

R.

ACF-7431
INVC. nms 17/10/98

PERPUSTAKAAN UNIVERSITI MALAYA

**CoPAS : AN EXPERIMENTAL EXPERT ADVISER SYSTEM FOR
CATALOGUING PUBLISHED CONFERENCE PROCEEDINGS**

Sharon Manel De Silva

A dissertation submitted in partial fulfilment of the requirement for
the degree of Master in Library and Information Science at the
Faculty of Computer Science and Information Technology
University of Malaya, Kuala Lumpur

1998

Perpustakaan Universiti Malaya



A507734312

Dimikrofilmkan pada 15.12.98
No. Mikrofis 13829
Jumlah Mikrofis 4
HAMSIAH BT. *for* HAMDAN ZAHARI
UNIT REPROGRAFI
PERPUSTAKAAN UTAMA
UNIVERSITI MALAYA

UPR

ABSTRACT

This thesis is an experimental research in the area of cataloguing published conference proceedings. It begins by identifying the nine types of published conference proceedings found in University of Malaya Library's Catalogue based on the published knowledge as found in the cataloguing manual Anglo American Cataloguing Rules Revised 2nd ed. (AACR2R). This is followed by a questionnaire and semi-structured interviews with expert cataloguers in conference proceedings to verify the existence of these nine types of conference proceedings. Based on the interviews, a mental map of their thought processes is structured providing heuristic knowledge. CoPAS, an expert adviser system, is then developed using Asymetrix Multimedia's ToolBook II. CoPAS uses both the published knowledge and private (heuristic) knowledge as its knowledge base. CoPAS' three modules – Adviser, Examples, and AACR2R Rules – aims to give advise to novice cataloguers. When tested with undergraduate library science students, CoPAS was found to produce significantly better results in seven out of nine types of conference proceedings as compared with using the AACR2R manual. All 15 students did not reveal negative comments about CoPAS.

ACKNOWLEDGEMENT

I wish to thank the many individuals who have assisted and been with me until the completion of this study. First and foremost is my supervisor, Puan Zainab bt Awang Ngah, without whom this study would not have even lifted off the ground. Her critical comments, suggestions and extremely high standards have tremendously improved the original presentation of this study.

I would also like to thank the librarians at the University of Malaya's Library for their kind assistance in the collection of materials from various sources. My grateful thanks also go to the staff and students of the Faculty of Information Studies, ITM, Shah Alam for their kind support.

To my coursemates and Mrs. Koh, I would like to say thank you for your helpful comments, especially in the design of CoPAS. To my friends who have waited impatiently for me to come out of my self-imposed hermit lifestyle during the course of this thesis, I can only say – I'm back guys!

Finally, I am absolutely certain that nothing would please my family more than to see the completion of this study. To them goes my heartfelt gratitude for their constant patience, support and encouragement.

TABLE OF CONTENTS

Page number

List of Tables	vii
List of Figures	ix

CHAPTER 1 : INTRODUCTION

1.1	Background	1
1.2	Context of Study	5
1.3	Need and Importance of the Study	6
1.4	Aims and Objectives of the Study	7
1.5	Research Problems	8
1.6	Research Questions and Hypotheses	10
1.7	Assumptions	11
1.8	Methodology	11
1.9	Limitations	12

CHAPTER 2 : LITERATURE REVIEW

2.1	Introduction	15
2.2	Quantitative Analysis of the References	15
2.3	Definitions of Expert Systems	23
2.4	Expert Systems in Library and Information Science	24
2.4.1	Expert Systems in Technical Services	25
2.4.1.1	Classification	26
2.4.2	Expert Systems in Public Services	28
2.4.2.1	Reference Services	28
2.4.2.2	Information Search and Retrieval	36
2.4.2.2.1	Search Advisors	36
2.4.2.2.2	Intelligent Front Ends	38
2.4.2.2.3	Intelligent Intermediaries	40
2.4.2.2.4	Experts in Query Formulation	43
2.4.2.2.5	Experts for Database Selection	44
2.4.2.2.6	Experts for Retrieval in Subject Domains	46
2.4.2.3	Document Delivery	49
2.4.3	Expert Systems in Abstracting	49
2.4.4	Expert Systems in Indexing	50
2.4.5	Expert Systems in Acquisitions	52
2.4.6	Expert Systems in Collection Development	54
2.4.7	Expert Systems in Preservation	57
2.5	Expert Systems in Cataloguing	57

2.5.1	Expert Systems as Advisory Programs	58
2.5.2	Expert Systems for Record Creation	61
2.5.3	Expert Systems for Automated Cataloguing	62
2.6	Problems in Cataloguing Cataloguing Conference Proceedings	65

CHAPTER 3 : METHODOLOGY

3.1	Introduction	87
3.2	Procedure in the Study	89
3.3	Preliminary Findings	92
3.3.1	Published Knowledge : AACR2 Rules	92
3.3.1.1	Rules for Main Entry	92
3.3.1.2	Additional Rules for Title Main Entry	96
3.3.1.3	Rules for Series	97
3.3.1.4	Rules for Notes	98
3.3.1.5	Rules on Added Entries for Personal Names	98
3.3.1.6	Rules on Added Entries for Corporate Names	98
3.3.1.7	Rules on Added Entries for Variant Titles	99
3.3.1.8	Rules on Added Entries for Series	99
3.3.2	Types of Published Conference Proceedings	100
3.3.3	Analysis of the Experts' Response (Private Knowledge)	102
3.3.4	Mental Map of Experts' Thought Processes	118

CHAPTER 4 : SELECTION OF MULTIMEDIA TOOLS, SYSTEM DESIGN AND SYSTEM IMPLEMENTATION OF CoPAS

4.1	Selection of Multimedia Tools	122
4.1.1	Tools for Writing Instructional Programs	122
4.1.2	Considerations in Choosing an Authoring Tool	123
4.1.3	Asymetrix Multimedia ToolBook	124
4.2	System Design of CoPAS	127
4.2.1	Introduction	127
4.2.2	Design Principles	128
4.2.3	Objective of CoPAS	129
4.2.4	Major Roles of the System	130
4.2.5	Overall Organisation of CoPAS	136
4.2.6	System Layout	136
4.2.7	CoPAS' Design Motives	141
4.2.8	CoPAS' Interface Design	143
4.3	System Implementation Of CoPAS	144
4.3.1	Introduction	144
4.3.2	Structure of Multimedia ToolBook II Used in CoPAS	146
4.3.3	User Guidance	149
4.3.4	Control vs. Guidance	150
4.3.5	Granularity	155

4.3.6	Animation Techniques	156
-------	----------------------	-----

CHAPTER 5 : TESTING AND EVALUATION

5.1	Introduction	161
5.2	Testing of COPAS	161
5.2.1	Variables Under Study	161
5.2.1.1	Independent Variables	162
5.2.1.2	Dependent Variables	163
5.2.2	Subjects	163
5.2.3	Threats to Validity	164
5.2.3.1	Internal Validity	164
5.2.3.2	External Validity	165
5.2.4	Types of Conference Proceedings	165
5.2.4.1	External Validity	166
5.2.5	Cataloguing Task Elements	166
5.2.6	Affective Measures	166
5.2.7	Scoring of Published Conference Proceedings Answers	167
5.2.7.1	Potential Sources of Error	168
5.2.8	Testing Environment	169
5.3	Evaluation of CoPAS	170
5.3.1	Published Conference Proceedings Evaluation Scores	172
5.3.1.1	Testing of Hypotheses	173
5.3.1.2	Affective Measures	182

CHAPTER 6 : CONCLUSION

6.1	Introduction	186
6.2	Discussion of Results	186
6.2.1	Subjects' Confidence Level and Computer Literacy	186
6.2.2	Subjects' Performance in Cataloguing Published Conference Proceedings	189
6.2.3	Subject's Evaluation of CoPAS	199
6.2.4	General Discussion	203
6.3	Further Work	209

BIBLIOGRAPHY 211

APPENDIX A	Definitions and Glossary of Terms	248
APPENDIX B	Orientation Narrative and Interview Schedule	255
APPENDIX C	Sample Questions to Expert Cataloguers	261
APPENDIX D	Sample Questions to Subjects	286
APPENDIX E	Answer Sheet	315
APPENDIX F	Cataloguing Students Questionnaire	316
APPENDIX G	Evaluation Form	317

LIST OF TABLES

	<u>Page number</u>
Table 2.1	References Retrieved According to Types of Sources 17
Table 2.2	Number of References Retrieved According to Broad Subject Areas 19
Table 2.3	Ranking of Journals Contributing to Expert Systems in LIS 22
Table 2.4	Scattering of Articles on Expert Systems in LIS in Journals 23
Table 2.5	Expert Systems in Classification 28
Table 2.6	Expert Systems in Reference Services 35
Table 2.7	Expert Systems in Information Search and Retrieval 48
Table 2.8	Expert Systems in Document Delivery 49
Table 2.9	Expert Systems in Abstracting 50
Table 2.10	Expert Systems in Indexing 52
Table 2.11	Expert Systems in Acquisition 54
Table 2.12	Expert Systems in Collection Development 56
Table 2.13	Expert Systems in Cataloguing 64
Table 3.1	Types of Published Conference Proceedings 101
Table 3.2	Type 1: Complete conference statement (Conference ... (Subject)) 103
Table 3.3	Type 2: Complete conference statement ((subject) ... Conference) 104
Table 3.4	Type 3: Complete conference statement (Area/Location ... Conference ... (subject)) 105
Table 3.5	Type 4: Complete conference statement (Association takes precedence) 106
Table 3.6	Type 5: Title main entry. Unedited work. 107
Table 3.7	Type 6: Title main entry. Edited work. 108
Table 3.8	Type 7: Two conference statements in the same language 109
Table 3.9	Type 8: Conference statements in different languages 110
Table 3.10	Type 9: Acronym as part of the conference name 111
Table 3.11	Summary Table of Agreement 112
Table 4.1	Comparison of Authoring Systems 125
Table 4.2	Information Sources and Research Methods 133
Table 5.1	Number of Documents Per Subject in Treatment Groups 163
Table 5.2	Weighted Scoring for Conference Proceeding Answers 168
Table 5.3	Weighted Scoring for Each Type of Conference Proceeding Answer 169
Table 5.4	Comparison of Confidence Levels for Control and Experimental Groups 171
Table 5.5	Experimental Group's Computer Usage in Various Areas 172
Table 5.6	Measurements Used to Rate Subjects' Scores 173
Table 5.7	Subjects Performance and Analysis for Conference Proceeding Type 1 174
Table 5.8	Subjects Performance and Analysis for Conference Proceeding Type 2 175
Table 5.9	Subjects Performance and Analysis for Conference Proceeding Type 3 175

	<u>Page number</u>	
Table 5.10	Subjects Performance and Analysis for Conference Proceeding Type 4	176
Table 5.11	Subjects Performance and Analysis for Conference Proceeding Type 5	177
Table 5.12	Subjects Performance and Analysis for Conference Proceeding Type 6	178
Table 5.13	Subjects Performance and Analysis for Conference Proceeding Type 7	179
Table 5.14	Subjects Performance and Analysis for Conference Proceeding Type 8	179
Table 5.15	Subjects Performance and Analysis for Conference Proceeding Type 9	180
Table 5.16	Subjects Performance and Analysis for All Types of Conference Proceedings	181
Table 5.17	Summary of Hypotheses Tested for All Types of Conference Proceedings	182
Table 5.18	Affective Measures from CoPAS Students Evaluation Form	183
Table 6.1	Correlation Between Subjects' Scores and Their Confidence Level	187
Table 6.2	Correlation Between Experimental Group's Scores and Their Computer Literacy (n = 15)	189
Table 6.3	Correlation Between Subjects' Computer Literacy and Evaluation of CoPAS (n = 15)	200

LIST OF FIGURES

	<u>Page number</u>
Figure 2.1	20
Figure 3.1	88
Figure 3.2	102
Figure 4.1	125
Figure 4.2	131
Figure 4.3	134
Figure 4.4	134
Figure 4.5	135
Figure 4.6	137
Figure 4.6a	138
Figure 4.6a	139
Figure 4.7	148
Figure 4.8	149
Figure 4.9	153
Figure 4.10	153
Figure 4.11	154
Figure 4.12	154
Figure 4.13	156
Figure 4.14	159
Figure 5.1	171
Figure 5.2	181