (Ashworth & Lucas 2000, p. 299)

With this in mind, when considering how to start the interviews, it was decided to invite the participants to reveal how they understood 'information' by asking them to draw the first thing that came into their minds when they heard the word information. In doing so each interview was, in effect, started on the participants own terms and not those of the researcher. In producing a drawing of something that they associated with 'information' the participants started the interview by talking about something that they had chosen and that was meaningful to them in terms of their relationship with information. This proved to be a successful method of eliciting participants' initial thoughts and served to concretise the abstract topic of 'information'. Twenty three drawings followed by a short interview were collected alongside the eighteen that were drawn at the beginning of the longer interviews. It was decided that the drawings should be accompanied by an interview as it was thought that this would lead to a deeper and richer understanding of what the participant was trying to convey and indeed this proved to be the case. To have analysed the drawings without the written and verbal explanations would have been to only partially understand what the participant was saying.

The power balance between researcher and participant

Throughout the course of an interview it was necessary to monitor the balance of power between the researcher and the participant. The relationship was a fragile one particularly during times of reflection requiring the researcher to tread a fine line when using probing questions by not being too demanding whilst at the same time not appearing indifferent (Marton & Booth 1997, p.131).

Phenomenographic interviews

In order to enter into the lifeworlds of the young people participating in the study (Ashworth & Lucas 2000, pp.296-298) it was necessary to bracket presuppositions. A constant check needed to be kept on whether or not this was being achieved during the interview process. Following each interview the recording was played back and listened to in order to determine how well bracketing had been achieved. This was a valuable and necessary exercise to ensure that any preconceived ideas and assumptions of the researcher were set

aside. A major strength of the phenomenographic research approach is the aim to uncover both the referential and structural components of the ways in which a phenomenon is experienced i.e. what is experienced and how it is experienced. Great care needed to be taken to ensure that participants' answers did not stop at a simple description of what they thought information was. Throughout the interview participants were encouraged to reflect on and reveal the ways in which they experienced information. This was achieved by the use of probing questions which aimed to get the participants to reflect often on things they had never reflected on before. Frequently during interviews there were periods of silence whilst reflection took place. Although periods of silence often felt uncomfortable for the researcher it was important to allow sufficient time for the participant to reflect and uncover thoughts not previously acknowledged. As a result of getting participants to reflect it was possible to gain a deep and rich understanding of how information was experienced.

During the course of an interview it was necessary for the researcher to be very attentive to what was being said. Keen listening skills were needed to hear and identify new lines of thought as they were introduced by participants. These then needed to be followed up. This bears out the design of the interview with pre planned open ended questions, aiming to keep the interview on track by addressing the main themes as determined by the research questions and also allowing any new and unexpected lines of discussion which the participant might introduce to be followed. There were occasions where participants appeared hesitant, as though unsure if they should continue with their line of thought. It was found that if the researcher repeated statements they had made the participants were encouraged to continue with their line of thought and to reflect upon it.

Data analysis

The process of data analysis involved reading and re-reading the transcripts; listening to and re-listening to recordings of the interviews. The whole process was one of iteration where eventually dimensions of variation in the participants' descriptions of the phenomenon became evident and so the

different categories of description emerged. The analytical stage of the research study required more time than had at first been anticipated. It was a demanding procedure requiring both concentration and an open mind receptive to new lines of thought. It was important for the researcher to be consistently attentive to the need to bracket all presuppositions during data analysis and remain focused at all times on what had been said by the participants. One particular challenge presented by the analytical stage of the research study related to the fact that phenomenographic analysis endeavours to describe the variety of ways a phenomenon is experienced by a group of individuals. The number of participants who experienced the phenomenon in a certain way was irrelevant; it might be many or it might be just one. No category was more significant than another. During analysis care had to be taken not to deem some categories more significant than others on the basis that they consisted of more responses.

6.6. *Limitations of study*

The design and conduct of the research study had a number of limitations. The study focused on two co-educational secondary schools in Derbyshire in the United Kingdom using an in depth research approach with a small sample. It is not claimed that the findings are generalisable. Nevertheless they do provide a basis for future studies.

As described in Chapter Three, after careful deliberation, the research was conducted using a single research approach phenomenography which was considered the most appropriate to answer the research questions. It is, however, recognised that the use of a single research approach excludes understanding that might be provided by the use of other approaches.

Phenomenography uncovers the variety of qualitatively different ways a phenomenon is understood by a collective group of individuals in a given context. Therefore it cannot be employed to connect individual participants with specific experiences; neither can it be used to ascertain the prevalence of experiences within a population.

Due to constraints in the school timetable it was only possible to recruit participants from Years 7, 12 and 13. It is acknowledged that different outcomes might have been described if it had been possible to also recruit participants from Years 8, 9, 10 and 11.

6.7. Recommendations for further research

As a result of this research study a more comprehensive picture of young people's experiences of information to that currently available has been revealed however the research also revealed the incompleteness of this picture and suggests the need for further research. The following recommendations grew out of the present study:

- In order to build on the foundations laid by the present study it would be interesting to replicate the research with young people of all ages and in different contexts:
 - Young people of secondary school age representing all year groups (ages 11-18 years) ;
 - Young people of primary school age representing all year groups (ages 5-11 years);
 - First year undergraduates. Their academic and social lives will have undergone a large change. How, if at all will this have impacted on their experiences of information?
 - Young people who live in care;
 - Young people with a disability;
 - Young people living in areas of the developing world;

- It would be useful to establish the experiences of information held by other groups in the field of education in particular teachers, educational policy makers and library and information science professionals. These data could then be looked at in relation to the outcome space produced in this study to establish what correspondence there is between the experiences of information amongst the groups investigated and young people's experiences of information;

- Young people described one experience of information as something that is received knowingly. This is a new and previously unreported information behaviour which merits further investigation to establish if it is practised by other groups in other contexts;
- Young people were found to acquire information not because they had a current need or want but because they had awareness that the information might have a potential future use. When managing the information they had acquired, this led to a reluctance to analyse or evaluate it in any way for fear that they might lose some vital piece of information. Research to establish whether this finding is replicated in other sectors of society e.g. amongst new parents, working adults, carers would add appreciably to the body of knowledge about information behaviour and its management;
- Some young people who experienced information as described in Category Four (Store of unprocessed information) reported that their understanding of what was required by teachers when setting a research task was to find and store the “*right information*” i.e. not to alter the information in any way. Research to compare young people’s and teachers’ understanding of what was required when setting a research task could prove valuable and instructive to educators;
- Participants who experienced information as described in Category Five (Processing information) often referred to acquiring the information as a result of being intrinsically motivated to do so through interest or curiosity. Research into the effect of motivation on the different ways information can be experienced would be both interesting and valuable from a pedagogical point of view;
- Young people who experienced information as described in Category Six (Use of information) experienced it as something that could be shared. Recognising this view of information as something that can be easily passed around may have implications when it comes to plagiarism. Possibly taking a piece of information from a book or a

website may be seen as no different from accepting a piece of information from a friend on an instant messaging site. Young people's attitude to sharing information is one that offers the potential for future research.

6.8. Summary

This chapter has reflected upon various aspects of the research study: the findings of the study and how they addressed the research questions; the phenomenographic research approach employed and the limitations of the study. Based upon the findings recommendations have been made for LIS professionals and educators and finally recommendations for further research have been suggested.

This thesis has contributed to the knowledge and understanding of young people's experiences of information. By employing a phenomenographic research approach the study described the qualitatively different ways young people experience information in the context of their daily lives both academic and social and the kind of variation that exists between these experiences. The findings from the study have provided an important insight into the understanding of young people's relationship with information.

Bibliography

Agosto, D. E. & Hughes-Hassell, S., 2005. People, places, and questions: an investigation of the everyday life information-seeking behaviors of urban young adults. *Library and Information Science Research*, **27**(2), 141-163.

Åkerlind, G., 2005. Variation and commonality in phenomenographic research methods. *Higher Education Research and Development*, **24**(4), 321-334.

Akin, L., 1998. *Information overload and children: a survey of Texas elementary school students*.

<<http://www.ala.org/ala/mgrps/divs/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume11998slmqo/akin.cfm>>, [accessed 23.1.2007].

Alch, M. L., 2000. The echo boom generation: a growing force in American society. *The Futurist*, **34**(5), 42-46.

Apple Computer, 2003. *Achievement for all children: an Apple perspective*.

<<http://edcommunity.apple.com/ali/galleryfiles/487/achievement.pdf>>, [accessed 05.09.2006].

Ashworth, P. & Lucas, U., 2000. Achieving empathy and engagement: a practical approach to the design, conduct and reporting of phenomenographic research. *Studies in Higher Education*, **25**(3), 295-308.

Atkin, C., 1973. Instrumental utilities and information seeking. *In*: Clarke, P., ed. *New models for mass communication research*. Beverley Hills, CA: Sage, pp.205-242.

Barnard, A., McCosker, H. & Gerber, R., 1999. Phenomenography: a qualitative research approach for exploring understanding in health care. *Qualitative Health Research*, **9**(2), 212-226.

- Barranoik, L., 2001. Research success with senior high school students. *School Libraries Worldwide*, **7**(1), 28-45.
- Bates, M. J., 1989. The design of browsing and berrypicking techniques for the online search interface. *Online Review*, **13**(5), 407-424.
- Bates, M., 2002. Toward an integrated model of information seeking and searching. [Paper presented at the] *Fourth International Conference on information needs, seeking and use in different contexts, September 11-13, 2002, Lisbon, Portugal*.
<http://www.gseis.ucla.edu/faculty/bates/articles/info_SeekSearch-i-030329.html>, [accessed 06.02.2009].
- Belkin, N. J., 1978. Information concepts for information science. *Journal of Documentation* [online], **34**(1), 55-85.
<<https://vpn.lboro.ac.uk/+CSCO+ch756767633A2F2F6A6A6A2E727A72656E7971766166767475672E70627A++/Insight/viewPDF.jsp?contentType=Article&Filename=html/Output/Published/EmeraldFullTextArticle/Pdf/2780340105.pdf>>, [accessed 11.10.2008].
- Belkin, N. J. & Robertson, S., 1976. Information science and the phenomenon of information. *Journal for the American Society for Information Science*, **27**(4), 197-204.
- Belkin, N. J., Oddy, R. & Brooks, H. M., 1982. ASK for information retrieval. *Journal of Documentation*, **38**(2), 61-71.
- Bell, J., 1987. *Doing your research project: a guide for first-time researchers in education and social science*. Milton Keynes: OUP.
- Bent, M., 2008. *Perceptions of information literacy in the transition to higher education*. National Teaching Fellowship Project Report.
<http://eprint.ncl.ac.uk/file_store/production/55850/9543764E-D3BB-47D2-8FD3-CDE6BBEA0FD4.pdf>, [accessed 12.11.2009].

Beverley, C.A., Bath, P.A. & Barber, R., 2007. Can two established information models explain the information behaviour of visually impaired people seeking health and social care information? *Journal of Documentation*, **63**(1), 9–32.

Bilal, D., 2000. Children's use of Yahoo!igans! Web search engine: I. Cognitive and physical behaviors on fact based search tasks. *Journal of the American Society for Information Science*, **51**(7), 646-665.

Bilal, D., 2001. Children's use of Yahoo!igans! Web search engine: II. Cognitive and physical behaviors on research tasks. *Journal of the American Society for Information Science*, **52**(2), 118-136.

Bilal, D., 2002. Perspectives on children's navigation of the World Wide Web: does the type of search task make a difference? *Online Information Review*, **26**(2), 108-117.

Bilal, D. & Watson, J. S., 1998. Children's paperless projects: inspiring research via the Web. [Paper presented at the] *64th IFLA General Conference. August 16 – August 21, 1998.*
<<http://www.ifla.org/IV/ifla64/009-131e.htm>>, [accessed 26.06.04].

Bleakley, A. et. al., 2004. Computer access and Internet use among urban youths. *American Journal of Public Health*, **94**(5) 744-746.

Bloom B. S., 1956. *Taxonomy of educational objectives, handbook I: the cognitive domain*. New York: David McKay Co Inc.

Boon, S., Johnston, B. and Webber, S., 2007. A phenomenographic study of English faculty's conceptions of information literacy. *Journal of Documentation*, **63** (2), 204-228.

Booth, S., 1997. On phenomenography, learning and teaching. *Higher Education Research and Development*, **16**(2), 135-158.

Bowden, J., 1994. The nature of phenomenographic research. In: Bowden, J. & Walsh, E., eds. *Phenomenographic research: variations in method*. Melbourne: RMIT, Educational Quality Assurance, Research and Development Unit, pp.43-55.

Bowden, J. & Walsh, E., eds., 1994. *Phenomenographic research: variations in method*. Melbourne: RMIT, Educational Quality Assurance, Research and Development Unit.

Bowden, J. & Walsh, E., eds., 2000. *Phenomenography*. Melbourne: RMIT Publishing.

Brew, A., 2001. Conceptions of research: a phenomenographic study. *Studies in Higher Education*, **26**(3), 271-285.

Broch, E., 2000. Children' search engines from an information search process perspective. *American Library Association* [Online] 3.
<<http://www.ala.org/ala/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume32000/childrens.htm>>, [accessed 06.11.2006].

Brookes, B. C., 1974. Robert Fairthorne and the scope of information science. *Journal of Documentation*, **30**(2), 139-152.

Brookes, B. C., 1980. The foundations of information science: Part I: Philosophical aspects. *Journal of Information Science*, **2**, 125-133.

Bruce, C., 1997. *The seven faces of information literacy*. Adelaide, South Australia: Auslib Press.

Bruce, C., 1999. Phenomenography: opening a new territory for library and information science research. *The New Review of Information and Library Research*, **5**, 31-47.

Bruce, C., 2003. Frameworks guiding the analysis: applied to or derived from the data? *In: Proceedings EARLI Experience and Understanding SIG (SIG10) Meeting*, Australia National University, Canberra.

< <http://eprints.qut.edu.au/13581/1/13581.pdf>>, [accessed 07.11.08].

Bruce, C. & Gerber, R., 1995. *Phenomenographic research: an annotated bibliography*, 3rd ed. <<http://sky.fit.qut.edu.au/~bruce/anabib/title.php>>, [accessed 15.08.2006].

Bryman, A., 2004. *Social research methods*. Oxford: Oxford University Press.

Buckland, M. K., 1991a. Information as thing. *Journal of the American Society for Information Science*, **42**(5), 351-360.

Buckland, M. K., 1991b. *Information and information systems*. New York: Praeger.

Capurro R. & Hjørland, B., 2003. The Concept of Information. *In: B. Cronin ed. Annual review of information science and technology*. Volume 37. Medford, NJ: Information Today Inc, 343-411.

Case, D. O., 2002. *Looking for information: a survey of research on information seeking, needs and behavior*. London: Academic Press.

Chelton, M. K. & Cool, C., eds., 2004. *Youth information seeking behavior: theories, models and issues*. Lanham, Md.: Scarecrow Press.

Chelton, M. K. & Cool, C., eds., 2007. *Youth information seeking behavior II: context, theories, models, and issues*. Lanham, Md.: Scarecrow Press.

Clarke, P., ed., 1973. *New models for mass communication research*. Beverley Hills, CA: Sage.

Cohen, L., Manion, L. & Morrison, K., 2000. *Research methods in education* 5th ed. London: Routledge Falmer.

Cole, C., 1997. Calculating the information content of an information process for a domain expert using Shannon's mathematical theory of communication: A preliminary analysis. *Information Processing & Management*, 33, 715-726.

Cole, J. & Gardner, K., 1979. Topic work with first year secondary pupils. *In: E. Lunzer & K. Gardner, Eds. The effective use of reading*. London: Heinemann, pp.167-192.

Consoli, J., 2006. Nielsen: TV viewing grows. *Mediaweek* [online], 21 September 2006.

<http://www.mediaweek.com/mw/eseach/article_display.jsp?vnu_content_id=1003154980>, [accessed 10.01.2007].

Cope, C., 2002. Using the analytical framework of a structure of awareness to establish validity and reliability in phenomenographic research. [Paper presented at the] *Proceedings of the International Symposium on Current Issues in Phenomenography, Canberra: CEDAM, Australian National University, November 2002*.

<<http://www.anu.edu.au/cedam/ilearn/symposium/cope.pdf>>, [accessed 30.03.2007].

Cope, C., 2006. *Beneath the surface: the experience of learning about information systems*. Santa Rosa, California: Informing Science Press.

<http://books.google.co.uk/books?id=IRN-cTP-WTgC&pg=PA94&lpg=PA94&dq=Phenomenographic++experience+of&source=bl&ots=kksOoVUhrJ&sig=Za-HzGT8ysmXMTxuMipMW7AmvU0&hl=en&ei=csr-S9nVHpGU4gbA9tmbDg&sa=X&oi=book_result&ct=result&resnum=6&ved=0CCsQ6AEwBTgU#v=onepage&q=Phenomenographic%20%20experience%20of&f=false> [accessed 12.01.10].

Cornelius, I., 2002. Theorizing information for information science. *In*: B. Cronin ed. *Annual review of information science and technology*. Volume 36. Medford, NJ: Information Today Inc, 393-425.

Cornwall, A. & Jewkes, R., 1995. What is participatory research? *Social Science and Medicine*, **41**(12), 1667-1676.

Creswell, J., 2007. *Qualitative inquiry and research design: choosing among five traditions*. London: Sage.

Cronin, B., ed., 2002. *Annual review of information science and technology*. Volume 36. Medford, NJ: Information Today Inc.

Cronin, B., ed., 2003. *Annual review of information science and technology*. Volume 37. Medford, NJ: Information Today Inc.

Cronin, B., ed., 2005. *Annual review of information science and technology*. Volume 39. Medford, NJ: Information Today Inc.

Crotty, M., 1998. *The foundations of social research: meaning and perspective in the research process*. London: Sage.

Cuadra, C. & Bates, M., eds., 1974. *Library and information service needs of the nation: proceedings of a conference on the needs of occupational, ethnic, and other groups in the United States*. Washington DC: US Government Printing Office.

Dall'Alba, G., 1996. Reflections on phenomenography-an introduction. *In*: Dall'Alba, G. & Hasselgren, B., eds. *Reflections on phenomenography: toward a methodology*. Gothenburg: Acta Universitatis Gothoburgensis, pp.7-17.

- Dall'Alba, G. & Hasselgren, B., eds., 1996. *Reflections on phenomenography: toward a methodology*. Gothenburg: Acta Universitatis Gothoburgensis.
- De Rosa, C. *et al.*, 2006. *College students' perceptions of libraries and information resources: a report to the OCLC membership*. <<http://www.oclc.org/reports/pdfs/studentperceptions.pdf>>, [accessed 26.09.2006].
- Denzin, N. & Lincoln, Y., eds., 2000. *Handbook of qualitative research*, 2nd ed. Thousand Oaks, CA: Sage.
- Derr, R. L., 1983. A conceptual analysis of information need. *Information Processing and Management*, **19**(5), 273-278.
- Derr, R. L., 1985. The concept of information in ordinary discourse. *Information Processing & Management*, **21**(6), 489-499.
- Dervin, B., 1983. Information as a user construct: the relevance of perceived information needs to synthesis and interpretation. *In*: Ward, S. A. & Reed, L. J., eds. *Knowledge, structure and use: implications for synthesis and interpretation*. Philadelphia: Temple University Press, pp.153-184.
- Dervin, B., 1992. From the mind's eye of the user: the sense-making qualitative-quantitative methodology. *In*: Glazier, J. & Powell, R., eds. *Qualitative research in information management*, Englewood, CO: Libraries Unlimited, pp. 61-84.
- Dervin, B. & Voigt, M. J., eds., 1980. *Progress in communication sciences, volume II*. Norwood, New Jersey: Ablex.
- Dervin, B. & Nilan, M., 1986. Information needs and uses. *In*: M. Williams ed. *Annual review of information science and technology*. Volume 21. White Plains, NY: Knowledge Industry, 1-25.

EarthPulse: State of the earth 2010, 2008.

<<http://earthpulse.nationalgeographic.com/earthpulse/earthpulse-map>>,
[accessed 23.08.2009].

Edwards, S. L. (2003) *Using Phenomenography to Construct the Students Experience of Learning. (PowerPoint presentation) Paper by invitation presented at The Australian New Zealand Institute of Information Literacy (ANZIIL) Research practices for librarians' symposium, 7th-8th July 2003, Brisbane, Australia.* (Unpublished)

Edwards, S. L., 2005. *Panning for gold: influencing the experience of web based information searching.* PhD thesis, Queensland University of Technology.

Entwistle, N., 1997. Introduction: phenomenography in higher education. *Higher Education Research and Development*, **16**(2), 127-134.

Erdelez, S., 1997. Information encountering: a conceptual framework for accidental information discovery. In: Vakkari, P., Savolainen, R. & Dervin, B., eds. *Information seeking in context: proceedings of an international conference on research in information need, seeking and use in different contexts 14-16 August, 1996, Tampere, Finland.* London: Taylor Graham, pp.412-421.

Erdelez, S., 1999. Information encountering: it's more than just bumping into information. *Bulletin of the American Society for Information* [online], **25**(3). <<http://www.asis.org/Bulletin/Feb-99/erdelez.html>>, [accessed 21.11.2008].

Erdelez, S., 2004. Investigation of information encountering in the controlled research environment. *Information Processing and Management*, **40**(6), 1013-1025.

- Erdelez, S., 2005. Information encountering. *In*: Fisher, K., Erdelez, S. & McKechnie, L., eds., *Theories of information behaviour*. Medford, NJ: Information Today Inc., pp.179-184.
- Eylon, B., & Linn, M., 1988. Learning and instruction: An examination of four research perspectives in science education. *Review of Educational Research*, **58**(3), 251–301.
- Faibisoff, S. G. & Ely, D. P., 1976. Information and information needs. *Information Reports and Bibliographies*, **5**(5), 2-16.
- Fallows, D., 2005. *Search engine users*. Pew Internet and American Life Project, January 23, 2005.
<<http://www.pewinternet.org/Reports/2005/Search-Engine-Users.aspx>>, [accessed 12.09.2009].
- Feather, J. and Sturges, P., eds., 2003. *International Encyclopedia of Information and Library Science*. London/New York: Routledge.
- Fidel, R. *et al.*, 1999. A visit to the information mall: Web-searching behavior of high school students. *Journal of the American Society for Information Science*, **50**(1), 24-37.
- Fisher, K., Erdelez, S. & McKechnie, L., eds., 2005. *Theories of information behaviour*. Medford, NJ: Information Today Inc.
- Fisher, K. *et al.*, 2007. Tweens and everyday life information behavior: preliminary findings from Seattle. *In*: Chelton, M. & Cool, C., eds. *Youth information seeking behavior II: context, theories, models and issues*. Lanham, Md.: Scarecrow Press, pp.1-26.
- Forsythe, D., *et al.*, 1992. Expanding the concept of medical information: an observational study of physicians' information needs. *Computers and Biomedical Research*, **25**(2), 181-200.

Fourie, J. & Kruger, J., 1995. Basic and developmental information needs of secondary school pupils. *Mousaion*, **13**(1/2), 225-49.

Fox, C. J., 1983. *Information and misinformation*. Westport, CT: Greenwood Press.

Francis, H., 1996. Advancing phenomenography – questions of method. In: Dall'Alba, G. & Hasselgren, B., eds. *Reflections on phenomenography: toward a methodology*. Gothenburg: Acta Universitatis Gothoburgensis, pp.35-47.

Frاند, J. L., 2000. The information-age mindset: changes in students and implications for higher education. *Educause Review* [online], **35**(5), 14-24. <<http://www.educause.edu/apps/er/erm00/articles005/erm0051.pdf>>, [accessed 04.09.2006].

Gardner, H., 1983. *Frames of mind: the theory of multiple intelligences*. New York: Basic Books.

Garland, K., 1995. The information search process: a study of elements associated with meaningful research tasks. *School Libraries Worldwide*, **1**(1), 41-53.

Gefter, A., 2006. This is your space. *New Scientist*, September 16, 2006, pp.46-48.

Gill, D., 1999. Reinvent brands for Generation Y group. *Home Textiles Today*, **20**(44), 33.

Giorgi, A., 1999. A phenomenological perspective on some phenomenographic results on learning. *Journal of Phenomenological Psychology*, **30**(2), 69-93.

- Glazier, J. & Powell, R., eds., 1992. *Qualitative research in information management*, Englewood. CO: Libraries Unlimited.
- Gould, M. S. *et al.*, 2002. Seeking help from the internet during adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry*, **41**(10), 1182-1189.
- Gray, N. J. *et al.*, 2002. Adolescent girls' use of the internet for health information: issues beyond access. *Journal of Medical Systems*, 26 (6), 545-553.
- Green, A., 1990. What do we mean by user needs? *British Journal of Academic Librarianship*, **5**(2), 65-78.
- Grinter, R.E. & Palen, L., 2002. Instant messaging in teen life. *Proceedings of the 2002 ACM Conference on computer supported co-operative work New Orleans Louisiana USA November 16-20, 2002*.
<<http://portal.acm.org/citation.cfm?id=587082&dl=ACM&coll=portal&CFID=11111111&CFTOKEN=22222222>>, [accessed 06.11.2006].
- Gross, M., 2001. Imposed information seeking in school library media centers and public libraries: a common behaviour? *Information Research* [online], **6** (2). <<http://informationr.net/ir/6-2/paper100.html>>, [accessed 10.10.2006].
- Gurwitsch, A., 1964. *The field of consciousness*. Pittsburgh: Duquesne University Press.
- Haddon, L., 2008. Young people's diverse use of multimedia mobile phones. [Paper for the Panel Connecting with Generation Y-ired: Global perspectives on new media and youth cultures]. *Conference of the International Communications Association, Communicating for Social Impact, Montreal, May 22nd- 26th*.
<<http://www.lse.ac.uk/collections/media@lse/whosWho/LeslieHaddon/ICAPanelHaddon.pdf>>, [accessed 22.09.2009].

Haldenby *et al.*, 2008. *The mobile economy*.

<<http://www.reform.co.uk/Research/Education/EducationArticles/tabid/110/smid/378/ArticleID/620/reftab/71/t/The%20mobile%20economy/Default.aspx>> [accessed 06.11.2009].

Hansen, D. L. *et al.*, 2003. Adolescents searching for health information on the internet: an observational study. *Journal of Medical Internet Research* [online], **5**(4).

<<http://www.jmir.org/2003/4/e25/>>, [accessed 16.10.2006].

Harley, B., Dreger, M. & Knobloch, P., 2001. The Post-modern condition: students, the web and academic library services. *Reference Services Review*, **29** (1), 23-32.

Hartmann, E., 2001. Understandings of information literacy: perceptions of first year undergraduate students at the University of Ballarat. *Australian Academic and Research Libraries* [online], **32**(2)

<<http://alia.org.au/publishing/aarl/32.2/full.text/ha.tmann.html>>, [accessed 03.10.2006].

Hayter, S., 2005. *The information worlds of a disadvantaged community*. PhD thesis, Northumbria University.

Hazel, N., 1995. Elicitation techniques with young people. *Social Research Update* [online], **12**.

<<http://www.soc.surrey.ac.uk/sru/SRU12.html>>, [accessed 31.08.06].

Heinstrom, J., 2006. Fast surfing for availability or deep diving into quality - motivation and information seeking among middle and high school students. *Information Research* [online], **11**(4). <<http://InformationR.net/ir/11-4/paper265.html>>, [accessed 29.03.2009].

Herring, J. E., 1997. Enabling students to search and find. *Library Association Record*, **99**(5), 258-259.

- Hey, J., 2004. *The data, information, knowledge, wisdom chain: The metaphorical link*.
<http://ioc.unesco.org/Oceanteacher/OceanTeacher2/02_InfTchSciCmm/DIKWchain.pdf>, [accessed 01.01.2007].
- Hirsh, S. G., 1999. Children's relevance criteria and information seeking on electronic sources. *Journal of the American Society for Information Society*, **50**(14), 1265-1283.
- Hirsh, S. G. 2004. Domain knowledge and children's search behavior. *In*: Chelton, M. K. & Cool, C., eds. *Youth information seeking behavior: theories, models and issues*. Lanham, Md.: Scarecrow Press, pp.241-270.
- Hjørland, B., 1997. *Information seeking and subject representation. An activity-theoretical approach to information science*. New York: Greenwood Press.
- Holliday, W. & Li, Q., 2004. Understanding the millennials: updating our knowledge about students. *Reference Services Review*, **32**(4), 356-366.
- Howe, N. & Strauss, W., 2000. *Millennials rising: the next generation*. New York: Vintage Books.
- Hughes-Hassell, S., & Agosto, D. E., 2007. Modeling the everyday life information needs of urban teenagers. *In*: Chelton, M. K. & Cool, C., eds. *Youth information-seeking behavior II: context, theories, models, and issues*, Lanham, MD: Scarecrow Press, pp. 27-61.
- Huitt, W., & Hummel, J., 2003. Piaget's theory of cognitive development. *Educational Psychology Interactive*. Valdosta, GA: Valdosta State University.
<<http://www.edpsycinteractive.org/topics/cogsys/piaget.html>>, [accessed 12.01.10].

- Husén, T., 1997. Research paradigms in education. *In: Keeves, J., ed. Educational research, methodology, and measurement: an international handbook*, 2nd ed. Oxford: Pergamon, pp.16-21.
- Irvin, L., 2006. *Teacher conceptions of student engagement ion learning: a phenomenographic investigation*. PhD thesis, Central Queensland University.
- Johnson, J. D. 1997. *Cancer-related information seeking*. Cresskill, NJ: Hampton Press.
- Julien, H., 1999. Barriers to adolescent's information seeking for careers decision making. *Journal of the American Society for Information Science*, **50**(1), 38-48.
- Julien, H. & Barker, K., 2009. How high school students find and evaluate scientific information: a basis for information literacy skills development. *Library and Information Science Research*, **31**(1), 12-17.
- Kaimal, G., 2003. *Gen-X meets Gen-Y: youth perceptions and concerns about the future: a review of the literature*.
<<http://www.stonehill.edu/cs1/sa/Generation%20Y%20review%20of%20literature.pdf>>, [accessed 10.09.2006].
- Keeves, J., ed., 1997. *Educational research, methodology, and measurement: an International Handbook*, 2nd ed. Oxford: Pergamon.
- Kelly, G.A., 1955. *The psychology of personal constructs*. New York: Norton.
- Kennedy, G. *et al.*, 2007. The net generation are not big users of Web 2.0 technologies: preliminary findings. *In: ICT: providing choices for learners and learning. Proceedings ascilite Singapore 2007*.
<<http://www.ascilite.org.au/conferences/singapore07/procs/kennedy.pdf>>, [accessed 07.06.2009].

Kolb, D. A., 1984. *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, New Jersey: Prentice Hall Inc.

Kreuger, A., 1988. *Focus groups: A practical guide for applied research*. London: Sage.

Kreuger, R. A., 1997. *Developing questions for focus groups*. London: Sage.

Krikelas, J., 1983. Information searching behavior: patterns and concepts. *Drexel Library Quarterly*, **19**(2), 5-20.

Kuhlthau, C.C., 1988. Developing a model of the library search process: cognitive and affective aspects. *Reference Quarterly*, **28**(2), 232-242.

Kuhlthau, C. C., 1993. *Seeking meaning: a process approach to library and information services*. Norwood, NJ: Ablex.

Kvale, S., 1983. The qualitative research interview: a phenomenological and hermeneutical mode of understanding. *Journal of Phenomenological Psychology*, **14**(2), 171-196.

Kvale, S., ed., 1989. To validate is to question. In: Kvale, S., ed. *Issues of validity in qualitative research*. Lund, Sweden: Studentlitteratur, pp.73-91.

Kvale, S., 1989. *Issues of validity in qualitative research*. Lund, Sweden: Studentlitteratur.

Large, A., 2005. Children, teenagers and the Web. In: B. Cronin, ed. *Annual review of information science and technology*. Volume 39. Medford, NJ: Information Today Inc., pp.347-392.

Large, A. & Beheshti, J., 2000. The Web as a classroom resource: reactions from the users. *Journal of the American Society for Information Science*, **51**(12), 1069-1080.

Latrobe, K. & Havener, M., 1997. The information seeking behavior of high school honors students: an exploratory study. *Journal of Youth Services in Libraries*, **10**(2), 188-200.

Laurillard, D., 1993. *Rethinking university teaching: a framework for the effective use of educational technology*. London: Routledge.

Laverty, C., 2002. The challenge of information seeking: how children engage in library work. *Feliciter*, **48**(5), 226-228.

Lenhart, A. & Madden, M., 2005. *Teen content creators and consumers*. Pew Internet and American Life Project, November 2, 2005.
<http://www.pewinternet.org/~media/Files/Reports/2005/PIP_Teens_Content_Creation.pdf>, [accessed 20.09.2006].

Lenhart, A. *et al.*, 2007. *Teens and social media*. Pew Internet and American Life Project, December 19, 2007.
<http://www.pewinternet.org/~media/Files/Reports/2007/PIP_Teens_Social_Media_Final.pdf>, [accessed 09.09.2009].

Lenhart, A. *et al.*, 2008. *Writing, technology and teens*. Pew Internet and American Life Project, April 24, 2008.
<http://www.pewinternet.org/~media/Files/Reports/2008/PIP_Writing_Report_FINAL3.pdf>, [accessed 09.09.2009].

Lenhart, A., 2009. *Teens and mobile phones over the past five years: Pew Internet looks back*. Pew Internet and American Life Project, August 19, 2009.
<<http://www.pewinternet.org/Reports/2009/14--Teens-and-Mobile-Phones-Data-Memo.aspx>>, [accessed 09.09.2009].

- Levitan, K., 1980. Applying a holistic framework to synthesize information science research. *In: Dervin, B. & Voigt, M. J., eds. Progress in communication sciences, volume II.* Norwood, New Jersey: Ablex, pp.241–273.
- Lewins, A. & Silver, C., 2007. *Using software in qualitative research: a step-by-step guide.* Sage: London.
- Limberg, L., 1999. Three conceptions of information seeking and use. *In: Wilson, T. & Allen, D., eds. Exploring the Contexts of Information Behaviour: proceedings of the second international conference on research in information needs, seeking and use in different context, 13-15 August 1998, Sheffield. UK.* London: Taylor Graham, pp.116-135.
- Livejournal, 2006. *Livejournal: interests.*
<<http://www.livejournal.com/interests.bml?view=popular&mode=text>>, [accessed 08.10.2006].
- Livingstone, S., 2006. *UK children go online: end of award report.*
<<http://www.children-go-online.net>>, [accessed 20.10.2006].
- Livingstone, S. & Bober, M., 2005. *UK children go online: final report of key findings.*
<<http://www.children-go-online.net>>, [accessed 10.10.2006].
- Lloyd, A., 2005. Information literacy: different contexts, different concepts, different truths? *Journal of Librarianship and Information Science* **37**(2), 82-88.
- Lorenzen, M., 2001. The land of confusion? High school students and their use of the World Wide Web for research. *Research Strategies*, **18**(2), 151-163.

- Loughborough University, 2006. *Ethical Advisory Committee: additional information and resources*.
<<http://www.lboro.ac.uk/admin/committees/ethical/>> [accessed 02.02.2007].
- Lunzer, E. & Gardner, K., eds., 1979. *The effective use of reading*. London: Heinemann.
- Lupton, M., 2008. Evidence, argument and social responsibility: first year students' experiences of information literacy when researching an essay. *Higher Education Research and Development* **27**(4), 339-414.
- Lutz, S., & Huitt, W., 2004. Connecting cognitive development and constructivism: Implications from theory for instruction and assessment. *Constructivism in the Human Sciences*, **9**(1), 67-90.
<<http://www.edpsycinteractive.org/papers/cogdev.pdf>>, [accessed 12.01.10].
- Lyman, P. & Varian, H. R., 2003. *How much information? 2003*.
<<http://www.sims.berkeley.edu/research/projects/how-much-info-2003/>>, [accessed 01.01.2007].
- McCosker, H., Barnard, A. & Gerber, R. 2004. Phenomenographic study of women's experiences of domestic violence during the childbearing years. *Online Journal of issues in nursing* **9**(1).
<<http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume92004/No1Jan04/ArticlePreviousTopic/ChildbearingDomesticViolence.aspx>> [accessed 12.01.10].
- Macgill A. R., 2007. *Data memo: parent and teenager Internet use*.
<http://www.pewinternet.org/pdfs/PIP_Teen_Parents_data_memo_Oct2007.pdf>, [accessed 12.07.2009].
- Machlup, F., 1983. Semantic quirks in studies of information. In: Machlup F. & Mansfield, U., eds. *Cultural diversity in studies of information*. New York: Wiley, pp.641-671.

- Machlup, F. & Mansfield, U., 1983. Cultural diversity in studies of information. *In: Machlup, F. & Mansfield, U., eds. Cultural diversity in studies of information.* New York: Wiley, pp.3-59.
- Machlup, F. & Mansfield, U., eds., 1983. *Cultural diversity in studies of information.* New York: Wiley.
- McIntyre, R. & Woodruff Smith, D., 1989. Theory of intentionality. *In: McKenna, W. & Mohanty, J., eds. Husserl's phenomenology: a textbook.* Washington, D.C.: University Press of America, pp.147-179.
- McKenna, W. & Mohanty, J., eds., 1989. *Husserl's phenomenology: a textbook.* Washington, D.C.: University Press of America.
- McKnight, C., 2000. The personal construction of information space. *Journal of the American Society for Information Science*, **51**(8), 730-733.
- McLean, M., 2001. Can we relate conceptions of learning to student academic achievement? *Teaching in Higher Education*, **6**(3), 399-413.
- McNicol, S., 2003. Creating effective information users. *In: Martin, A. & Rader, H. eds. Information and IT literacy: enabling learning in the 21st century.* London: Facet, pp.207-216.
- MacPhail, A. & Kinchin, G., 2004. The use of drawings as an evaluative tool: students' experiences of sport education. *Physical Education and Sport Pedagogy*, **9**(1), 87-108.
- Madden, A., Ford, N. & Miller, D., 2007. Information resources used by children at an English secondary school: perceived and actual levels of usefulness. *Journal of Documentation*, **63**(3), 340-358.

- Mallett, M., 1992. Using and sharing ideas from information books in the context of a primary school project. *British Educational Research Journal*, **18**(1), 45-62.
- Manuel, K., 2002. Teaching information literacy to Generation Y. *Journal of Library Administration*, **36**(1/2), 195-217.
- Marchionini, G., 1989. Information seeking strategies of novices using a full text electronic encyclopaedia. *Journal of the American Society for Information Science*, **40**(1), 54-66.
- Martin, A. & Rader, H. eds., 2003. *Information and IT literacy: enabling learning in the 21st century*. London: Facet.
- Marton, F., 1981. Phenomenography – describing conceptions of the world around us. *Instructional Science*, **10**, 177-200.
- Marton, F., 1986. Phenomenography: a research approach to investigate different understandings of reality. *Journal of Thought*, **21**(30), 28-49.
- Marton, F. 1994. *Phenomenography*.
<<http://www.ped.gu.se/biorn/phraph/civil/main/2res.appr.html>>, [accessed 12.01.2007].
- Marton, F., 1996. Cognosco ergo sum – reflections on reflections. In: Dall'Alba, G. & Hasselgren, B., eds. *Reflections on phenomenography: toward a methodology?* Gothenburg: Acta Universitatis Gothoburgensis, pp.163-187.
- Marton, F., 1997. Phenomenography. In: Keeves, J., ed. *Educational research, methodology, and measurement: an international handbook*, 2nd ed. Oxford: Pergamon, pp.95-101.
- Marton, F., 2000. The structure of awareness. In: Bowden, J. & Walsh, E., eds. *Phenomenography*. Melbourne: RMIT Publishing, pp.102-116.

- Marton, F. & Booth, S., 1997. *Learning and awareness*. New Jersey: Lawrence Erlbaum Associates.
- Maybee, C., 2006. Undergraduate perceptions of information use: the basis for creating user-centred student information literacy instruction. *The Journal of Academic Librarianship*, **32**(1) 79-85.
- Maybee, C., 2007. Understanding our student learners: a phenomenographic study revealing the ways that undergraduate women at Mills College understand using information. *Reference Services Review*, **35**(3), 452-462.
- Maykut, P. & Morehouse, R., 1994. *Beginning qualitative research: a philosophic and practical guide*. London: Falmer Press.
- Merritt, S. R., 2002. Generation Y: a perspective on America's next generation and their impact on higher education. *Serials Librarian*, **42**(1/2), 41-52.
- Metzger, M., Flanagin, A. & Zwarun, L., 2003. College student web use, perceptions of information credibility, and verification behavior. *Computers and Education*, **41**(3), 271-290.
- Meyers, E. M., Fisher, K. E. & Marcoux, E. L., 2009. Making sense of an information world: the everyday life information behavior of preteens. *Library Quarterly*, **79** (3), 301-341.
- Minudri, R., 1974. Library and information services for young adults and students. In: Cuadra, C. & Bates, M., eds. *Library and information service needs of the nation: proceedings of a conference on the needs of occupational, ethnic, and other groups in the United States*. Washington DC: US Government Printing Office, pp.155-161.
- Moore, N., 1983. *How to do research*. London: The Library Association.

- Moore, P., 2000. Primary school children's interaction with library media: information literacy in practice. *Teacher Librarian*, [online], **27**(3). <http://www.teacherlibrarian.com/pages/27_3_feature.html>, [accessed 16.04.03].
- Moore, P. A. & St. George, A., 1991. Children as information seekers: the cognitive demands of books and library systems. *School Library Media Quarterly*, **19**(3), 161-168.
- Morgan, D. L., ed., 1993. *Successful focus groups: advancing the state of the art* [online]. London: Sage.
<<http://books.google.co.uk/books?id=HTOQOPIA2MsC&printsec=frontcover&dq=successful+focus+groups#v=onepage&q=&f=false>>, [accessed 10.10.2009].
- Morgan, D. L., 1997. *Focus groups as qualitative research*, 2nd ed. Thousand Oaks: Sage.
- Morgan, D.L. & Kreuger, R. A., 1993. When to use focus groups and why. *In: Morgan, D. L., ed. Successful focus groups: advancing the state of the art* [online]. London: Sage, pp.3-19.
<<http://books.google.co.uk/books?id=HTOQOPIA2MsC&printsec=frontcover&dq=successful+focus+groups#v=onepage&q=&f=false>>, [accessed 10.10.2009].
- Morris, J., 2006. *The implications of either 'discovering' or 'constructing' categories of description in phenomenographic analysis*.
<<http://www.middlesex.ac.uk/aboutus/fpr/clqe/docs/jennymorris.pdf>>, [accessed 06.01.08].
- Morrison, H., 1997. Information literacy skills: an exploratory focus group study of student perceptions. *Research strategies*, **15**(1), 4-17.

- Mumtaz, S., 2001. Children's enjoyment and perception of computer use in the home and the school. *Computers and Education*, **36**(4), 347-362.
- Nahl, D. & Harada, V. H., 2004. Composing Boolean search statements: self confidence, concept analysis, search logic and errors. *In: Chelton, M. K. & Cool, C., eds. Youth information seeking behavior: theories, models and issues.* Lanham, Md.: Scarecrow Press, pp.119-144.
- Neuborne, E. & Kerwin, K., 1999. Generation Y. *Business Week* [online], February 15, 1999.
<http://www.businessweek.com/1999/99_07/b3616001.htm>, [accessed 18.10.2006].
- Neuman, D., 1995. High school students' use of databases: results of a national Delphi study. *Journal of the American Society for Information Science*, **46**(4), 284-298.
- Nicholas, D., 2000. *Assessing information needs: tools, techniques and concepts for the internet age*, 2nd ed. London: Aslib Information Management.
- Oblinger, D., 2003. Boomers, Gen-Xers and Millennials: understanding the new students. *Educause Review* [online], **38**(4), 37-47.
<<http://www.educause.edu/ir/library/pdf/ERM0342.pdf>>, [accessed 25.07.2006].
- Oblinger, D. & Oblinger, J., eds., 2005. *Educating the Net Generation.* Washington, DC: Educause,
<<http://www.educause.edu/ir/library/pdf/pub7101.pdf>>, [accessed 24.07.2006].
- Ofcom, 2010. *UK children's media literacy.*
<<http://stakeholders.ofcom.org.uk/binaries/research/media-literacy/ukchildrensml1.pdf>>, [accessed 12.01.10]

- Osteraker, M., 2002. *Phenomenography as a research method in management research*.
<<http://www.ecsocman.edu.ru/images/pubs/2002/12/27/0000034593/phenomenography.pdf>>, [accessed 20.01.2007].
- Pang, M. & Marton, F., 2005. Learning theory as teaching resource: enhancing students' understanding of economic concepts. *Instructional Science*, **33**(2), 159-191.
- Pettigrew, K., Fidel, R. & Bruce, H., 2001. Conceptual frameworks in information behaviour. In: Williams, M., ed. *Annual review of information science and technology*. Volume 35. Medford NJ: Information Today Inc., pp.43-78.
- Pitts, J., 1995. Mental models of information: the 1993-94 AASL/Highsmith research award study. *School Library Media Quarterly*, **23**(3), 177-184.
- Poston-Anderson, B. & Edwards, S., 1993. The role of information in helping adolescent girls with their life concerns. *School Library Media Quarterly* **22**(1) 25-30.
- Prasad, J., ed., *Proceedings of the 1999 ACM SIGCPR Conference on computer personnel research, New Orleans, Louisiana, US, April 8-10 1999*.
<<http://portal.acm.org/citation.cfm?id=299602&coll=GUIDE&dl=GUIDE&CFID=6920034&CFTOKEN=70882905&ret=1#Fulltext>>, [accessed 23.11.2006].
- Prensky, M., 2001a. Digital natives, digital immigrants. *On the Horizon* [online], 9 (5). <<http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf#search=%20digital%20natives%20digital%20immigrants%22>> [accessed 29.04.2006].

Prensky, M., 2001b. Digital natives, digital immigrants, part II: do they really think differently? *On the Horizon* [online], **9**(6).

<<http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part2.pdf>>, [accessed 29.04.2006].

Prensky, M., 2004. *What can you learn from a cell phone? – almost anything!*

<http://www.marcprensky.com/writing/Prensky-What_Can_You_Learn_From_a_Cell_Phone-FINAL.pdf>, [accessed 09.11.2006].

Project Tomorrow, 2006. *Our voices, our future: student and teacher views on science, technology and education: national report on NetDay's 2005 speak up event.*

<http://www.netday.org/Speakup/pdfs/SpeakUpReport_05.pdf>, [accessed 03.10.2009].

Prosser, J. ed., 1998. *Image based research: a sourcebook for qualitative researchers.* London: Falmer Press.

Quigley, E. J. & Debons, A., 1999. Interrogative theory of information and knowledge. In: Prasad, J., ed. *Proceedings of the 1999 ACM SIGCPR Conference on computer personnel research, New Orleans, Louisiana, US, April 8-10 1999* [online].

<<http://portal.acm.org/citation.cfm?id=299602&coll=GUIDE&dl=GUIDE&CFID=6920034&CFTOKEN=70882905&ret=1#Fulltext>>, [accessed 23.11.2006].

Qvortrup, L., 1993. The controversy over the concept of information. An overview and a selected and annotated bibliography. *Cybernetics & Human Knowing*, **1**(4), 3-24.

- Rainie, L., 2006. *Life online: teens and technology and the world to come*. Speech to Annual Conference of the Public Library Association Boston. <<http://www.pewinternet.org/ppt/Teens%20and%20technology.pdf>>, [accessed 25.09.2006].
- Renner *et al.*, 1976. *Research, teaching, and learning with the Piaget model*. Norman, OK: University of Oklahoma Press.
- Rowlands, I. *et al.*, 2008. The Google generation: the information behaviour of the researcher of the future. *Aslib Proceedings*, **60**(4), 290-310.
- Rowley, J., 2007. The wisdom hierarchy: representations of the DIKW hierarchy. *Journal of Information Science*, **33**(2), 163–180.
- Säljö, R., 1997. Talk as data and practice – a critical look at phenomenographic inquiry and the appeal to experience. *Higher Education Research & Development*, **16**(2), 173-190.
- Sandberg, J., 1996. Are phenomenographic results reliable? *In: Dall'Alba, G. & Hasselgren, B., eds. Reflections on phenomenography: toward a methodology?* Gothenburg: Acta Universitatis Gothoburgnesis, pp.129-140.
- Sandberg, J., 1997. Are phenomenographic results reliable? *Higher Education Research & Development*, **16**(2), 203-212.
- Sandberg, J., 2000. Understanding human competence at work: an interpretative approach. *Academy of Management Journal*, **43**(1), 9-25.
- Sandberg, J., 2005. How do we justify knowledge produced within interpretive approaches? *Organizational Research Method*, **8**(1), 41-68.

- Sandfort, M. H. & Haworth, J. G., 2002. Whassup? A glimpse into the attitudes and beliefs of the millennial generation. *Journal of College and Character* [online], **2**.
<<http://www.collegevalues.org/articles.cfm?a=1&id=613>>, [accessed 19.09.2006].
- Schacter, J., Chung, G. & Dorr, A., 1998. Children's Internet searching. *Journal of the American Society for Information Science*, **49**(9), 840-849.
- Schneider, B. & Stevenson, D., 1999. *The ambitious generation: America's teenagers motivated but directionless*. New Haven, MA: Yale University Press.
- Seamans, N. H., 2002. Student perceptions of information literacy: insights for librarians. *Reference Services Review*, **30**(2), 112 –123.
- Selwyn, N., 2006. Exploring the 'digital disconnect' between net-savvy students and their schools. *Learning, Media and Technology*, **31**(1), 5-17.
- Shannon, C., 1948. A mathematical theory of communication. *The Bell System Technical Journal*, **27**, 379-423, 623-656.
- Shannon, C. & Weaver, W., 1949/1972. *The mathematical theory of communication*. Urbana, IL: The University of Illinois Press. (Original work published in 1949).
- Sheesley, D., 2002. The Net Generation: characteristics of traditional-aged college students and implications for academic information services. *College and Undergraduate Libraries*, **9**(2), 25-42.
- Shenton, A. K., 2002. *The characteristics and development of young people's information universes*. PhD thesis, Northumbria University.

- Shenton, A.K. & Dixon, P., 2003a. Models of young people's information seeking. *Journal of Librarianship and Information Science*, **35**(1), 5-22.
- Shenton, A.K. & Dixon, P., 2003b. Youngster's use of other people as an information-seeking method. *Journal of Librarianship and Information Science*, **35**(4), 219-233.
- Shenton, A.K. & Dixon, P., 2004a. Issues arising from youngsters' information-seeking behaviour. *Library and Information Science Research*, **26**(2), 177-200.
- Shenton, A.K. & Dixon, P., 2004b. The nature of information needs and strategies for their investigation in youngsters. *Library and Information Science Research*, **26**(3), 296-310.
- Shenton, A. K. & Johnson, A., 2008. Young people's perspectives on 'information' revisited. *IFLA Journal*, **34**(3), 238-255.
- Shenton, A.K., Nasset, V. & Hayter, S., 2008. Children's conceptualizations of the word, 'information'. *Journal of Librarianship and Information Science*, **40**(3), 151-164.
- Silverman, D., 1993. *Interpreting qualitative data*. London: Sage Publications.
- Slater, M., 1990. Qualitative research. In: M. Slater, ed. *Research methods in library and information studies*. London: The Library Association, pp.107-127.
- Slater, M., ed., 1990. *Research methods in library and information studies*. London: The Library Association.

- Small, R. V. & Ferreira, S., 1994. Information location and use, motivation and learning patterns when using print or multimedia information resources. *Journal of Educational Multimedia and Hypermedia*, **3**(3/4), 251-273.
- Smith, M., & Hepworth, M., 2005. Motivating learners to become information literate. *Library and Information Update*, **4**(1/2), 46-47.
- Smith, M. & Hepworth, M., 2007. An investigation of factors that may demotivate secondary school students undertaking project work: implications for learning information literacy. *Journal of Librarianship and Information Science*, **39**(1), 3-15.
- Smith, M. & Hepworth, M., 2008. *Perceptions of information: the net generation* [Presentation given at the Librarians' Information Literacy Annual Conference, Liverpool John Moores University, 18 March 2008]. <http://www.lilconference.com/dw/archive/2008/Parrell_tuesday_afternoon.htm?action=programme#tuesday>, [accessed 28.09.2009].
- Strauss, A. and Corbin, J., 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. London: Sage Publications.
- Strauss, A. & J. Corbin, 1998. *Basics of qualitative research: techniques and procedures for developing grounded theory* [online]. 2nd ed. Thousand Oaks: Sage.
<<http://books.google.co.uk/books?id=wTwYUnHYsmMC&printsec=frontcover&dq=basics+of+qualitative+research#v=onepage&q=&f=false>>, [accessed 08.11.2009].
- Svensson, L., 1989. The conceptualisation of cases of physical motion. *European Journal of Psychology of Education*, **4**(4), 529-545.
- Svensson, L., 1997. Theoretical foundations of phenomenography. *Higher Education Research and Development*, **16**(2), 159-171.

- Tamm, M. E. & Granqvist, A., 1995. The meaning of death for children and adolescents: a phenomenographic study of drawing. *Death Studies*, **19**(3), 203-222.
- Tapscott, D., 1998a. *Growing up digital: the rise of the Net Generation*. New York: McGraw Hill.
- Tapscott, D., 1998b. *The Net Generation and the School*.
<http://www.mff.org/edtech/article.taf?_function=detail&Content_uid1=109>,
[accessed 18.09.2006].
- Taylor, R. S., 1968. Question negotiation and information seeking in libraries. *College and Research Libraries*, **29**(3), 178-194.
- Tesch, R., 1990. *Qualitative research: analysis types and software tools*. London: Falmer.
- Teijlingen van, E. and Hundley, V., 2001. The importance of pilot studies. *Social Research Update* [online], **35**.
<<http://sru.soc.surrey.ac.uk/SRU35.html>>, [accessed 18.07.2007].
- Uljens, M., 1996. On the philosophical foundations of phenomenography. In: Dall'Alba, G. & Hasselgren, B., eds. *Reflections on phenomenography: toward a methodology?* Gothenburg: Acta Universitatis Gothoburgnesis, pp.103-128.
- Vakkari, P., Savolainen, R. & Dervin, B., eds., 1997. *Information seeking in context: proceedings of an international conference on research in information need, seeking and use in different contexts 14-16 August, 1996, Tampere, Finland*. London: Taylor Graham.
- Valentine, B., 1993. Undergraduate research behavior: using focus groups to generate theory. *The Journal of Academic Librarianship*, **19**(5), 300-304.

- Van Manen, M., 1990. *Researching lived experience: human science for an action sensitive pedagogy*. New York: State University of New York Press.
- Vickery, B. C., ed., 1994. *Fifty years of information progress: a Journal of Documentation review*. London: Aslib.
- Vidich, A., & Lyman, S., 2000. Qualitative methods: their history in sociology and anthropology. In: Denzin, N. & Lincoln, Y., eds. *Handbook of qualitative research*, 2nd ed. Thousand Oaks, CA: Sage, pp.37-84.
- Walsh, E., 1994. Phenomenographic analysis of interview transcripts. In: Bowden, J. & Walsh, E., eds. *Phenomenographic research: variations in method*. Melbourne: RMIT, Educational Quality Assurance, Research and Development Unit, pp.17-30.
- Ward, S. A. & Reed, L. J., eds., 1983. *Knowledge, structure and use: implications for synthesis and interpretation*. Philadelphia: Temple University Press.
- Webber, S., Boon, S. & Johnston, B., 2005. A comparison of UK academics' conceptions of information literacy in two disciplines: English and marketing. *Library and Information Research*, **29**(93), 4-15.
- Weiler, A., 2005. Information seeking behaviour in Generation Y students: motivation, critical thinking and learning theory. *The Journal of Academic Librarianship*, **31**(1), 46-53.
- Wetton, N. M. & McWhirter, J., 1998. Images and curriculum development in health education. In: Prosser, J., ed., 1998. *Image based research: a sourcebook for qualitative researchers*. London: Falmer Press, pp.263-283.
- Williams, D. & Wavell, C., 2007. Secondary school teachers' conceptions of student information literacy. *Journal of Librarianship and Information Science*, **39**(4), 199-212.

Williams, J. B. & Jacobs, J., 2004. Exploring the use of blogs as learning spaces in the higher education sector. *Australasian Journal of Educational Technology*, **20**(2), 232-247.

Williams, M. ed., 1986. *Annual review of information science and technology*. Volume 21. White Plains, NY: Knowledge Industry.

Williams, M., ed., 2001. *Annual review of information science and technology*. Volume 35. Medford NJ: Information Today Inc.

Williams, T., Wetton, N. & Moon, A., 1989. *A way in: five key areas of health education*. London: HEA.

Wilson, T., 1981. On user studies and information needs. *Journal of Documentation*, **37**(1), 3-15.

Wilson, T., 1994. Information needs and uses: fifty years of progress. In: Vickery, B., C., ed. *Fifty years of information progress: a Journal of Documentation review*. London: Aslib, pp.15-52.

Wilson, T., 1997. Information behaviour: an interdisciplinary perspective. In: Vakkari, P., Savolainen, R. & Dervin, B., eds. *Information seeking in context: proceedings of an international conference on research in information need, seeking and use in different contexts 14-16 August, 1996, Tampere, Finland*. London: Taylor Graham, pp.39-50.

Wilson, T., 1999. Models in information behaviour research. *Journal of Documentation*, **55**(3), 249-270.

Wilson, T., 2000. Human information behaviour. *Informing Science*, **3**(2), 49-55.

Wilson, T. & Allen, D., eds., 1999. *Exploring the Contexts of Information Behaviour: proceedings of the second international conference on research in information needs, seeking and use in different context, 13-15 August 1998, Sheffield. UK.* London: Taylor Graham.

Windham, C., 2005. The student's perspective. *In: Oblinger, D. & Oblinger, J., eds. Educating the Net Generation.* Washington, DC: Educause, p.5.1-5.16. <<http://www.educause.edu/ir/library/pdf/pub7101e.pdf>>, [accessed 18.09.2006].

Appendix 1: Focus group participants

A total of eighteen young people participated in the focus groups. The young people were from Year 7 and from Years 12 and 13. The Year 7 focus group comprised of ten students, four male and six female. Five students were from the independent school and five students from the state comprehensive school. The Year 12 and 13 focus group comprised of eight students, four Year 13 students from the independent school, two male and two female and four students from the comprehensive school, three male Year 13 students and one female Year 12 student. Table 11 lists the focus group participants. Each participant was assigned a code made up of five elements: the letters FG referring to the focus group; a random initial to refer to the individual; the initial F or M to denote female or male gender; the initials representing the school attended (CS representing comprehensive school and IS representing independent school) and a number which referred to their school year:

Year 7 participants	
FGNMIS7	FGLFCS7
FGBMIS7	FGGMCS7
FGKFIS7	FGJMCS7
FGWFIS7	FGSFCS7
FGRFIS7	FGEFCS7
Year 12 and 13 participants	
FGJMIS13	FGCFCS12
FGEFIS13	FGLMCS13
FGRFIS13	FGSMCS13
FGTMIS13	FGAMCS13

Table 11: Focus group participants

Appendix 2: Focus Group Questions

Purpose

The discussion will be based on the research questions and will take place in order to:

- Give the participants an opportunity to introduce into the research arena any factors or issues they consider pertinent and relevant to their situation
- To provide a forum to elicit the language and terms used by the participants when discussing this topic
- Provide data that will inform the questions posed in the individual interviews

Research questions

The following research questions have been identified for investigation:

- What are the qualitatively different ways young people experience information?
- What kind of variation exists between these experiences?
- What holistic picture of young people's relationship with information can be composed from knowledge of the different ways young people experience information?
- How do young people's experiences of information compare with the meanings given to information by LIS scholars?

In order to answer the research questions the following questions will need to be addressed:

- When do young people seek information?
- What information do young people require/want/need?
- What information do young people value?
- How is information perceived at various stages of the information seeking process?
- What resources are used or associated with information and how is information perceived in these resources?

Focus Group Session

Introduction

I am Marian Smith. I am a research student at Loughborough University and I am talking to students in secondary schools about information and what it means to them. I am hoping to collect a range of opinions and views. Nothing that you say will be judged good or bad, right or wrong. I welcome all your thoughts. The points that you raise will be used as part of my research project. Any comments you make during the course of this session will be made anonymous in any research documents I produce....

We will start by introducing ourselves and telling everyone our names and just for fun our least favourite food and why?

5 minutes

1. What does information mean to you?

What does information mean to you? Take a minute to think about it and then write each of your ideas on post-it notes.

Go around table each person offers an idea. Go around again each person offers a second idea and so on until all ideas are exhausted.

When you listen to each others ideas if you think of something new jot that down on another post-it note.

Discussion

Collect post-it notes

Reflection and summary of what has been said

10 minutes

2. What does information mean to you in the school context?

When do you talk about information in school?

Tell me about the last time when you needed information. Write that down and also two other occasions when you needed information on post-it notes.

Read out the three examples.

Pick out a common situation.

Discussion

Describe the information you needed

What were you looking for? [What did you want to know?]

Did you find what you were looking for?-----If not what would have helped?

What was the information you found about?

Where did you get it from?

How did it help?

How did you feel?

What terms do you use to describe information in school? What terms are used in school to describe information?

Reflection and summary of what has been said

Total 15 minutes

3. What does information mean to you outside the school environment in the context of home and leisure?

When do you talk about information outside of the school context, in the home or with friends for instance?

Tell me about the last time when you needed information. Write that down and also two other occasions when you needed information on post-it notes.

Read out the three examples.

Pick out a common situation.

Discussion

Describe the situation.

What were you looking for?

What was the information about?

Where did you get it from?

How did you feel?

What did you do with the information?

What terms do you use to describe information?

Reflection and summary of what has been said

Total 15 minutes

4. What information resources do you use?

Tick list of resources to be filled in

5 minutes

5. Students' ideas on how the research project could be conducted

In terms of this research do you have any thoughts and ideas about how you could let me know your thoughts and views about information?

5 minutes

Thanks

Appendix 3: Pilot interview participants

Pilot interviews were conducted with four young people, two Year 7 students and two Year 12 students. The participants from each school were assigned a code in the same manner as the participants in the focus groups (see Appendix 1) with the exception that in this case the letter P referred to the pilot study.

Table 12 gives a list of participants:

Year 7 participants	
PJMIS7	PKMCS7
Year 12 participants	
PRFIS12	PCFCS12

Table 12: Pilot interview participants

Appendix 4: Pilot interview schedule

The interviews started with a request to the participants to draw the first thing that came into their head when they heard the word information. One of the recommendations made by Shenton (2002) was that in future studies participants should be given the option of explaining their drawings using words. This option was given to the participants in the pilot interviews. Reassurances were given that no assessment was going to be made of the drawing.

The interview questions followed on directly from the discussion about the drawings that the participants had completed. A set of open ended questions aimed at capturing participants' experiences of information were drawn up with the intention that either all of them or most of them could be addressed to the participants during the course of the interview:

- What do you understand by the term information?
- What do you understand information to be about?
- What do you mean by information?
- What does information mean to you?
- What do you think of when you hear the word information?
- When do you talk about information?
- When do you use the term information?

All of the participants were initially asked:

- What does information mean to you?

Appendix 5: Research study participants

A total of forty one young people participated in the study. All forty one of the participants completed drawings and were then interviewed about their drawings. In addition eighteen young people were interviewed at length about their experiences of information. An outline of the young people's participation in the study is given in Table 13.

Students participating in study	Drawings and discussion	Interviews
Independent school Y7	10	3
Comprehensive school Y7	13	8
Independent school Y12	6	3
Independent school Y13	4	1
Comprehensive school Y12	4	1
Comprehensive school Y13	4	2

Table 13: Outline of young people's participation in the study

The participants were assigned a code in a similar manner to codes assigned in the focus groups and pilot interviews: a random initial to refer to the individual; the initial F or M to denote female or male gender; the initials representing the school attended (CS representing comprehensive school and IS representing independent school) and a number which referred to their school year. Table 14 gives details of the participants who took part in the study:

Year 7 participants	
RFIS7	CFCS7
EFIS7	YFCS7
IFIS7	JFCS7
HFIS7	HFCS7
AFIS7	RFCS7
JFIS7	AFCS7
WMIS7	ChFCS7
JMIS7	LMCS7
RMIS7	JMCS7
LMIS7	BMCS7
	ZMCS7
	RMCS7
	AMCS7
Year 12 participants	
EFIS12	AFCS12
SMIS12	RFCS12
HMIS12	ABFCS12
CMIS12	SFCS2
DMIS12	
JMIS12	
Year 13 participants	
SFIS13	KFCS13
SoFIS13	LFCS13
KFIS13	SMCS13
HFIS13	RMCS13

Table 14: Participants in the research study

Appendix 6: Interview schedule

Drawings

The participants were asked to draw the first thing they thought of when they heard the word information. It was made clear that the quality and accuracy of the drawing were not of concern. It was only the thoughts that lead to the drawing that were of interest. In addition the participants were invited to write any words or phrases to explain their drawing.

Interviews

Interviews were conducted in a semi-structured fashion with a small number of pre-planned open ended questions. Following on from the research questions the interview questions addressed the following:

- General understanding of information
- Personal, subjective understanding of information
 - Experiences of information outside the school context
 - Experiences of information in school
 - Experiences of information in relation to sources

The following list of questions was drawn up with the intention that either all of them or most of them could be addressed to the participants during the course of the interview:

- What do you understand information to be about?
- What is not information?
- What does information mean to you?
- Can you give me an example of a time when you have dealt with information?
- What do you understand by the term information?
- What do you mean by information?
- When do you talk about information?
- When do you use the term information?
- Can you give me some examples of information?

All of the participants were initially asked:

- What does information mean to you?

Each interview then developed at its own pace and further questions from the list were asked when necessary to keep the interview on track.

Probing questions

In addition probing questions were addressed to the participants in order to get them to clarify or explain their comments further. These questions were an important means of getting respondents to reflect on what they had said. The following list provides some examples of probing questions that were used during the interviews:

- What do you mean by that? Could you write it/them down?
- Can you tell me more about that?
- When you say xxxx what exactly do you mean?
- When you say xxxx what are you thinking about?
- If it is not about xxxx, what is it about?
- What do you mean by xxxx?
- Let's look at a specific xxxx, as mentioned by you
- I'm not sure I understand you
- Can you give me an example of that?
- Could you explain further?
- What do you mean by? I want to bring you back to...
- What does xxxx mean to you?
- How do you view xxxx?
- Why questions e.g. why do you say that? Why is that the case?