

**INFORMATION UTILISATION:
A COGNITIVE ANALYSIS OF HOW GIRLS UTILISE DRUG
INFORMATION BASED ON BROOKES' FUNDAMENTAL
EQUATION $K[S] + \Delta I = K[S + \Delta S]$**

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CERTIFICATE

I certify that this thesis has not already been submitted for any degree and is not being submitted as part of candidature for any other degree.

I also certify that the thesis has been written by me and that any help that I have received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

Signature of Candidate

Rass J. Zaidi

DEDICATION

**This dissertation is dedicated to my late parents
Margaret and Cedric Todd.**

They provided me with opportunities for learning and living they never had,
and in these opportunities they found their own dreams and hopes.

When I said: *"a little knowledge is a dangerous thing",*
they said: *"where is the person who has so much as to be out of danger?"*

(T. Huxley. On elemental instruction in physiology. 1877)

Through their world, their wisdom, and their work,
I have found a never-ending beginning, and I thank them for it.

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TABLE OF CONTENTS

<u>CERTIFICATE</u>	ii
<u>DEDICATION</u>	iii
<u>ACKNOWLEDGMENTS</u>	iv
<u>ABSTRACT</u>	xvii-xviii
<u>CHAPTER 1: INTRODUCTION</u>	
1.1 ORIGIN OF THE STUDY	1
1.2 AIMS OF THE STUDY	9
1.3 SIGNIFICANCE AND BENEFITS OF THE STUDY	11
1.4 TERMINOLOGY AND GLOSSARY	15
<u>CHAPTER 2: CONTEXT AND FRAMEWORK FOR THE STUDY</u>	
2.1 INTRODUCTION	18
<u>PART 1: OVERVIEW OF INFORMATION UTILISATION</u>	18
2.2 THE STUDY OF INFORMATION UTILISATION	19
2.2.1 Terminological confusion	19
2.2.2 Definitions of information utilisation	21
2.3 PERSPECTIVES OF INFORMATION UTILISATION	23
2.3.1 Information utilisation as end-state	28

2.3.2	Information utilisation as interactive change process	30
2.4	CLASSIFICATION OF INFORMATION UTILISATION	32
2.4.1	Instrumental utilisation	32
2.4.2	Conceptual utilisation	33
2.4.3	Symbolic utilisation	39
2.5	CONTEXTUAL FACTORS SHAPING INFORMATION UTILISATION	41
2.6	THE CURRENT STATE OF INFORMATION UTILISATION RESEARCH: IDENTIFYING THE GAPS	44
2.7	RESEARCH APPROACHES	48
2.8	SUMMARY AND IMPLICATIONS FOR THE STUDY	49
	<u>PART 2 BROOKES AND THE CENTRAL CONCEPTS OF INFORMATION UTILISATION</u>	51
2.9	THE FUNDAMENTAL EQUATION AS AN EXPRESSION OF COGNITIVE INFORMATION UTILISATION	51
2.9.1	Origin and background of the Fundamental Equation	52
2.9.2	The components of the Equation	56
2.10	THE NATURE OF INFORMATION ΔI	59
2.10.1	Physical information	60
2.10.2	Biological and cognitive information	62
2.10.3	Information in the wider context of information science	64
2.11	THE NATURE OF KNOWLEDGE, AND THE RELATIONSHIP BETWEEN INFORMATION AND KNOWLEDGE	67
2.11.1	Knowledge in the wider context of information science	69
2.12	KNOWLEDGE STRUCTURES AND THEIR REPRESENTATION	70
2.12.1	Objective maps	71
2.12.2	Cognitive maps	73
2.12.3	Other views of knowledge structure	74

2.13	THE UNIT OF KNOWLEDGE IN A KNOWLEDGE STRUCTURE	78
2.14	KNOWLEDGE STRUCTURES RESEARCH	79
2.14.1	Cognitive change strategies	80
2.14.2	Time, semantic relatedness, and other concepts	84
2.15	CONCLUSION	89
<u>CHAPTER 3: THE METHODOLOGY OF THE STUDY</u>		
3.1	INTRODUCTION AND AIMS OF THE RESEARCH	91
<u>PART 1 METHODOLOGICAL UNDERPINNINGS AND ISSUES</u>		92
3.2	THEORETICAL CONSIDERATIONS OF RESEARCH DESIGN	92
3.2.1	Choice of research methodology	92
3.2.2	Quasi-experimental approach	93
3.2.3	Justification of design	98
3.2.4	Phases of the quasi-experimental approach	100
3.2.5	Sampling issues	100
3.3	THEORETICAL CONCERNS IN THE ACQUISITION AND REPRESENTATION OF KNOWLEDGE	101
3.3.1	Approaches to knowledge elicitation and acquisition	102
3.3.2	Constructing representations of knowledge	107
3.3.3	Assumptions of knowledge representation	109
3.3.4	Network models of knowledge representation	110
3.3.4.1	Semantic networks	110
3.3.4.2	Schemata	111
3.3.4.3	Mental models	113
3.4	OPERATIONALISING KNOWLEDGE STRUCTURES	114
3.4.1	Approaches in Information Science	115
3.4.2	Approaches in Artificial Intelligence	117
3.4.3	Approaches in Education and Language Studies	119
3.4.4	Summary	122

3.5	THE STUDY'S APPROACH TO OPERATIONALISING KNOWLEDGE STRUCTURES: CONCEPTUAL GRAPH STRUCTURES	123
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<u>PART 2 OPERATIONALISATION</u>	127
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3.6	PROCEDURES	127
3.6.1	Limitations of the study	128
3.6.2	Selection of the girls	128
3.6.3	Context of the quasi-experiment	130
3.6.4	Focus problem	131
3.6.5	Ethical issues and related procedures	132
3.6.6	General procedures plan	133
3.6.7	Operationalisation of exposure to information	134
3.6.8	Pilot study	136
3.6.9	Steps in the data collection procedure	138
3.6.10	Generating the knowledge structures	144

CHAPTER 4: DATA ANALYSIS

4.1	INTRODUCTION	148
4.2	DATA ANALYSIS TECHNIQUES: OVERVIEW	148
4.3	PHASE 1: DATA ANALYSIS TECHNIQUES FOR ESTABLISHING PERCEIVED EFFECTS ΔI (AIM 1)	150
4.4	PHASE 2: DATA ANALYSIS TECHNIQUES FOR IDENTIFYING ASSOCIATIONS OF PERCEIVED EFFECTS AND CHANGES TO KNOWLEDGE STRUCTURE (AIM 2)	158
4.4.1	Cognitive strategies operating on knowledge structures	158
4.4.2	Phase 2 outcomes: cognitive strategies operating on knowledge structures	162
4.4.2.1	Appending	163
4.4.2.2	Inserting	164
4.4.2.3	Deleting	167
4.4.3	Establish how perceived effects are associated with changes to a girl's knowledge structure	168

4.5	PHASE 3: DATA ANALYSIS TECHNIQUES FOR ESTABLISHING PATTERNS	177
<u>CHAPTER 5 FINDINGS</u>		
5.1	INTRODUCTION	178
5.2	THE PERCEIVED EFFECTS: OVERVIEW	178
5.3	GET A COMPLETE PICTURE	180
5.3.1	Description of <i>get a complete picture</i>	180
5.3.2	Manifestation of <i>get a complete picture</i> in changes to the girls' knowledge structures	183
5.3.2.1	More inclusive knowledge structures	184
5.3.2.2	More elaborative knowledge structures	188
5.3.2.3	More integrative knowledge structures	194
5.3.3	<i>Get a complete picture</i> : some patterns	196
5.4	GET A CHANGED PICTURE	199
5.4.1	Description of <i>get a changed picture</i>	199
5.4.2	Manifestation of <i>get a changed picture</i> in changes to the girls' knowledge structures	201
5.4.2.1	Revised knowledge structures: construction	203
5.4.2.2	Revised knowledge structures: deconstruction	204
5.4.2.3	Revised knowledge structures: reconstruction	206
5.4.3	<i>Get a changed picture</i> : some patterns	213
5.5	GET A CLEARER PICTURE	216
5.5.1	Description of <i>get a clearer picture</i>	216
5.5.2	Manifestation of <i>get a clearer picture</i> in changes to the girls' knowledge structures	217
5.5.2.1	Revised knowledge structure: explanation and precision	218
5.5.3	<i>Get a clearer picture</i> : some patterns	223
5.6	GET A VERIFIED PICTURE	224
5.6.1	Description of <i>get a verified picture</i>	224
5.6.2	Manifestation of <i>get a verified picture</i> in changes to the girls' knowledge structures	226

5.6.2.1	Revised knowledge structures: no change	227
5.6.2.2	Revised knowledge structures: emphatic	229
5.6.2.3	Revised knowledge structures: inclusive	231
5.6.2.4	Revised knowledge structures: defensive	232
5.6.3	<i>Get a verified picture</i> : some patterns	234
5.7	GET A POSITION IN A PICTURE	235
5.7.1	Description of <i>get a position in a picture</i>	235
5.7.2	Manifestation of <i>get a position in a picture</i> in changes to the girls' knowledge structures	236
5.7.2.1	Revised knowledge structures: reactive	237
5.7.2.2	Revised knowledge structures: formative	239
5.7.2.3	Revised knowledge structures: potential position	240
5.7.2.4	Revised knowledge structures: predictive	241
5.7.3	<i>Get a position in a picture</i> : some patterns	243
5.8	OVERALL SUMMARY OF PATTERNS	243
<u>CHAPTER 6 CONCLUSIONS</u>		
6.1	INTRODUCTION	245
6.2	SUMMARY AND DISCUSSION OF FINDINGS	245
6.2.1	The perceived effects: types of cognitive information utilisation	247
6.2.1.1	Discussion: the perceived effects	251
6.2.2	Types of changes in knowledge structures	258
6.2.2.1	Discussion: types of changes in knowledge structures	262
6.2.3	Cognitive strategies	266
6.2.3.1	Discussion: cognitive strategies	267
6.3	BROOKES AND THE FUNDAMENTAL EQUATION	269
6.4	EXPERIMENTAL DESIGN AND TRANSFERABILITY: SOME ISSUES	271

6.5	IMPLICATIONS	275
6.5.1	Implications for practice	275
6.5.1.1	Data base design	275
6.5.1.2	Information interview	277
6.5.1.3	Instructional design	279
6.5.1.4	Provision of information in media campaigns	279
6.5.2	Methodological implications	281
6.5.3	Implications for future research	285
6.6	CONCLUSION	291
	<u>APPENDICES</u>	293
APPENDIX 1	ETHICS DOCUMENTATION	294-297
1.1	UTS Human Research Ethics Committee approval	294
1.2	Marist Sisters' College approval	295
1.3	Participant agreement form	296
1.4	Information sheet for participants and parents / guardians	297
APPENDIX 2	INFORMATION EXPOSURES	298-312
2.1	Information exposure 1	298-302
2.2	Information exposure 2	303-308
2.3	Information exposure 3	309-312
APPENDIX 3	TIME PLAN FOR STEPS IN THE DATA COLLECTION PROCEDURE	313
APPENDIX 4	DATA COLLECTION FORM: DEMOGRAPHICS	314
APPENDIX 5	TABLES 21 - 30: INDICATORS OF PERCEIVED EFFECTS AND ANALYSES	315
	<u>BIBLIOGRAPHY</u>	358

LIST OF FIGURES

Figure 1	Model of information-seeking behaviour: Krikelas	25
Figure 2	Information-seeking model: Green	26
Figure 3	Information-knowledge relationship: Brookes	70
Figure 4	Cognitive strategies: Graesser	82
Figure 5	Concept map: Novak & Gowin	119
Figure 6	Argument analysis: Toulmin	121
Figure 7	Example of argument analysis: Toulmin	122
Figure 8	Example of conceptual graph structure: Graesser & Clark	127
Figure 9	Conceptual graph structure	146
Figure 10	Overview: aims, data analysis and findings	149
Figure 11	Change in knowledge structure	160
Figure 12	Generic change process	162
Figure 13	The cognitive strategy of appending	163
Figure 14	Conceptual graph structure showing appending	163
Figure 15	Conceptual graph structure showing appending	164
Figure 16	The cognitive strategy of inserting	165
Figure 17	Conceptual graph structure showing inserting	165-166
Figure 18	Conceptual graph structure showing appending after inserting	166
Figure 19	The cognitive strategy of deleting	167

Figure 20	Conceptual graph structure showing deleting	168
Figure 21	Changes in a knowledge structure	170
Figure 22	Example of completed proforma	173-176
Figure 23	Inclusive knowledge structure: Type 1	186
Figure 24	Inclusive knowledge structure: Type 2	187-188
Figure 25	Elaborative knowledge structure	191
Figure 26	Goal-oriented knowledge structures	192
Figure 27	Cause-oriented knowledge structures	192
Figure 28	Inclusive knowledge structure	193
Figure 29	Property and manner-oriented knowledge structures	193-194
Figure 30	Integrative knowledge structures	194-195
Figure 31	Get a changed picture	206-207
Figure 32	Get a changed picture	208-209
Figure 33	Get a changed picture	210
Figure 34	Get a changed picture	211
Figure 35	Get a changed picture	213
Figure 36	Model of Get a changed picture	215
Figure 37	Get clearer picture	219
Figure 38	Get clearer picture	220
Figure 39	Get clearer picture	221
Figure 40	Get clearer picture	222-223
Figure 41	Get a verified picture: no change	227
Figure 42	Get a verified picture: emphatic	229-231
Figure 43	Get a verified picture: inclusive	232
Figure 44	Get a verified picture: defensive	233

Figure 45	Get a position in a picture: reactive	238
Figure 46	Get a position in a picture: formative	239
Figure 47	Get a position in a picture: potential positioning	240-241
Figure 48	Get a position in a picture: predictive	242

LIST OF TABLES

Table 1	Number of indicators by source	151
Table 2	Preliminary clustering of debriefing indicators	152-155
Table 3	Number of indicators of perceived effect for each girl	179
Table 4	Number of indicators by source	179
Table 5	Number of indicators: <i>get a complete picture</i>	180
Table 6	Number and type of cognitive strategies: <i>get a complete picture</i>	183
Table 7	Number and nature of revised knowledge structures: <i>get a complete picture</i>	196-197
Table 8	Number and nature of change sequences: <i>get a complete picture</i>	197-198
Table 9	Number of indicators: <i>get a changed picture</i>	199
Table 10	Number and type of cognitive strategies: <i>get a changed picture</i>	201
Table 11	Number of indicators: <i>get a clearer picture</i>	216
Table 12	Number and type of cognitive strategies: <i>get a clearer picture</i>	217
Table 13	Number and nature of revised knowledge structures: <i>get a clearer picture</i>	224
Table 14	Number of indicators: <i>get a verified picture</i>	225
Table 15	Number and type of cognitive strategies: <i>get a verified picture</i>	226
Table 16	Patterns of <i>get a verified picture</i>	234
Table 17	Number of indicators: <i>get a position in a picture</i>	235

Table 18	Number and type of cognitive strategies: <i>get a position in a picture</i>	236
Table 19	Summary of findings	243-244
Table 20	Summary of findings: cognitive information utilisation	245
Table 21	Indicators of <i>get a complete picture</i> for each girl	315-327
Table 22	Summary of changes to knowledge structures associated with perceived effect <i>get a complete picture</i>	318-328
Table 23	Indicators of <i>get a changed picture</i> for each girl	329-330
Table 24	Summary of changes to knowledge structures associated with perceived effect <i>get a changed picture</i>	331-337
Table 25	Indicators of <i>get a clearer picture</i> for each girl	338-339
Table 26	Summary of changes to knowledge structures associated with perceived effect <i>get a clearer picture</i>	340-343
Table 27	Indicators of <i>get a verified picture</i> for each girl	344-345
Table 28	Summary of changes to knowledge structures associated with perceived effect <i>get a verified picture</i>	346-349
Table 29	Indicators of <i>get a position in a picture</i> for each girl	350-351
Table 30	Summary of changes to knowledge structures associated with perceived effect <i>get a position in a picture</i>	352-357
Table 31	Summary of findings: cognitive information utilisation	246

ABSTRACT

The central focus of this study is cognitive information utilisation. Research in information utilisation to date has largely focused on the organisational outcomes of the take up of scientific and professional information in the context of social practice, and the related political, cultural and economic factors affecting this. Conceptualising information utilisation as a type of organisational change or end-state has tended to mask the complex cognitive exchanges that occur. While there has been increasing acknowledgement that information utilisation is a more holistic interactive change process involving cognitive strategies and transformations, very little research has focused on the cognitive dimension of information utilisation.

Bertram Brookes claimed that the theoretical pursuit of information science should be the cognitive interaction between people and information. He explicated this as the Fundamental Equation of information science, most commonly expressed in his writings as $K(S) + \Delta I = K[S + \Delta S]$. By this equation, Brookes was stating that in the process of doing something with information, a person's existing knowledge structure $K[S]$ is changed by an increment of information ΔI , and this modification has some effect, a changed knowledge structure $K[S + \Delta S]$ where ΔS indicates the effect of the modification. This equation is posited as an expression of cognitive information utilisation.

The specific purpose of this study is to further understanding of cognitive information utilisation, employing Brookes' Fundamental Equation as a general framework for establishing research questions, operationalisations and procedures. With a group of four girls in their final year of secondary education, the study sought to: (a) establish the effects ΔS of exposure to information perceived by the girls; (b) establish how the perceived effects are associated with changes to their knowledge structures $K[S]$; and (c)

establish the patterns, if any, within and between the girls in relation to changes in knowledge structures and perceived effects ($K[S + \Delta S]$).

The study employed a quasi-experimental repeated phase approach. The girls' existing knowledge structures about the drug heroin were mapped, and knowledge structures after each of three exposures to different information on heroin were also mapped. Eliciting the girls' knowledge about heroin was based on written discourse and question / answer protocols, and this knowledge was represented as conceptual graph structures, based on an analytical procedure developed by Graesser & Clark (1985). The data were analysed qualitatively to establish indicators and conceptualisations of the perceived effects, and to identify and conceptualise the changed knowledge structures.

The study found that the exposures to information and the deliberate consideration of this information had effects for all the girls. Five types of effects were perceived, these being: *get a complete picture*, *get a changed picture*, *get a clearer picture*, *get a verified picture*, and *get a position in a picture*. These effects are presented as types of cognitive information utilisation. The knowledge structures after each exposure were shown to change by cognitive strategies of appending, inserting and deleting. The analysis of the knowledge structures associated with these five effects showed that there was coherence between the effects and how these effects were manifested in changes to the girls' knowledge structures. A number of distinct patterns were evident, for example, *get a complete picture* was associated with revised knowledge structures that were more inclusive, elaborative and integrative.

The study raises important implications for information practice, including data base design, information interviews, provision of information in media campaigns, and instructional design. The study also addresses methodological issues and identifies area for further research.