INFORMATION EDUCATION IN THE DIGITAL ENVIRONMENT

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DEDICATION

This book is produced as a volume in honor of Professor Mumtaz Ali Anwar who retired in 2010 at the age of 74. He is now an Honorary Professor at the University of the Punjab, Lahore. This book is in recognition of his valuable contributions to the field of information studies through his work as an effective administrator, a dedicated researcher and a proficient academic. He also made excellent contribution to the professional literature through his publications. The authors of this book were fortunate to be his students and colleagues. The authors are pleased to present this volume on his 81st birthday.

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AUTHORS AND CONTRIBUTORS

Mumtaz Ali Anwar received his undergraduate education from University of the Punjab, Lahore, Pakistan and did Master's in Library Science from University of Karachi. He received his PhD from Pittsburgh University, USA. He started his career as a practicing information professional and later moved to teaching in the Department of Library Science at University of the Punjab. He later held senior administrative and academic positions in universities in Saudi Arabia, Malaysia and Kuwait and retired in 2010 at the age of 74. He is now is an Honorary Professor at the University of the Punjab, Lahore. Professor Anwar has made valuable contributions in the professional literature in the field of library and information science. His areas of teaching and research encompass a broad range of subjects in information studies. Professor Anwar also made valuable contribution to institution and strengthening professional associations in Pakistan and overseas. Students taught, mentored, and supervised by him are carrying his legacy by performing in senior professional and professional and academic positions in several countries.

Abdus Sattar Chaudhry is currently a professor in the Department of Information Studies, College of Social Sciences at Kuwait University. He was Head of the Division of Information Studies at Nanyang Technological University of Singapore from 2005-2008 where he taught for more than 12 years. He also taught at International Islamic University of Malaysia and served there as Chief Librarian for a couple of years. He held a number of professional and academic positions in Pakistan, Saudi Arabia, and United States of America. Abdus Sattar Chaudhry did Master's from University of

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Sajjad ur Rehman is currently Director of the Master of Information Studies Program at Kuwait University where has been professor for more than 20 years. He also served as Head of the Department of Library and Information Science at Kuwait University from 2014 to 2016. Before joining Kuwait University in 1995, Professor Rehman taught at International Islamic University for more than five years. He has earlier held professional and academic positions in Pakistan, Saudi Arabia, and USA. Professor Rehman did Master's and PhD in Library and Information Science from Indiana University, Bloomington, USA. He has authored books on library management and LIS education. He is currently teaching research methods and information resources and services. He has a long list of publications to his credit in the field of information studies. He has made valuable contributions to teaching and professional continuing education in the field of information. His current areas of research include LIS education & research and information behaviour.

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PREFACE

The digital transformation of economies is increasing the need for more innovation, knowledge spread, operational efficiency, and improved services. This in turn is requiring educational institutions and academic programs to be more responsive to changing trends. This is putting pressures on information institutions which were already under pressure as a result of unprecedented connectivity and availability of networked resources and services. They are expected to deploy new strategies and operating models to emerge globally for provision of needed information services. These developments have resulted in initiating new services and reviewing current practices of information professionals so as to remain relevant and responsive to the imperatives of the digital environment. Accordingly, information professionals are desired to be equipped with relevant and appropriate competencies for taking advantage of the opportunities that have become available in the digital environment with the challenges of the emerging socio-economic environment.

Among other things, the digital environment requires changes in education of information professionals through review of curricula and deployment of strategies for effective delivery of academic programs. The field of Information Studies (IS) has always been subjected to changes. However, new trends are making re-thinking necessary in information education requiring major changes in curriculum and teaching strategies. In order to keep up with these developments, a remodeling of courses in information education has become crucial. New trends in educational practice need to be followed in the form of new courses, course

concentrations, and programs. Information education programs are expected to stake out unclaimed areas such as the organization and management of information and knowledge, and collection development, management and preservation of information resources. The courses that IS schools are offering need to be reviewed and new curricular opportunities be explored in view of the expertise of staff and resources available to make changes. Roggema-van Heusden (2004) has rightly pointed out that recent developments have called for a re-thinking of LIS education requiring widening of the curriculum. In order to keep up with these developments a remodeling of courses in information education has become crucial. Markey (2004) also stressed to follow new trends in educational practice in the form of new courses, course concentrations, and programs. Faculty should examine new content areas and embark on new curricular opportunities that make sense to respond to changes at their institutions.

Yu and Davis (2007) asserted that there was a need to re-conceptualize education for information in a broader context. They highlighted that re-thinking of information education was necessary because of shifts towards educating graduates to work in broader information environments. In their opinion, the need for a broader context has become more obvious by emerging interdisciplinary connections, collaborations, and converging information disciplines represented by the recent i-School phenomenon. Anderson (2007) suggested a re-inventing of information education curricula with greater emphasis on the relation of information studies to digital design. He suggested that there was a need to be more proactive and focused on creative industries. With the rapidity of change in digital environments, imaginative solutions to organizational problems were

becoming crucial. A successful information professional in the changing landscape will be the one who is capable of adapting to change. Re-conceptualization of information education curricula will be necessary for preparing graduates for work in such dynamic environments. Educators need to articulate clearly how information studies courses can help their graduates develop skills needed to work in these environments.

Several researchers have highlighted the challenges that are expected to be faced in the process of modernization of information education curricula. Ahmad (2012) discussed the challenges of modern trends in Library and Information Science Education and highlighted that the contemporary scenario predominated by information and knowledge perspectives suggests the pressing need to educate and train information manpower towards a sustainable professional competence. Sinha (2016) pointed out that most of the professional deliberations in the information field were based on subjects rather than the core information functions and activities. He argued that with the advancement of information and communication technology (ICTs) and its applications in information services, future trends in information education and research are expected to be influenced by ICT applications.

Vikrus (2016) examined current trends and developments in higher education and investigated the response of information science education institutions to these trends. She examined the contribution of information education to innovation through case studies in European information institutions. She reported that information education institutions had met a number of challenges including financial crisis, negative demographic trends, emerging technologies, internationalization and globalization. These

encouraged the information schools to find innovative ways to survive and achieve their educational goals. She pointed out that there was pressure on higher education institutions to do more with less and to answer the question of how to achieve excellence in teaching and learning in a time of costs and cuts. She concluded that institutions examined in her study responded to these challenges and innovated constantly in order to maintain efficiency, effectiveness, and economy. In her opinion, information education institutions worldwide are expected to face this situation.

We, the authors of this book, are of the view that education for information be looked at in a broader context. We are convinced that a broader perspective of information education is necessary in educating graduates to work in broader information environments. Our view is that information education programs need to be more proactive and explorative of opportunities in the new environment. A successful information professional in the changing information landscape will be the one who is capable of adapting to change. Information education curricula must strive for preparing graduates for work in dynamic information environments. Courses in information education programs should help develop skills needed to work in these environments. These considerations have guided in selecting topics for chapters of this book. A wider context and a broader perspective have also been kept in view in developing the chapter template.

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INTRODUCTION

Focus and Approach

This book has been conceptualized with the need for re-thinking of core knowledge in the field of information as highlighted in the relevant professional literature. New trends and changes needed in information education highlighted in the preface have been kept in view in preparing the chapters of this book. A bio-biblio essay about Professor Mumtaz Ali Anwar (in whose honor this book is written) provides a foundation and perspective for this book. An informetric analysis of his contributions is presented in Chapter One. It is written by a researcher who is well versed with his works because of his close relationship to Professor Mumtaz Anwar as his student and collaborator. His publications summarized in this chapter provide a context to this book reflected in breadth and depth of a broad range of topics cover by his work. Accordingly, the book looks at information education from a broader perspective and covers new dimensions of the information field.

This book reflects on the need for re-conceptualization of knowledge in the information education curricula focusing on emerging and important areas. It is conceptualized with a realization that information professionals need to develop a wide range of capabilities that would enhance their efficiency and productivity in the digital economy. The chapter on bio-biblio of Professor Mumtaz Anwar provides a good foundation for this book as his publications cover a wide variety of topics reflecting on his breadth and depth of knowledge and experience as practicing information professional and an accomplished academician. The book follows a non-prescriptive and non-suggestive approach and does not follow a chapter template.

Coverage and Distribution of Chapters

Even though the contents not explicitly distributed in different parts, a thematic approach is followed in distribution and placement of chapters in three parts. The preliminary section of the book consists of preface, introduction, and Chapter One. Preface and introduction highlight need for effective teaching in the field of information. Chapter One: An Informetric Analysis of Contributions of Professor Mumtaz Anwar provides an overview how the field emerged from practical education on librarianship to an academic discipline of information management encompassing the multidisciplinary orientation. The comprehensive coverage of different dimensions of the field in this chapter reflects on the need for preparation of professionals to work in a variety of information settings. The summary of contributions of Professor Anwar in this chapter demonstrates wider coverage of topics and information studies courses reflecting on the competencies needed for successful professional practice in a wide range of information environments.

Remaining 10 chapters of the books are placed in three parts. The first part of the book (chapter 2 - 4) focuses on curriculum design and program development. Chapter Two and Chapter Three describe and discuss the design and development of curricula and need for continuous assessment of academic programs. Chapter Four addresses the need for advance studies focusing on doctoral stuies in the area of library and information science.

The second part consisting of the next three chapters (5-7) focus on developing courses drawing on three examples (Chapter Five provides guidelines for a core course - Information Organization; Chapter Six is on a selected elective course –Business Information; and Chapter Seven on

Research Methods. Business Information relates to the courses in the category of information resources and services and is generally placed in elective courses. This area has become important in the new environment. Chapter Seven is on a course in a cognate area – Research Methods, an area which is general considered core course in most information studies programs. This chapter focuses on cultivating research skills in information professionals. Chapters in this part are written with an approach to provide an overview of the selected areas with an orientation of teaching. These target the content and substance of the area with particular emphasis on changes and trends imperative for the digital environment. Authors of these chapters have also listed the main topics desired to be covered and identified relevant readings expected to support teaching these courses. Suggestions have been put with an objective of balanced coverage of theoretical and practical aspects. Suggestions are also put forward for introducing advance courses in the respective areas to strengthen specializations and concentration in different functional areas.

The third part consisting of chapters 8-11 focus on topics and functional areas that have become crucial in the digital environment. These include e-books, database searching, taxonomies and metadata, and information management. These areas have become extremely important for the new breed of information and knowledge professionals. These are treated separately and follow a different style of treatment as these may not be considered broad enough for a full course but might be taken up as modules in different core or elective courses. Also, literature on topics covered in these chapters is fragmented because these topics are taught from different perspectives. Suggested readings are provided in these chapters to cover

different aspects. Each segment of coursework may require different pedagogical orientation and contextual specifications may require flexibility in the design of detailed course outlines, course requirements, and instructional practices.

Targeted Audience

The book is designed mainly for use by academics involved in the design and delivery of information education programs. The information in the book will also be useful to practicing information professionals interested in building and enhancing competencies for information work through professional continuing programs. There are already numerous books available on teaching of information but only a few appear to have covered emerging topics looking at the needs of information environment beyond libraries. This volume provides coverage from a broader perspective and in a wider context focusing on imparting competencies to information professionals for work in different information environments. The book is expected to provide a comprehensive overview of core knowledge in the field of information. The book is expected to be useful for curriculum design and review and for initiatives for continuing professional education.

Authors

The three main authors of the book are Abdus Sattar Chaudhry (Professor of Information Studies in the College of Social Sciences at Kuwait University), Sajjad ur Rehman (Professor and Program Director at the Department of Information Studies at Kuwait University), and Shaheen Majid (Associate Professor at WKW School of Communication and Information at Nanyang University in Singapore). All three of them worked

as information professionals in different type of information institutions before assuming full-time academic positions. They have been involved in teaching and research in the areas covered in this book. They have worked in reputable universities in several countries. They bring in their extensive practical, academic, and research experience in preparing the book chapters using examples, case studies, and discussions on relevant resources and guidelines. Their combined professional and academic experience and exposure to international information scene bring a unique perspective to their ideas presented in the chapters they wrote. They are able to provide a broader perspective to the readers of this book about the changing information landscape because of the variety of professional and teaching assignments held by them in different work environments. Brief profiles of the authors have been given in the beginning of the book.

Chapter One

AN INFORMETRIC PORTRAIT OF MUMTAZ ALI ANWAR'S CONTRIBUTIONS

Muhammad Asif Naveed

Introduction

The purpose of this chapter is to present bio-informetric analysis of the professional constitution of Mumtaz Ali Anwar. It is divided into two sections. The first section outlines his biographical background, education, and working experience and the second section presents informetric portrait of his contribution along with concluding remarks about his productivity. The researcher obtained his latest curriculum vitae, updated on January 23, 2017, to prepare this chapter in addition to consulting several national and international biographical sources presenting his biographical sketch.

Biographical Information

Mumtaz Ali Anwar, a towering figure and a prolific writer in information profession, was born in 1937 in a small village of district Sahiwal, Punjab. He obtained his early education from local schools and his Matriculation in 1956 and Intermediate (Arts) in 1958. He graduated from the University of the Punjab, Lahore, in 1960. The entrance of Mumtaz Anwar into the library profession was accidental and quite interesting. Azra (2017) reports that Anwar got fever immediately before the declaration of his graduation results which kept him home for many days. When he came to Lahore to seek admission to the master's degree in Economics at the University of Punjab, he came to know that admissions had been over by that time. He decided to

get admission to B. Ed. in the Central Training College and found that he was late. Then he travelled to Bahawalpur for having admission in B.Ed., found admissions closed, and decided to return home. During his travel back home by train, he purchased a newspaper to read and saw an advertisement for admission to the Diploma in Library Science at the University of the Punjab. He changed his ticket during the journey, came to Lahore, applied for and got admission. Like many other professionals, Anwar also joined this profession by chance.

He did his Postgraduate Diploma in Library Science in 1961 and joined the library profession on June 1, 1961 before the results were declared as a cataloguer in the Punjab University Library. He completed his Master of Arts Degree in Library Science, on Asia Foundation scholarship, from the University of Karachi studying in the 1963-64 session and obtained first position. In August 1964, he was appointed as lecturer, first ever full-time appointment since 1915, in the Department of Library Science, University of the Punjab. In 1968, he was awarded the Fulbright-Hays Scholarship to study at the Graduate School of Library and Information Sciences, University of Pittsburgh, USA. He received the Advanced Certificate in 1969 and his Ph. D. degree in January 1973. The topic of his dissertation was *"The Career of the Pakistani Librarian: A Study of Socioeconomic Background, Influences in Vocational Choice and Appraisal of Librarianship in Pakistan"*. One segment of his dissertation dealt with 'inter-generational mobility', a topic not touched in the professional literature. During his studies at the University of Pittsburgh, he taught two courses at the master's level as a Teaching Fellow and as a Visiting Lecturer, the first Pakistani to do so, for two years during 1971 and 1972

including the summer sessions. He also received the *"ALA Beta Phi Mu"* award from the International Library Science Honor Society in November 1971 in recognition of his distinguished service to education for librarianship.

After his return to Pakistan in February 1973, he reorganized the department as its chairman and started the master's programme in LIS in 1974. He had also been the Superintendent of Ch. Rahmat Ali Hall (Hostel No. 14) from January 1974 to December 1976. He was also the Secretary-General of the Pakistan Library Association from January 1974 to February 1976, the period when a new constitution was prepared and approved. He also acted as the chief librarian of the Punjab University Library from September to December 1976. Disappointed by the then prevailing conditions inside and outside the university, he resigned his position after serving the university for over 16 years, got an offer from Saudi Arabia and left the country at the end of 1976.

He worked as an Associate Professor and Director of Library Affairs, at King Abdul Aziz University, Jeddah, Saudi Arabia, from January 1977 to August 1992, and as Professor and Chief Librarian at the International Islamic University Malaysia, from August 1992 to August 1999. He was Professor at Kuwait University from September 1999 to August 2009. After retiring from there at the age of 72, he joined the Foreign Faculty Programme of the Higher Education Commission in August 2009 and was placed at the University of the Punjab as HEC Professor. However, he decided not to renew his contract after August 2011 due to several reasons. In August 2011, he was appointed as Honorary Professor by the University

of the Punjab. He has been teaching the M. Phil. and Ph. D. classes and supervising student research. He is a founding member and chairman of the Knowledge and Information Management Academy (KIMA which replaced LIMA established during the 1980s), a non-profit professional organization established to promote research and development in the Information Management discipline.

He edited a series 'Libraries and Librarianship in Muslim Countries' with Mansell Publishing, London, which published four books from 1984 to 1990. He has also prepared many consultancy reports, both nationally and internationally and worked with architects in planning a number of library buildings in several countries. He was awarded a gold medal and life achievement award by the Pakistan Library Association. He has recently received a "*Life Time Achievement Award*" for outstanding services to the profession at the centennial ICIML conference 2015. He had served as the Judge of the King Faisal Award in 1998 on the subject *"Studies on Libraries or Art of Book Making by Muslims"*. He had been an external examiner for both PhD and master thesis for several national and international universities. He also served as the referee for several journals including *Journal of Information Science, Business Information Review, Library Review, The Electronic Library, Journal of Social Sciences (Kuwait University), Pakistan Journal of Information Management & Libraries (Punjab University), Pakistan Library and Information Science Journal (Karachi), and Aalam (Riyadh).* In addition, he had been the referee for the promotion / selection of senior academics at several universities. As a space planner, he worked for the library building and space planning of several universities in Pakistan, Saudi Arabia, Malaysia, UAE, and Yemen.

During his professional career which is more than 56 years, he has conducted many workshops, participated in many conferences and seminars, and delivered lectures in several countries. His main research interests are in the areas of: information seeking behaviour; Library anxiety; Research methodology; Information resources; Library management; Continuing professional development; and Scientometric studies. He is listed in several national and international biographical sources.

Informetric Analysis

Choronological Distribution of Productivity

Anwar made 187 contribtions to the field of information management which was also known as Library and Information Science. The results analysed here are based on his scholarly productivity over the period of his academic career staring from 1964 to the beginning of 2017.

The distribution of his contribution by year covering all types of documents which are mainly journal articles, followed by conference papers, books, book chapters, research reports, and book reviews is presented in Figure 1. The average yearly productivity varies from three to four items during the period from 1964 to 2008. However, it is quite interesting to note that his research productivity increases since 2009 after joining the Department of Information Management, University of the Punjab, Lahore in August 2009 initially as an HEC Professor and later as an Honorary Professor. He produced about 6 items per year during 2009 to 2016. His pre-2009 low productivity is mainly due to the devotion of his maximum time in developing and managing the two university library systems at the King Abdul Aziz University, Jeddah (1977-1992) and the International Islamic University Malaysia (1992-1999). The reason behind his increased productivity during the post-2009 period is due to his enagagnment as
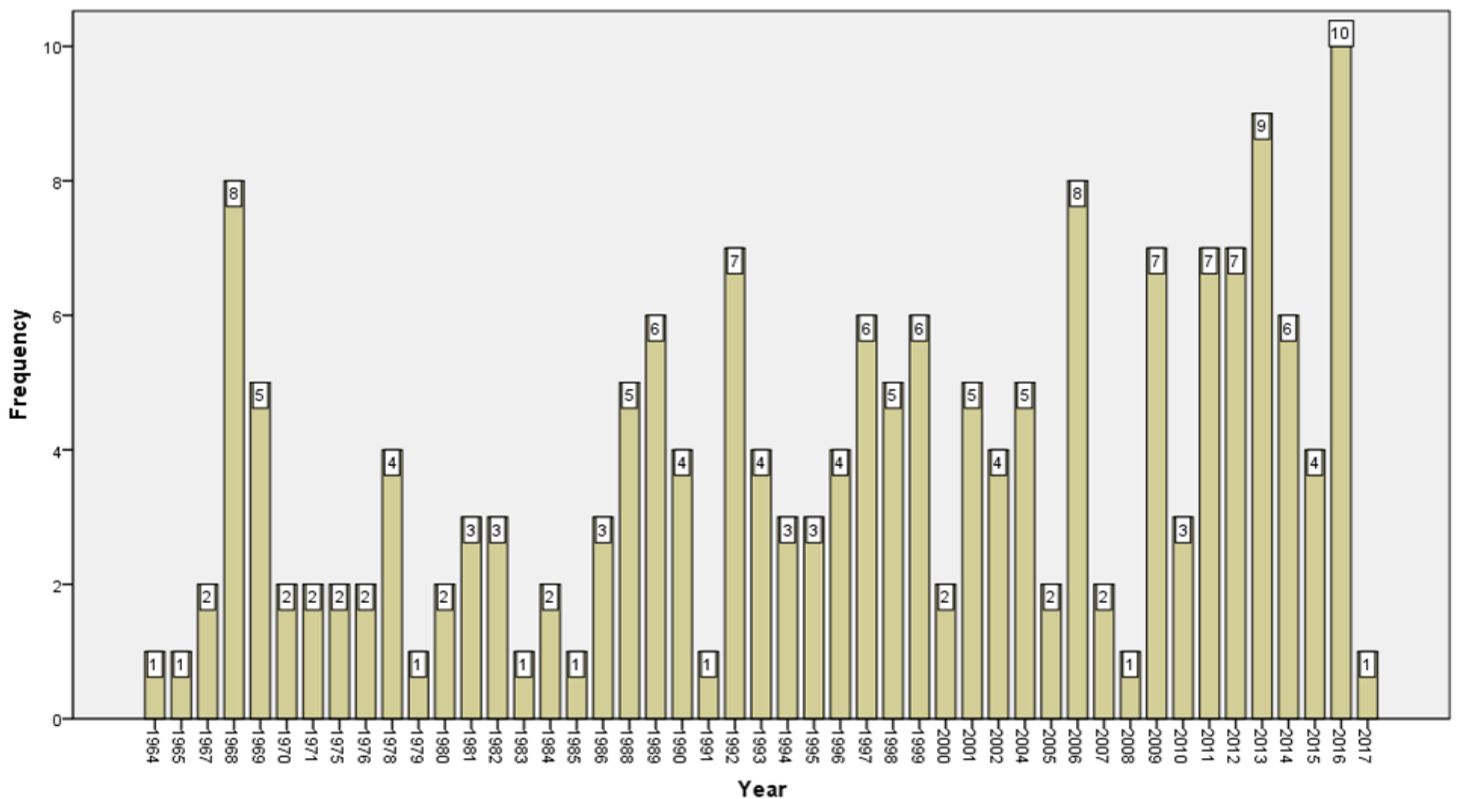

Figure 1. Distribution of Anwar's contributions by year

supervisor of research students enrolled in MPhil/PhD programmes.

Communication Channels used by Authorship Patterns

Table 1 reflects the distribution of Anwar's contributions in different channels of communication by collaboration patterns. It is clearly evident from these figures that a large majority of his contributions are journal articles, followed by publications in conference proceedings and reports of funded research projects. A good number of contributions are made in the form of books, book chapters, and booklets. However, the editing and compiling responsibility is represented in a reasonable number of books. By looking at the variety of communication channels, one can imagine his versatility, skillfulness, and thoughtfulness in producing different types of documents.

Table 1

Distribution of Anwar's contributions in different channels (N=187)

Communication Channels	Collaboration Patterns				Total
	Single authored	Two authored	Three authored	Four authored	
Journal Articles	48	21	12	1	82
Conference Papers	14	5	0	1	20[*]
Research Reports	4	3	3	1	11
Books	2	0	0	0	2
Books Edited	5	0	1	0	6
Books Compiled	8	1	0	0	9
Magazine article	1	0	0	0	1
Editorials	4	0	0	0	4
Foreword, preface, short notes,	8	0	0	0	8
Book Reviews	9	0	0	0	9
Literary Writings	6	0	0	0	6
Booklets	5	0	0	0	5
Book Chapter	9	0	0	0	9
Part of the Book	0	1	0	1	2

Newsletter	2	0	0	0	2
Other Reports	9	1	0	1	11
Total	*134*	*32*	*16*	*5*	*187*

Note. *Conference papers were also published as journal articles.

When we examine the collaboration patterns, it becomes clear that a large majority of Anwar's total contribution is made up of single-author approximately across all the channels of communications whether research papers or other output. This is followed by two-authored and three-authored items. There are only a few documents which have been produced by the collaboration of more than three individuals. Out of the 53 collaborative contributions, he is the first author in 28 items and second author in 23. There are only two items in which he is the third author. The reason behind his low collaborative output is his prolonged engagement in managerial activity.

Table 2

Collaboration patterns by authorship position

(N=53)

Collaboration Patterns	Authorship Position			Frequency	%
	1st	2nd	3rd		
Single authored	---	---	---	134[*]	71.6
Two authored	17	15	0	32	17.1
Three authored	6	8	2	16	8. 6
Four authored	5	0	0	5	2.7
Total	*28*	*23*	*2*	*53*	*100*

Note. This is excluded due to solo contributions.

Journal-wise Distribution of Publications

The journal-wise distribution of Anwar's publications is presented in Table 3. The figures show that his papers were spread over 24 journals

originating from different geographical areas across the globe which include USA, UK, Germany, Netherlands, Singapore, Malaysia, Egypt, Saudi Arabia, Pakistan, and Bangladesh. Out of 82 papers, 53 (65%) papers were published in only seven journals, namely, *Pakistan Library and Information Science Journal* (n=14, 17%), *Pakistan Journal of Information Management & Libraries* (n=10, 12.2%), *Malaysian Journal of Library and Information Science* (n=7, 8.5%), *The Eastern Librarian* (n=7, 8.5%), *International Information & Library Review* (n=5, 6.1%), *Library Review* (n=5, 6.1%), and *Libri* (n=5, 6.1%). Three papers (3.7%) were published in *Research and Information Bulletin*, The Electronic Library, and *Pakistan Library Association Journal* each. Two papers (2.4%) each appeared in *Health Information and Librarianship Journal, Journal of Librarianship and Information Science, Library and Information Science Research, Library Philosophy and Practice, and World Libraries.* One paper each was published in *Asian Libraries, Behavioural and Social Sciences Librarian, Information Services and Use, International Journal of Information Management Sciences, New Review of Academic Librarianship, PUTAJ-Humanities and Social Sciences, Scientometrics, and Singapore Journal of Library & Information Management.* Out of these, 22 (27%) papers were published in the impact factor journals such as Scientometrics, LISR, JOLIS, MJLIS, HILJ, Libri and The Electronic Library. However, it is worth mentioning that a large majority (n=60, 73.2%) of these papers were produced as a result of either solo effort (n=48, 58.5%) or as first author (n=12, 14.7%).

Table 3
Journal wise distribution of publications by authorship patterns (N=82)

SN	Core Journals	Single	Collaborative effort by authorship			Total	%	Origin
			1st	2nd	3rd			
1	Pakistan Library and Information Science Journal	13	0	1	0	14	17.07	Pakistan
2	Pakistan Journal of Information Management & Libraries	6	1	3	0	10	12.20	Pakistan
3	Malaysian Journal of Library and Information Science	4	1	2	0	7*	8.54	Malaysia
4	The Eastern Librarian	7	0	0	0	7	8.54	Bangladesh
5	International Information & Library Review (IILR)[3]	4	1	0	0	5	6.10	USA
6	Library Review	0	0	4	1	5	6.10	UK
7	Libri	3	1	0	1	5*	6.10	Germany
8	Research and Information Bulletin (IIUM)	3	0	0	0	3	3.66	Malaysia
9	The Electronic Library	0	3	0	0	3*	3.66	UK
10	Pakistan Library Association Journal[4]	3	0	0	0	3	3.66	Pakistan
11	Arab Journal for Librarianship and Information Science	2	0	0	0	2	2.44	Egypt
12	Health Information and Librarianship Journal (HILJ)	0	1	1	0	2*	2.44	UK
13	Journal of Librarianship and Information Science	1	1	0	0	2*	2.44	UK
14	Library & Information Science Research (LISR)	0	1	1	0	2*	2.44	USA
15	Library Philosophy and Practice	0	0	2	0	2	2.44	USA
16	World Libraries[5]	2	0	0	0	2	2.44	USA
17	Asian Libraries	0	1	0	0	1	1.22	UK
18	Behavioural and Social Science Librarian	0	0	1	0	1	1.22	USA
19	Information Services and Use	0	0	1	0	1	1.22	Netherland
20	International Journal of Information Management	0	0	1	0	1	1.22	Pakistan
21	New Review of Academic Librarianship	0	0	1	0	1	1.22	UK
22	PUTAJ - Humanities and Social Sciences	0	0	1	0	1	1.22	Pakistan
23	*Scientometrics*	0	1	0	0	1*	1.22	USA
24	Singapore Journal of Library & Information Management	0	0	1	0	1	1.22	Singapore
	Total	*48*	*12*	*20*	*2*	*82*	*100*	

1. *Earlier name Pakistan Library Bulletin*

2. *Pakistan Journal of Library and Information Science; Pakistani Librarian*

4. *International Library Review*

5. *Journal of Pakistan Library Association*

6. Third World Libraries

Subject-wise Distribution of Contributions

      The subject-wise distribution of Anwar's contributions is shown in Table 4. These figures indicate that his contributions are centered on some key domains. The following paragraphs discuss the coverage of each domain in detail.

Table 4
Subjects wise distribution of Anwar's contributions
(N=187)

SN	Core Subjects	No	%
1	Libraries	36	19.2
2	Professional education	24	12.8
3	Information needs and seeking	19	10.2
4	Informetrics	16	8.6
5	Library Management	10	5.3
6	Academic anxieties	9	4.8
7	Philosophical aspects	9	4.8
8	Library Automation	9	4.8
9	Professional associations	8	4.3
10	Biographical notes	8	4.3
11	Bibliographies	8	4.3
12	User education (Information literacy)	3	1.6
13	Information organization	2	1.0
14	Miscellaneous	17	9.1
	Total	*187*	100

Academic anxieties

There were nine (4.8%) citations investigating certain academic anxieties such as emotional intelligence and library anxiety. He made a worthwhile contribution in the domain of library anxiety in a number of ways. First, he questioned the validity of Bostick's Library Anxiety Scale developed in 1992 by evaluating its psychometric properties in the digital environment. Second, he as the principal researcher with three Kuwaiti colleagues, developed and validated a new Library Anxiety Scale called AQAK for undergraduate students. This scale for first time included a factor of 'user education'. It has been and is now being used by several scholars around the globe. This scale is highly reliable and suitable in the digital information environment. Later on, he investigated the relationship between emotional intelligence and library anxiety among university students.

User education

Three publications (1.6%) deal with the important area of user education. now known as information literacy (IL) around the globe. Two of these studies traced the development of user education in Pakistan (Anwar, 1979; 1981). He investigated the college teachers and working scientists in order to discover their information literacy skills and the extent to which these respondents had been able to use the literature of their respective fields. As a result, he recommended that a national user education programme should be prepared by the University Grants Commission (now Higher Education Commission) and the Pakistan Science Foundation. He also suggested the integration of a subject entitled "Knowledge of Information" in the curriculum of all educational institutions in Pakistan.

The syllabus for this subject, prepared by him, was also appended at the end of the paper. This study appears to be the first in Pakistan that examined the area of user education (information literacy) in Pakistan. This research also seems to be the first that investigated IL at the workplace. In another study, he investigated the perceptions of the faculty of a Malaysian university about the students' library use skills. These studies can be used as a road map for researchers working on the subject of information literacy in Pakistan.

Information needs and seeking

Nineteen citations (10.2%) were found on the investigation of information behaviour of different population segments such as agricultural scientists, journalists, rural dwellers, farmers, social science faculty, construction material sector, obese married women, madrassah students, and community based organizations. Such studies usually help information professionals in developing need-based information resources and services compatible with users' information behaviour and result in user satisfaction. Moreover, these studies may be used as a guide for investigating information behaviour of other professional and marginalized segments of populations.

Philosophical aspects

Considering the nature of an ever-changing LIS profession and its practice-oriented origin, Anwar also produced a reasonably good number of writings (n=9, 4.8%) discussing philosophical issues and prospects of the LIS profession. For example, Anwar has been very keen to the profile of the librarian and changing nomenclature of the library profession throughout the world (Anwar, 1980). He questioned several times the validity of existing nomenclature of the library profession such as library science, information

science, and information studies and proposed Information Management as an appropriate name for the library profession (Anwar, 1992, 2009, 2015, 2016). In an article, he also defines the working information sphere of information professionals while defining their core functions (Anwar, 2009). Moreover, he expanded the horizons of information management while presenting a paper at the International conference on Information Management and Libraries which was organized on the occasion of the centennial celebrations of LIS education in Pakistan by the Department of Information Management, University of the Punjab, Lahore. (Anwar, 2015; 2016). By reading these contributions, one can visualize his extra-ordinary vision, futuristic thinking, understanding of the developments in LIS that took place during the past six decades, and expanding scope of this profession. In another article, he proposed Urdu name for information management as 'Ma'loomaatiyaat'. Another interesting study was on the role of information management in preserving indigenous knowledge. It may be interesting to record that his second paper (Anwar, 1967) is listed in Nitecki's (1995) monumental work on the philosophy of Library Information Science.

Libraries

A majority of the publications (n=36, 19.2%) dealt with issues of different types of libraries such as public, academic, special, and national. The issues of public libraries were discussed in 22(11.8%) items. These studies covered various topics such as public library development, library legislation, financial resources, political and professional efforts for public library development, public library system, problems, history of certain public libraries, and a proposal for the development of Integrated Rural

Information system for Pakistan. Eleven citations (5.9%) addressed the status, issues, and services of university, college and school libraries. Only a few citations dealt with special libraries (n=2, 1%) and national library development in Pakistan (n=1, 0.5%). These studies are important for future researchers in understanding the legal foundations of public libraries, issues of academic libraries, and existing library system in Pakistan.

Professional education

There are 24(12.8%) citations on the issues of the professional education in the field of library and information science which is now changing to information management. These studies covered the domains, namely, faculty development, librarians' professional development, continuing professional education, state of LIS education, state of LIS Research, problems and prospects, and the foundations of LIS education in Pakistan. These studies are very helpful for teachers in understanding and teaching the historical development of LIS education not only in Pakistan but also in South Asia.

Scientometric investigations

A reasonably good number of citations (n=16, 8.6%) were scientometric studies of literature on medicinal plants, terrorism, economics, agriculture, science and technology, and interdisciplinarity. The literature on medicinal and agricultural plants such as Phoenix Declylifera (Date Palm) and Nigella Sativa (Black seed) was also investigated using scientometric principles. These studies, published in renowned journals, e.g., Scientometrics, MJLIS, etc., were highly important for certain fields and

indicate his vision for interdisciplinary research which can provide visibility and respect to LIS professionals in other disciplines.

Library management

Ten (5.3%) citations addressed the area of library management. These areas include: Participative management practices, career development, standards for library service, competencies development, resource sharing, continuing professional development, document supply services, and library collection evaluation.

Library automation

A good number of citations (n=9, 4.8%) were related to the area of library automation. These citations were mainly the reports of library automation projects. There were few studies investigating the use of information technology in libraries of Pakistan. One paper provides details of the development of a local bilingual (Arabic-English) automated circulation system.

Professional associations

There were eight citations (4.3%) focusing on certain professional associations. Some citations focused on historical development of Pakistan Library Association, its meetings, and certain conference proceedings. One citation reviewed an old publication of Pakistan Bibliographical Working Group and anther one about the development and growth of the Library Promotion Bureau.

Information organization

Two citations were on the area of organization of information. One study compared the Anglo-American Code with ALA Cataloguing Rules whereas the second one was an experiment to investigate the comparative advantages of the alphabetical and classified subject catalogues.

Bibliographies

Eight citations (4.3%) dealt with the compilation of bibliographies on various subjects such as parenting, Pakistan, information services in the Muslim world, UNESCO Field Mission Reports on Muslim Countries, dissertations on Saudi Arabia, and doctoral research on Pakistan.

Biographical notes

There were several short biographical notes (n=8, 4.3%) about various Pakistani LIS personalities written after their death.

Miscellaneous

There were 26 (13.9%) citations that are of miscellaneous nature. Most of these citations were in the form of editorials, forewords, and prefaces. Nine contributions (4.8%) were made in the form of book reviews. Some citations were in the form of short notes outlining biographical sketches of Pakistani LIS personalities such as Abdul Rahim, Anis Khurshid, Muhammad Fasihuddin, M. Adil Usmani, Yaqub Ali, and Abdul Hafeez Akhtar.

Prominent Collaborators

Table 5 provides details of Anwar's collaborative writers. These collaborators belonged to many countries, e.g., USA, UK, Canada, Singapore, Malaysia, Kuwait, Iran, Pakistan, Saudi Arabia, and Uganda. Of the 42 collaborators, Shaheen Majid, Husain A. Al-Ansari, Ahmad I. Iskanderani, Sajjad Ullah Jan, Charlene L. Al-Qallaf, Noriah M. Al-Kandari, Tamara S. Eisenschitz, Midrar Ullah, and Muhammad Asif Naveed were his prominent collaborators who contributed three or more citations each.

Table 5
Collaborators of Mumtaz Ali Anwar
(N=42)

SN	Name of the collaborator	Nationality	Citations
1	Shaheen Majid	Canada/Pakistan	7
2	Husain A. Al-Ansari	Kuwait	7
3	Ahmad I. Iskanderani	Saudi Arabia	7
4	Sajjad Ullah Jan	Pakistan	7
5	Charlene L. Al-Qallaf	Kuwait	5
6	Noriah M. Al-Kandari	Kuwait	5
7	Tamara S. Eisenschitz	UK	5
8	Midrar Ullah	Pakistan	4
9	Muhammad Asif Naveed	Pakistan	4
10	Nosheen Fatima Warraich	Pakistan	3
11	Yaseen A. Jifry	Saudi Arabia	3
12	Ahmad Bakeri Abu Bakar	Malaysia	2
13	Sajjad ur Rehman	Canada/Pakistan	2
14	Abdus Sattar Chaudhary	Canada/Pakistan	1
15	Mohammad Saleh Ashoor	Saudi Arabia	1
16	Malik Ahmad Nawaz	Pakistan	1
17	Bashir Ali Tiwana	USA/Pakistan	1
18	Saqlain Misbah	Pakistan	1
19	Mushtaq Ahmad Malik	USA/Pakistan	1
20	Syeda Hina Batool	Pakistan	1
21	Sajjad Ahmad	Pakistan	1
22	Surraya Bano	Pakistan	1
23	Sultan M. Al-Daihani	Kuwait	1

24	Laila Maroof	Kuwait	1
25	Muhammad Asghar	USA/Pakistan	1
26	Arwa Tuqan	Kuwait	1
27	Adnan Ali Adikata	Uganda	1
28	Abdullnaser Abdullah	Kuwait	1
29	Fazida A. Raza	Singapore	1
30	Dheya Abdulqader Al-Jasem	Kuwait	1
31	Hamid Saeed	Pakistan	1
32	Hana Imam Supaat	Malaysia	1
33	Hooshang Ebrami	USA/Iran	1
34	Adnan Soofi	Saudi Arabia	1
35	Muhammad Anwar	USA/Pakistan	1
36	Kalsom Sharif	Malaysia	1
37	Abdur Rauf	Pakistan	1
38	Nooraini Ismail	Malaysia	1
39	Zahrah Abdus Samad	Malaysia	1
40	Amna Kastyana Mukandar	Malaysia	1
41	Mariam I. Abdulrehman	Kuwait	1
42	Abbas Horri	Iran	1

Concluding Remarks

In summing up, Anwar's publications have appeared in leading professional journals and documents, most of which are read beyond the country and reach international audience. The content of these publications is more important for their distribution because his writings have dealt with professional topics in an explanatory and interpretive rather than descriptive way. Several of his publications deal with LIS developments in Pakistan which are very important for future researchers. He has so far produced 22 books, 82 journal papers, 20 papers in conference proceedings, 23 reports, 11 short pieces, 9 book chapters and 9 book reviews. In addition to these, he has published several literary writings such as short stories, travelogue, etc. which have been published in renowned Urdu magazines such as Urdu Digest, Mahnama Hikaayat, etc. He has several research projects in hand which cannot be mentioned by title at this time and will be published in next few years. The interesting thing about his contributions is that as he is

growing old year by year, his average research productivity per year is increasing (Figure 1). Because of his own direct practical experience of library management and education in other parts of the world, he is able to put his subjects not only in the local context but also in a more universal context. His publications focus more on why and how certain practices are followed in particular environments.

Like his name Mumtaz, he has been 'Mumtaz' meaning prominent throughout his professional career. It does not matter whatever role he got either as a Manager, teacher, or researcher, he remained distinctive. He has been endowed with intellectual luxury and rigor, the ability to think critically, creatively, anticipatively along with passion for hard work with self-motivation and self-sufficiency of high level. Moreover, he has the ability to transfer his knowledge and skills to his students giving many able professionals to the information profession working in various countries around the globe He never let the limited facilities to be a barrier on the road to his success. He is an exemplary figure to follow for young information professionals and faculty of LIS schools. Pakistan really needs such visionary, knowledgeable, and capable teachers if it wants to compete with other nations.

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Chapter Two

CURRICULUM DESIGN AND DEVELOPMENT

Sajjad ur Rehman

We need to use a systematic approach as and when we need to develop or design academic programs. This approach needs to be applied to both summative and segmental designs when we envisage developing an altogether new academic entity or we intend compartmental or incremental design. It becomes more significant keeping in view the fact that information education has undergone fundamental changes in its structure, content, and conduct. New areas of studies have emerged in the field. We can note changes in the identity and nomenclature of the names of library and information schools and degree programs. Also, a great deal of diversity is found in the spread and scope of degree programs, academic cores, tracks of specialization, and curricular content (Rehman, 2000; Rubin, 2004). These changes are profound, pervasive, and universal.

Academics and professionals in the field of library and information science (LIS) agree that the information market needs a new breed of professionals who possess relevant capabilities and competencies in today's changed context. TFPL has completed crucial surveys of the market and identified how the field has opened new opportunities in the areas of information and knowledge management (TFPL, 1999). Abell (1998) emphasized that the professionals needed to possess new roles and competencies for these emerging roles. Morton (1996), based on a survey of the graduates of seven Canadian schools, found that the nature of work these

professionals performed had changed. Junzic and Badovinac (2000) analyzed the comparative situation of ten. European schools and noted that these schools presented diverse situation, yet there were changes in the thrust and content of their programs.

New Areas of Studies

Information field has new domains of studies in the areas of information science, information management (IM), information architecture, information organization, ICT applications for networking and portals, digitization and digital library initiatives, and, knowledge management (KM). New areas of specialization have been added to the traditional discipline of LIS and almost all operations and services are being approached from new perspectives and technologies. While LIS programs have addressed the demands of changes in LIS, many of them have opened new avenues where they are targeting general information market. It has resulted in new degree programs, having a great deal of diversity. LIS, since 1980s, has traditionally been active in information management and has added these competencies to its curricula.

Loughridge (1999) noted that LIS schools were dealing with new situation, though information professionals did not clearly conceive differences in librarianship, information management, information resource management, and knowledge management. Oxbrow & Abell (2002) and Southon & Todd (2001) reached similar conclusions about the treatment of IM and KM in professional ranks. It has been realized that there exists a common denominator in these distinct areas in which information professionals could play an effective role. Koenig (1999) provided a

checklist of KM areas that could be better taught in LIS environment. Henczel (2004) discussed the changes happening in the workplace for information professionals and proposed sets of knowledge, skills and personal attributes as these were related to the possible contributions of these professionals for their emerging roles, responsibilities, and rights in the KM era. Conolly and Matarazzo (1999) asserted that shared collective knowledge of an organization was creating new values and the corporate information professionals were now charged with the mission to explore and implement new and innovative methods to encourage sharing and to better manage information.

Needed Professional Capabilities

Researchers have been analyzing the needs of the information market in order to configure desired capabilities of information professionals, which could provide new directions for academic programs and curricula of library and information science. Academic and professional bodies such as Special Libraries Association, Medical Library Association, and Association for Library and Information Science Education have been engaged in surveys to assess the extent to which current curriculum offers the kind of training the students need to develop their knowledge, understandings and skills (Taylor, 1998). Using competency framework, Rehman (2003) proposed a model of curriculum development, taking into view the input of employers, professionals and academics. A number of studies have used the competency model to identify curriculum content for general professionals and those who are working in specialized domains of academic, public and special libraries (Rehman, Majid and Abu Baker, 1997; Rehman, Abu Baker and Majid, 1998; Rehman, Majid and Abu Baker, 1998; Rehman, Majid and Abu

Baker, 1999). Work on competency definition and validation is mostly done through surveys, expert judgments and analysis of employer perceptions in the job market. In this context, a large number of studies have been reported that deal with perceptions and insights of professionals, employers, and graduates of LIS programs.

Perceptions about Changed Capabilities

Perceptions of students and alumni of the LIS programs deal with a number of factors related to curriculum, faculty, and resources and facilities. A number of perception-based surveys are found in literatures (Blankson-Hemans & Hibberd, 2004; Edomi & Ogbomo, 2001; Edzan, et al., 2004; Genoni, Exon & Farrelly, 2000; Genoni & Smith, 2005; Jefferson and Contreras, 2005; Loughridge & Speight; 1996; Moahi, 1999; Yen, et al., 2003). These studies point to the significance of the views of employers, stakeholders, academics, and graduates of LIS programs about different aspects of the design and direction of education programs. Thrust of change has been multi-dimensional and pervasive.

Model

In order to design an information study academic program, a model is proposed in this chapter. The model is based on the review of studies and a conceptual frame. The model is presented in Figure1. This model has the following elements: (1) analyzing market needs, (2) assessing resources and capabilities, (3) defining competencies and capabilities, (4) designing curriculum and program development, (5) designing and implementation, and (6) evaluation. The model stipulates that the design of education programs is based on following through these six stages. The model is cyclic and continuous in nature.
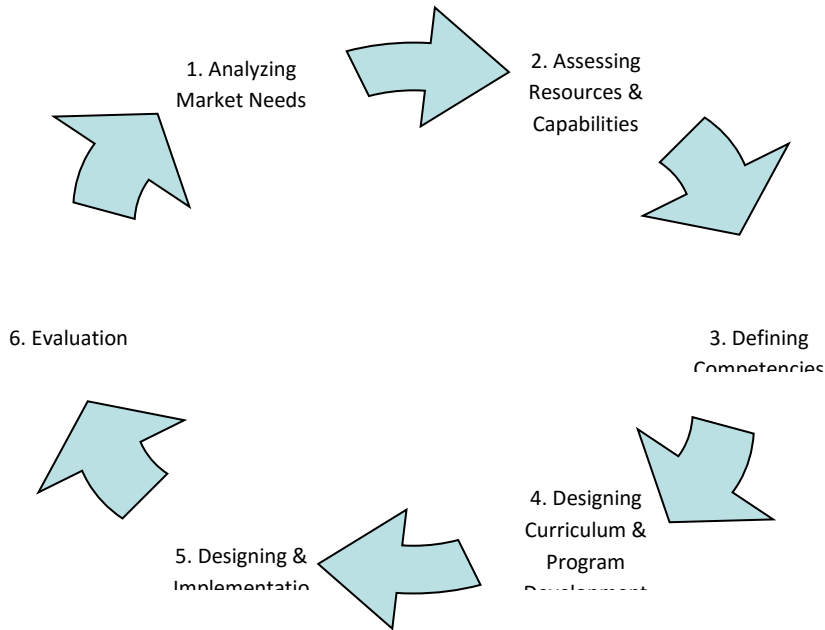
Figure 1: Model for the Design of Education Programs

Assessment of Market Needs

First step in the model is related to a comprehensive analysis of the needs in the market for employment and use of professionals, expected to graduate from a program. For assessing market needs, we need to use a number of strategies, spelled out in Figure 2. These include a number of pertinent factors. Employment market is the most credible barometer. For this purpose, the environment needs to be scanned through surveying information and knowledge operations and activities, ICT infrastructure, and employer perceptions. National policies present significant pointers to the changing market. These are related to socio-political, legal, economic, political, education, media, S&T, R&D, and human resource policies. These have both long-term and short-term implications for information and knowledge professionals. Another important variable is related to graduates

of the academic programs. The alumni perceptions about ground realities and their insights about emerging needs are most pertinent in this review process. Also, there is a need of stocktaking of the opportunities of education and training in the higher education and vocational education programs in any given situation.

It is understood that challenge of change is pervasive in the LIS programs and curricula. A change needs to be responsive to the market needs. A number of factors contribute to the definition of market needs that include employer perceptions, alumni surveys, and assessment of the needs of other stakeholders. Competency definition becomes the basis the efforts of module development and curriculum design. The role of each segment in redesigning academic programs and curricula is generally recognized. However, there exists a need that these dynamics are presented in the form of a model that is systematically examined and validated, using the available body of evidence in a context. A viable model may provide useful insight to all those who are spearheading the change process in LIS schools.
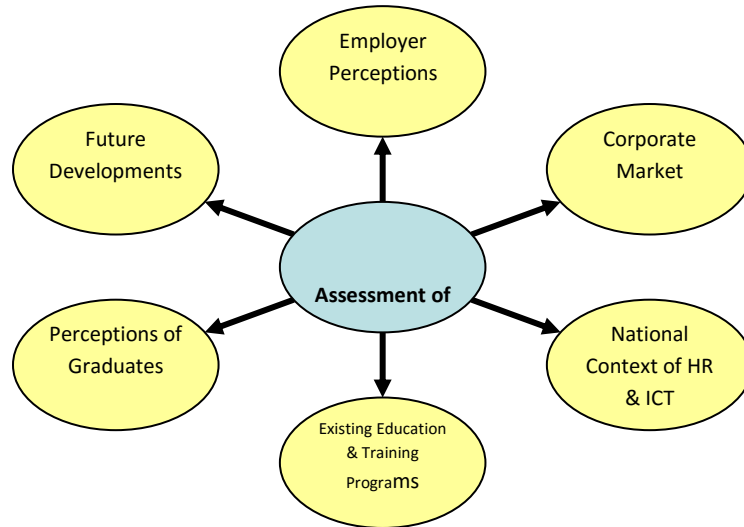
Figure 2: Assessment of Market Needs

Competency Definition

Figure 3 provides a graphic view of the important sources of information used in the process of defining competencies. These include surveys of the employment market, task analysis resulting in data banks, input from experts, and using modular approaches in the identification process. Competencies need to be appropriately validated in order to serve as the essential framework for the design of education programs and curricula.
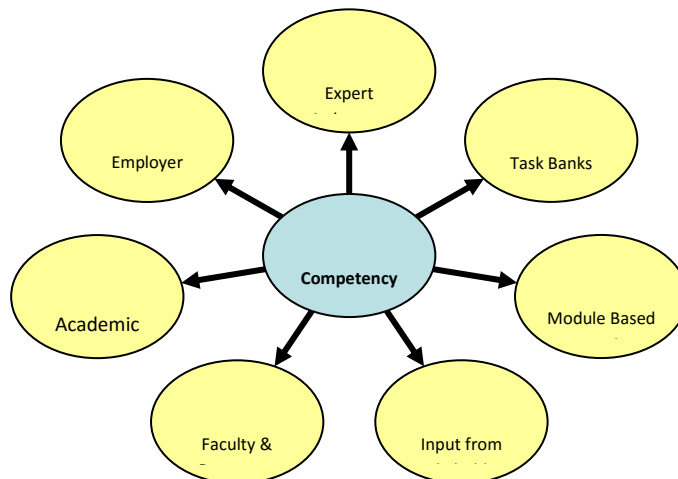

Figure 3: Competencies

Areas of Competencies

A number of competency studies have been conducted that have resulted in identification of major areas of competencies (Buttlar and DuMont (1996); Middleton, 2003; Rehman, Majid and Abu Baker, 1997a; Rehman, Abu Baker and Majid, 1997b; Rehman, Abu Baker and Majid, 1998; Rehman, Majid and Abu Baker, 1998; Rehman, Majid and Abu Baker, 1999). Special Libraries Association, Medical Library Association and Law Library Association have also proposed sets of competencies. Based on these studies, we can identify primary areas competencies that need to be focused in our efforts of curriculum revision and redesign.

Figure 4 gives an overview of the areas in which information and knowledge management competencies need to be defined. Since these areas have the most significant influence on LIS education, the LIS educators need to have a critical view of these areas. These areas are related to the apparent needs of the emerging employment market. A careful review would help the LIS educators in having a clear focus on the desired competencies, which can be translated into efforts of curriculum and program redesign.
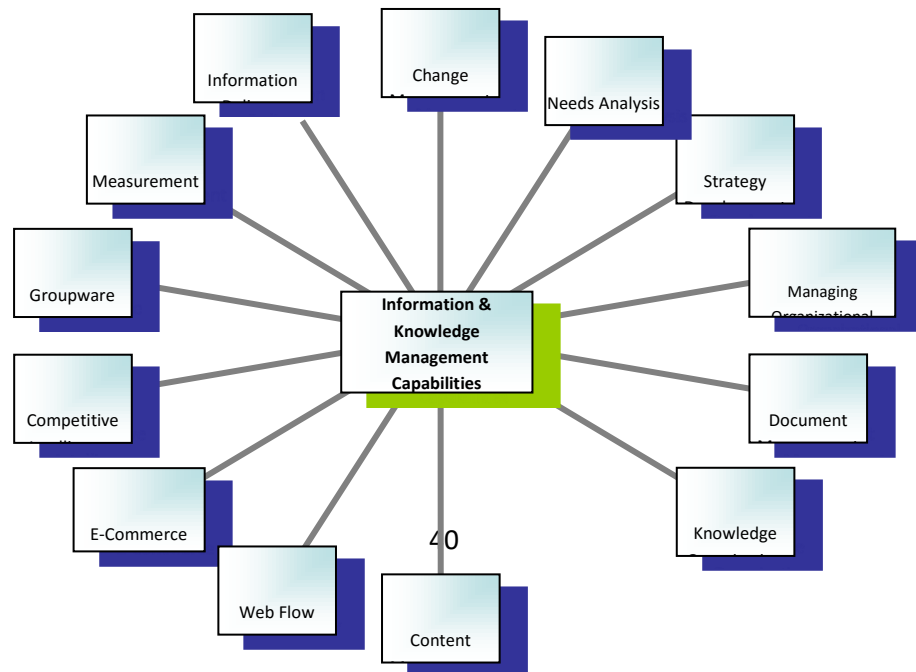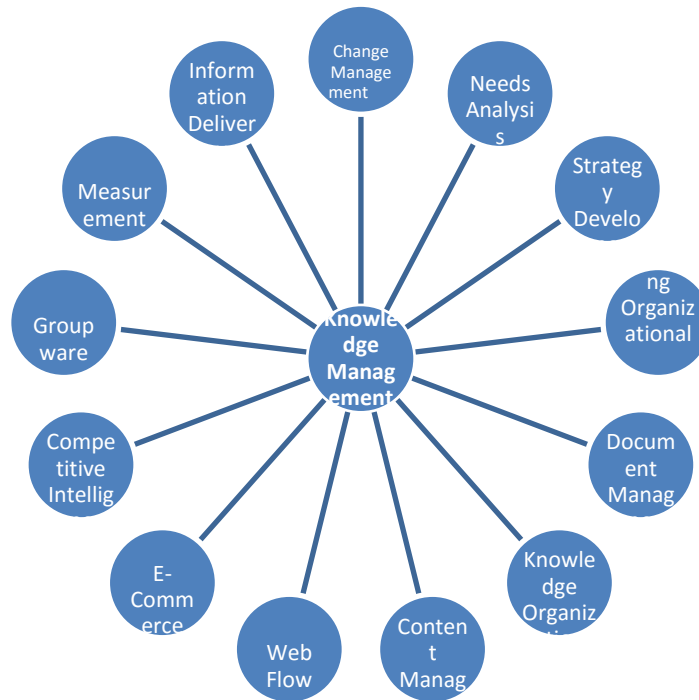
Figure 4. Competency of Information and Knowledge Management

Application of the Model

According to our model, design of educational programs depends on the assessment of market needs. Factors that contribute to examining market needs include an analysis of the employment market, perceptions of professionals about ground realities of the employment market, availability of existing programs of education and training, and overall national policies dealing with ICT, information, media, education, S&T, research, and human

resource development. When viewed in a holistic manner, these may provide a general understanding of the needs.

We are applying the model in the case of one developing nation where we have been trying to monitor the pertinent factors for coming with a realistic assessment of the needs of information and knowledge education.

Step One: Assessing Needs

As shown in Figure 2, needs are examined from a multitude of vantages, some of which are discussed here.

1. Corporate market

In our model, it is apparent that competency definition is based on a number of factors that include market analysis, alumni perceptions, overall national policies, and the national context. In Kuwait, we have conducted a number of studies about IT operations, information management activities, organizational context, human resource management aspects, and related aspects of information and knowledge management. Rehman & Marouf (2003) analyzed the information management activities and IT operations of 41 corporate companies. In a follow-up study of 2003, Rehman analyzed the organizational and human resource aspects of the corporate sector. A focused analysis of the information management applications of 17 financial companies was conducted quite recently (Rehman, 2005; Rehman, 2006). Findings of the three studies about the corporate world have brought forth some vital understandings that indicate prevalent market needs and trends. These companies lack policies and practices for organization of their internal information sources. An apparent weakness has been noted in indexing, archiving, warehousing, and retrieval systems.

1. These companies have no active liaison with Kuwait University for education and training of their professionals. They feel least involved about the academic and research activities in the higher education institutions. Their perceptions about the competencies of Kuwaiti graduates are low.

2. Perceptions of graduates about market realities

In the preceding section, employer perceptions and needs in the corporate market had been examined. Another significant measure is to view the perceptions of the graduates of the information study program who have been facing the ground realities of the market. For this purpose, we have conducted an extensive study of the graduates of the MLIS program of Kuwait University, 1996-2006 (Rehman, Marouf & Al-Ajmi, 2006; Rehman & Marouf, 2007). In this study, we have analyzed perceptions about coursework, faculty, instructional methods, instructional facilities, fieldwork, comprehensive examination, and research component. These preliminary findings can be summarized as follows:

1. The graduates were most satisfied with faculty members and core courses.
2. The graduates were least satisfied with fieldwork and conduct of comprehensive examination.
3. They wished that new names and labels may be used for degrees and programs.
4. They identified many new areas of ICT, information management, and knowledge management in which coursework and tracks of specialization need to be introduced in the degree programs.

5. A stronger collaboration with the corporate market was emphasized.

3. Additional Factors

National policies are reflected in a variety of ways. These are general in nature and provide an insight to the existing situation. The needs of the citizenry about information resources and services need to be examined. Research and development sector makes a significant contribution. Another vital area worth-examining is human development policies in both public and private sectors, Socio-cultural realities of a society also have substantial input. Developing a detailed profile has a great deal of bearing on the way

Educational programs are conceived and developed.

Step 2: Assessing Resources and Capabilities

After assessing needs, it is prudent that an objective stock is taken of the available resources and capabilities. Faculty members are the most critical resource in all the stages of conception, design, conduct, deliver, and review. Space, laboratories, computing facilities, human and administrative resources have to be ensured before launching a program. Nature and thrust of the academic program would dictate the extent of resources. An information management program will be IT-intensive, while a KM program may require little in that area.

Capabilities for inter-disciplinary collaboration and creating partnerships with the market are the additional capabilities. Isolated academic programs are most vulnerable, both politically and administratively. Engaging enterprises brings resources, richness and diversity to the programs.

Step 3: Defining Competencies

The next step is defining competencies for which the academic programs and curricula are to be designed. This is a crucial step both for the designing of new programs and redesigning of the existing programs. The effort needs to be systematic and thorough. Figure 3 shows the possible sources for getting input for competency definition. In a situation, one school may use a singular source or a multitude of sources. Griffiths and King (1983), the pioneers of competency definition in the field of library and information science, developed an enormous data bank of tasks to be used for different operations and work settings. Such data are too minute for any meaningful grouping. These also require enormous commitment of human and financial resources. Task-data can easily become outmoded with the changes of systems, technologies, and processes. Rehman, Majid & Abu Baker (1999) found little use for this approach and used a modular approach for validation of competencies, based on the input of professionals and experts, gathered through interview-based survey. Use of surveys for defining and validating competencies is commonplace. It is always useful to benefit from the findings of earlier studies. However, it is always desirable to validate them in the context of a peculiar setting. Rehman (2003b) presented a model of defining these competencies in the international context. Rehman, Ansari & Yousef (2002) made methodological improvement by defining module-based validation in an international study. In another study, Rehman, Abdul Karim & Chaudhry (1998) noted that competency definition led to a clear understanding that undergraduate and graduate competencies could be differentiated. Employer perceptions and expectation have always been held in the highest esteem in the process of competency definition and validation.

The new disciplines of information and knowledge management have brought new avenues and challenges for the academics in the traditional domain of LIS education. Rehaman and Chaudhry (2005) reviewed perceptions of heads of LIS departments on what KM competencies LIS programs offered their students. Chaudhry and Higgins (2003) described levels of courses, areas and topics, and differences in emphasis in the instruction of KM courses. Lau and Al-Hawmadeh (2002) reviewed the need for designing KM curriculum at graduate level. Al-Hawamdeh (2005) examined the interdisciplinary nature of KM and assessed the need for a multidisciplinary approach in designing graduate programs. Rehman (2006), based on an extensive review, presented a profile of the core competencies for information and knowledge management for LIS professionals. Based on the preceding discussions, we are able to identify vital competency modules that need to be considered if any graduate program of information and knowledge management is being designed. These are also presented in figure 4.

1. Development of information/knowledge resources: developing information resources, creation and recreation of organizational knowledge; developing archives, document systems, records, repositories, organizational memories, collections of best practices, publishing systems and instruments
2. Information/knowledge organization: indexing, warehousing, metadata, infomaps, knowledge maps, creating organizational systems, taxonomies, ontologies, etc.

3. Content management: digitization, portal management, managing content systems in various media and formats, retrieval systems, information architecture

4. Use and user behaviors: determining needs, marketing strategies, man-machine interfaces, etc.

5. Information dissemination and knowledge sharing: policies and strategies, creating sharing context and environment, organizational communities of practice

6. Social capital and social networking: creating human and social networks

7. Systems, Tools and technologies: Technologies used for databases, document management, portal management, and content management

8. Learning organization: developing dynamic and responsive organizations

9. Management: corporate framework, leadership, motivation, human resource development, change management

10. Data and system security

11. E-commerce

12. Competitive intelligence

Steps 4-6: Development, Implementation and Evaluation

These steps require a great deal of planning and careful execution. This paper has a focus on the competency content and cannot have any in-depth treatment of these aspects. However, a multi-pronged strategic approach is needed if higher education institutions in the region plan to produce graduates who could be befittingly employed in the corporate market in

information and knowledge domains. Following are some of the strategic points that need to kept in consideration:

1. There exists a strong need to develop information and knowledge management programs in higher education institutions that might cater for the specialized needs of the corporate sector.

2. Initiatives for developing IM and KM programs need to be made at both the undergraduate and graduate levels. Rehman, Abdul Karim and Chaudhry (1998) had established that the academic programs for information studies need to be designed in a manner that these are mutually complementary. They also listed competencies for which undergraduate programs appeared to be more appropriate. A large number of undergraduates may serve in entry-level professional positions or vocational or technical tasks. For this purpose, academic program need to be carefully and thoughtfully designed. Rehman and Marouf (2003), based on their review of the North American model of information studies at the undergraduate level, proposed specific guidelines for developing undergraduate programs. Graduate programs, on the other hand, need to satisfy the needs of professionals who have to be employed for professional and managerial positions. Diverse approaches are needed for developing these programs.

3. Another vital strategic consideration is that information and knowledge management education are multidisciplinary in nature. Information systems, human resource department, IT and computing departments, organizational behavior, information science, and a number of other disciplines contribute to the development of these programs. It means that strong inter-disciplinary collaboration needs

to be managed for launching these programs. Academic politics and turf issues always cause serious sensitivities.

4. These programs require that a strong collaboration is cultivated with business and industry. These are the sources for exposing students to ground realities in the real world and providing opportunities for fieldwork, projects, and internships.

5. The schools need to develop faculty and other resources in order to offer these initiatives. These programs require that while curriculum is expanded, faculty members should also come from diverse backgrounds. LIS faculty members who have been living in their comfort zones of traditional identity are not very receptive to such changes of identity and substance.

6. Schools need to develop traditions of inquiry and research. Graduate students should be involved in applied research in organizations.

In the chapter, we have proposed a model for the design or redesign of academic programs in LIS schools. In order to apply this model in a given context, it is pertinent that systematic reviews are conducted about the market needs. We have also been able to delineate a number of factors that help us in articulating market needs. It requires commitment of substantial resources in order to reach clear understanding about the market needs. Competency definition is the next logical step in the process. Again, this exercised needs to be conducted with imagination and ingenuity. Over-generalization from the available findings may not serve the purpose. It should be done keeping in view the local needs and stocktaking of the resources.

Design of academic programs is essentially a political process. It needs to be initiated within the faculty members through engagement, deliberations and consensus building. It is quite a complex process. Working with other forums of academic decision-making is also quite a daunting task. Bureaucratic setups and procedures vary from place to place, but it is always through active lobbying and diligent persuasion that any meaningful change can be tracked.

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Chapter Three

CONTINUING ASSESSMENT

Sajjad ur Rehman

The previous chapter dealt with development and design of information education programs, both conceptually and pragmatically. This chapter addresses the need of constant review and renovation of an academic program. The process entails systematic assessment; using the approaches of quality assurance, accreditation and certification. The three terms have a common denominator--a built-in mechanism of continuous assessment. The three terms, despite having commonality of substance, have their own properties.

Accreditation: Meaning and Application

Accreditation means continuous examination of a program for bona fide competencies. Designated authorities such as agencies or societies conduct this process, using certain criteria; awarding recognition to those programs that fulfill the requirements. Graduates of accredited programs are accorded recognition, permitting their induction in the professional careers. Accrediting agencies have their distinct structure, norms and practices. for the field of library and information science, American Library Association (ALA) has been engaged in accreditation business. ALA's definition of accreditation is as follows:

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ALA had established Board of Education for Librarianship in 1924 that started accrediting the then education program, a 5th year undergraduate degree at the behest of Williamson's Report of 1923 that primarily transformed library education (Vann, 1961). As Master's degree became a norm during 40's and 50's, BEL assumed its role for accrediting these university degrees. Later ALA formed an committee that has been the accrediting agency. While ALA has been responsible for North American schools, other regional forums emerged for regional and national needs.

Chartered Institute of Library and Information Professionals (CILIP), founded in UK in 1962, has been responsible for assessing library and information education program. Australian Library and Information Association (ALIA) has been a counterpart in that part of the world.

Information studies have outgrown the traditional library schools, having an evolved setup with regard to curriculum, faculty credentials, and other contextual variable. Accrediting agencies have also evolved with fresh frameworks for their scope, role and practice.

Quality Assurance: Fundamentals

IFLA has been active in the areas of quality assurance and quality assurance. Its Section on Education and Training (SET) has been active for the last 40 years. The SET has been active in developing a model of quality assurance that was applied in the European continent (Tammaro, 2005). IFLA managed to publish monographs on quality assurance (Ameen, 2007; Miko & Miyahara, 2015). It also conducted SET satellite meeting in Ohio in 2016.

As a concept quality assurance has been applied in many professions and fields of practice such as health, education, business, etc. As a generic concept, it means the maintenance of a desired level of quality in a service or product, especially by means of attention to every stage of the process of delivery or production.

> ## Quality Assurance
>
> ## Definition
>
> The planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled. Essential ingredients of the terms include the concepts of quality control, transparency of operations, mobility of professionals, and uniformity in the application of criteria. Quality assurance implies continuous checking that the products and services satisfy the criteria for production and delivery. It connotes optimal uniformity, interchangeability and transferability for the purposes of admission, employment, and administration of rewards and remunerations.
>
> (The American Society for Quality (ASQ))

Certification

Certification literally means the action or process of providing someone or something with an official document attesting to a status or level of achievement. Business dictionary defines it as:

> ## What is Certification?
>
> Formal procedure by which an accredited or authorized person or agency assesses and verifies (and attests in writing by issuing a certificate) the attributes, characteristics, quality, qualification, or status of individuals or organizations, goods or services, procedures or processes, or events or situations, in accordance with established requirements or standards.
>
> (Business Dictionary)

Academic and professional bodies have been exercising certification in all the professional domains such as health, law, education, psychology, etc. Most of them conduct professional examinations after the practitioners have obtained a degree in the area of practice. The examinations and registration processes are considered the gateway for induction into any profession. In Europe in general, and UK, Australia and New Zealand in particular accorded membership and fellowship in the area of practice of librarianship. In USA, education being a state prerogative, state agencies have been responsible for certifying those who had to pursue a career in a library, media center or school resource center (Woellner,1980). The term *teacher librarian* is using for those who are certified to work in this domain. In USA, Nation Board Certification has been responsible for managing this process. The examination covers teaching knowledge, collaborative skills, organizational ability, and behavioral profile. ALA published Dickinson's work (2005) that addresses the National Board for Professional Teaching Standards (NBPTS) introduced in 2000.

Certification, as an instrument of professional induction or practice, is not widely applied in library or information positions. Yet it needs to be understood as a measure of evaluation.

Quality assurance, assessment, and accreditation have common ingredients. We understand that there is an institutional framework under which assessment is conducted to confer a degree of satisfaction of primary criteria of assessment of formal degree programs in the field of library and information education, resulting in the acceptance and absorption of graduates across the board. Certification in North American context is restricted to a state-based examining and conferment process for the

induction of school library or media resource center professionals (Woellner, 1980). Using general professional perspective, it is the conduct of an entrance examination, beyond the minimum of a professional degree, by a competent professional body that awards certificates to those who are allowed to practice. Certification, as a process, is excluded from further discussion.

In the following sections, we will focus on accreditation, as it is the essential means of systematic, intensive, and periodic assessment, which is the foundation of both the processes of quality assurance and certification. It also adds value to the efforts of LIS programs in keeping themselves current and relevant. Changes in the LIS profession have been swift and these need to be reflected in academic policies and curricula. Accreditation is a source of authentication that the accredited programs are pursuing changes.

While accreditation was a norm until the wave of iSchools swept through, yet it is by and large a widely accepted phenomenon. International and regional professional bodies have pushed through the initiatives of accreditation, targeting an optimal uniformity and standardization among the LIS programs. Accreditation targets professional knowledge, skills, capabilities, and values among professionals joining the workforce. Accreditation, as practiced by ALA (2016), stipulates a foundation of clearly defined objectives, their satisfaction and potential for continued sustenance. Accreditation serves as a mechanism for quality assessment and quality enhancement with quality defined as the effective utilization of resources to achieve appropriate educational objectives. Majid, et al. (2003) consider it a process that assures quality and integrity, using self-evaluation, peer assessment and expert examination for the improvement of academic quality and public accountability.

Regional Forums of Accreditation

As afore-mentioned, ALA, CILIP, IFLA, and ALIA are professional forums that have pursued assessment of LIS education programs. ALIA's process is labeled as course recognition in Australia, covering both undergraduate and graduate degrees, unlike ALA model that accredits

> **ACCREDITATION FRAMEEWORK**
> - Context of the program
> - Institutional support
> - Relationship with the parent institution
> - Mission, goals and objectives
> - Curriculum
> - Faculty and staff
> - Research productivity
> - Students
> - Instructional resources and facilities
> - Employment market

Master's degree only (Willard & Wilson, 2004). CILIP's role is primarily confined to the needs of Europe where vocational education, and degree education at both bachelor and post-bachelor programs, are practiced. The schools offering these programs are quite diverse in their academic and professional thrusts, also reflected in different titles these schools bear. IFLA, being an international forum, proposed its own accreditation guidelines.

Accreditation Guidelines

When we take an inventory of the accreditation guidelines of these three agencies, following common ingredients are identified: the context of the program,

institutional support, and relationship with the parent institution; mission, goals and objectives; curriculum, faculty and staff: research productivity; students; administration and financial support; instructional resources and facilities; and regular review of the program, the curriculum, and the employment market.

Pre-Accreditation

Identification of core competencies of the graduates precedes review and analysis of the employment market. ALA had initiated definition of core competencies in 1999. The draft was presented to a number of committees and conferences for review. In 2005, the exercise resulted in a document that outlined core competencies. McKinney (2006) used these statements for examining the curricula of accredited, accreditation-candidates, and pre-candidates. The core competencies identified included professional ethics, resource building, knowledge organization, technological knowledge, Knowledge dissemination, life-long learning, inquiry, and management.

IFLA guidelines also provided eleven competencies, in a more detailed and comprehensive manner. These included information environment, information policy and ethics, the history of the field; information generation, communication and use; assessing information needs and designing responsive services; the information transfer; organization, retrieval, preservation and conservation; research, analysis and interpretation; applications of information and communication technologies (ICT); library and information products and services; information resource management and knowledge management; management of information agencies; and quantitative and qualitative evaluation of outcomes of information and library use.

The IFLA profile of needed capabilities among professionals is detailed and may usefully serve as a yardstick for assessing quality assurance for LIS programs.

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│              Accreditation Problems               │
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│        •  Non-availability of funds               │
│        •  Limited understanding of the need       │
│        •  Lack of experts                         │
│        •  Logistic issues                         │
│        •  Resistance form the stakeholders        │
│        •  Fear of exposure to external agencies   │
│        •  Bureaucratic inhibitors                 │
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Accreditation Process

One important aspect of accreditation programs is the conduct of self-study. In this process of self-study, abundant documentation is needed before the accreditation team arrives. The process requires that the schools engage in an intensive exercise, which entails dialog and collaboration with many stakeholders such as faculty members, parent institution, professional bodies, students and alumni, accreditation body, and other schools and programs in the region (Miwa & Miyahara, 2015; Rehman, 2008; Tammaro, 2005; Tammaro, 2007).

Contextual Variation

The situation of library education varies from region to region. Many regions have attempted to develop a model of accreditation for Southeast Asian

nations (Khoo, Majid & Chaudhry, 2003). They gathered data from 14 LIS programs in five countries. They proposed CONSAL, a regional professional forum in Southeast Asian region, as an appropriate agency for accreditation. Many problems were perceived to be hindering any possibility of formal assessment. These were related to non-availability of funds, limited understanding of the need, lack of experts in developing and implementing accreditation, logistic issues, resistance from the LIS programs, fears of these programs to be exposed to external agencies, and the bureaucratic inhibitors.

Southeast Asian Context

Southeast region has seven nations; India, Pakistan, and Bangladesh being the largest. Sri Lanka is the fourth largest nation in this comity. This researcher examined if any of the seven nations had instituted any formal exercise of accreditation. Just like their counterpart of East Asia, none of them has formalized any structure thus far. In India, as of 2006, about 120 Indian universities were expecting to be offering bachelor's degree, 78 Master degree, and another 21 2-year integrated Master degree in library and information science. Additionally, 63 Ph.D. programs were also found (Sarkhel, 2006). He stated that the University Grants Commission (UGC) was responsible for monitoring higher education in India. The UGC had established National Assessment and Accreditation Council (NAAC), which pursued institutional and departmental accreditation. However, this body had not initiated any activity for the LIS education programs. Singh and Shahid (2010) also stressed the need that the Indian UGC needs to be proactive in introducing curricular frame and guidelines.

In Pakistan, nine LIS programs are offering Master's degree and post-Master programs. Eight of them are functioning in public sector. Rehman

(2016) noted that LIS education in Pakistan is facing an issue of quality of its graduates, as many graduates may not satisfy minimum criteria of professional credentials for their practice. He observed that the role of the professional association in the assessment of LIS education might not be practical, keeping in view the objectives, history, role, norms, profile of leadership, and constitution of Pakistan Library Association. Likewise, National Library does not have the role and capacity to assume any such role. Now the higher education lies in provincial domain and an entity at the federal level may be unable to assume regulatory role. Rehman (2016) found that since Higher Education Commission (HEC) of Pakistan had certain leverage on universities in the country, it might be considered as a viable option. HEC has also been an advisory body for the design of curricula and it has made major contribution to the development of faculty. In the field of LIS, it has played the role of an advisory body for the structure and content of Master's degree. HEC has been active in maintaining quality assurance in Pakistani universities. One of its divisions has been responsible for accreditation, equivalence of degrees and evaluating academic aspects using certain broad criteria in order to secure quality assurance among universities. They have applied *institutional performance evaluation standards* in these universities. The HEC also conducted a meeting of professional accreditation councils in the country. Though these initiatives are encouraging, yet these fall short of any systematic examination of LIS education in country.

Bangladeshi LIS

Islam and Chowdhury (2006) stated that in Bangladesh two universities offered B.A. (Honours) and M.A. in LIS and twelve institutes

offered diploma courses. Recently, some private universities were also offering diploma and certificate course in LIS. About five hundred LIS professionals were being produced from these educational institutions every year. But this number was insufficient to satisfy national needs. Also they were critical about the quality of LIS professionals as there was no system of quality assurance or systematic assessment. They also listed that LIS education in Bangladesh faced diverse problems of lack of infrastructure, scarcity of reading materials, inadequate faculty, inadequate research, lack of jobs and career development opportunities, and absence of national policies.

Status of AGCC Member Nations

The six nations of the Arabian Gulf Cooperation Council (AGCC) have similarities in linguistic, socio-politico-economic, and cultural domains. There are six members nations of the Gulf Cooperation Council (GCC), namely Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Muscat, and Bahrain. These nations make a homogenous unit and their educational policies and practices have similarities. Their economies are primarily petroleum-based.

In LIS education, Saudi Arabia, Kuwait, Oman, and UAE have formal degree programs for the education of professionals. Saudi Arabia has six LIS schools, located in four universities, offering both undergraduate and graduate degree programs. Kuwait University has a graduate degree program and an undergraduate minor in information studies and the other program of Public Authority for Applied Education & Training (PAEET) in Kuwait produces undergraduates with LIS degree. Sultan Qaboos University has both undergraduate and graduate degree programs. Range of graduates of undergraduate programs in

this region is broad; producing 100-300 graduates a year. There is a wide diversity in the graduate programs and products; all are research-based except Kuwait University.

Review of pertinent literature, input of academics, and insights of this researcher have been used for developing a proposal for introducing accreditation in this region. The same approach is used for discussing obstacles and possibilities for addressing them. It was found that with regard to the self-study, the activity was focused on strategic plan, students, curriculum, student evaluation, faculty, research output, academic management, computing facilities, library resources, market needs, and survey of graduates. Two schools reported that they had covered all the listed aspects. Kuwait University had to prepare a report before the visit of the external reviewer every four years. In Saudi Arabia, three universities conduct self-study regularly. Two LIS programs did not report any activity. Focus of self-study varied from program to program.

About half of the LIS programs in the region practice external review. Five schools used external expert for review. Selection of the expert was done internally. Experts were expected to submit both oral and written reports. LIS programs were expected to record their feedback on these reports. External reviews of two LIS programs covered curriculum only.

Perceptions about Accreditation

It is pertinent to examine faculty views about accreditation. All the respondents responded affirmatively that they wished to have accreditation in place. About accrediting agency, the respondents had different views. These may be summed up as follows:

1. A regional body

2. A forum under the consortium of AGCC universities.

3. Units in ministries of education in the six nations.

4. A forum of the LIS programs in the region.

5. An accreditation body working under the auspices of IFLA

Rehman viewed that use Last of IFLA as a probable accrediting agency might have pros and cons. On the side of cons, sensitivities may abound about experts, autonomy, local idiosyncrasies, issues, prerogatives, etc. On the pros side it is an established forum, it may have dedicated staff and place, it already has elaborate guidelines, and it may work with local professional bodies. All the LIS programs in a given region may become its institutional members. In order to work out details of this option, stakeholders need to be involved. One possibility is that IFLA may develop specific framework and pools of experts for any region. In the situation of this region, IFLA may work with a regional forum of academics of the region. A model thus developed may be replicated in different regions.

Developing Accreditation Programs

Once the accrediting agency is in place, it should engage senior academics to draft standards, guidelines, instruments, and processes. Detailed documentation needs to be developed. Appropriate adjustments and customization would be desirable for regional needs as proposed in the preceding section. There appears to be a common core of the elements that are to be evaluated in the accreditation process. One of the challenges is the formation of pools of experts or accreditation teams. The appointment of a member could be for a certain period. A viable possibility is that the team should have some eminent educationists from each region and about as many members might be picked from the international market.

This might be a sensitive issue for the academic departments, but the practices of ALA, ALIA and CILIP might provide guidelines.

In Nutshell

We have noted that the policies and practices of evaluation largely vary in the LIS programs. These schools are using evaluation outcomes for improving their academic programs and curricula in different ways. Using self-study or external evaluation is widely practiced. Yet, these efforts have been valuable, yet these do not provide a common ground for standardized practice. It largely varies how different programs conduct evaluation exercise in terms of objectives, strategies, instruments, outcome and application.

There prevails a general understanding that uniform policies may be adopted for student intake, acceptance, credit transfer, and employability among these LIS schools. Quality assurance requires that there should be common parameters for achieving the cross-acceptance of degrees in the region. What might be the most credible for achieving this objective is to introduce systems of accreditation, which is quite a challenging task, but it will surely bring prestige, status, and respectability to the LIS programs.

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Chapter Four

DOCTORAL STUDIES: DEVELOPMENT AND DESIGN
Sajjad ur Rehman

Since we entered mid-19th century, graduate studies have been widely offered in academia, both in European and North American continents. Traditions of higher education and conferring higher degree were strong in Europe in general and Germany in particular (Diehl, 1978). Until well into 19th century, scholars proceeded to Germany for 1-3 year training. Graduate studies in the US were founded after 1850; Yale offering first ever Ph.D. to three scholars in 1961. By the 1890s, Harvard, Columbia, Michigan and Wisconsin had developed major graduate programs, whose alumni were hired by research universities. Later graduate studies flourished and 382 scholars (about 10% were honorary degrees) were awarded Ph.D., mostly in the East Coast universities of the States (Diehl, 1978; Geitz, Heideking & Herbst 1995).

This development can be befittingly related to the development of academic and professional advancements in the domains of knowledge and practice. These movements have a lasting impact on the way the society has evolved around these advancements during the last couple of centuries. Ph.D. is the highest academic degree awarded by universities throughout the world in almost every academic field. Ph.D. is admittedly the license for entering academic cadres in universities and getting promoted to the highest ranks and academic positions. However, wide diversity is found in structural specifications, enrollment patterns, course content, graduation requirements, and career aspirations.

Why Ph.D.

Credence in research is manifest in the degree a student receives after going through intensive indoctrination spread over 3-5 years, as a norm. The commitment is life-long and has to be undertaken consciously, earnestly, and seriously. Figure 1 displays personal, professional, and academic factors that prompt an individual for making this major commitment in Ph.D. studies.
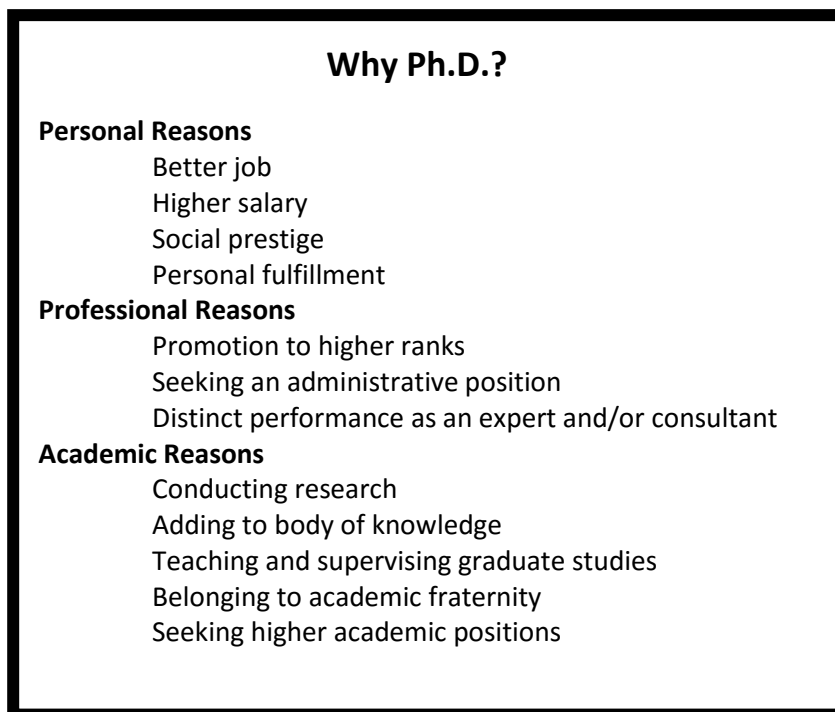
Why Ph.D.?

Personal Reasons
    Better job
    Higher salary
    Social prestige
    Personal fulfillment
Professional Reasons
    Promotion to higher ranks
    Seeking an administrative position
    Distinct performance as an expert and/or consultant
Academic Reasons
    Conducting research
    Adding to body of knowledge
    Teaching and supervising graduate studies
    Belonging to academic fraternity
    Seeking higher academic positions

Figure 1: Why Ph.D.

Ph.D. Studies

Ph.D. degree is admittedly a gateway to an academic career in universities worldwide. In every academic discipline, a number of Ph.D. programs offer flexible policies and processes for enrollment, conduct, examinations, research output, and wider dissemination of research reports. As we will review Ph.D. studies in LIS minutely, it is conceived that, in general, students face success or failure in their pursuit of Ph.D. studies. In Figure 1, we have outlined attributes that every successful candidate might have experienced in the course of Ph.D. studies.

Recipe for Success
Clarity of goals and career path
Motivation and commitment
Right selection of school and supervisors
Intimate socio-intellectual circle
Intensity in the conduct of research
Publishing during and after studies
Handling pressure
Post-doc engagement
Managing/participating in funded research
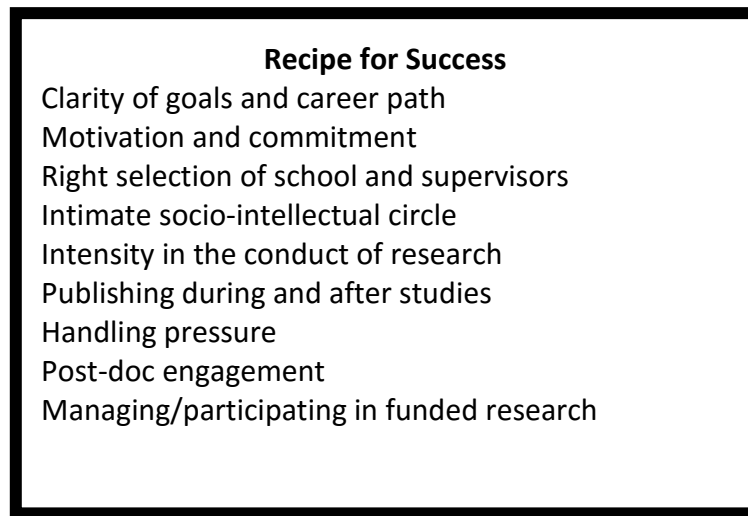
Figure 2: Recipe of success

Development of Ph.D. in LIS

Publication of Williamson Reports (1923), sponsored by the Carnegie Foundation, caused fundamental shift in the education of LIS, notwithstanding the current use of the term. We moved from vocational training to technical and then subsequently professional education in academia spanning through the following many decades (Bobinski, 1986; Hayes, 1986; Rehman, 2000; Robins-Carter & Seavey, 1986).

Melvil Dewey designed early tradition of training programs in the academia of Columbia College and Albany School. Albany School awarded first Master's degree in 1905 (Robbins-Carter & Seavey, 1986). These programs produced training programs, awarding varied degrees and the ALA had constituted a Committee for overseeing these programs and their productivity. We witnessed undergraduate degrees transforming into Master in library science. A concomitant advance was the introduction and implementation of Ph.D. degrees; Chicago School being the pioneer opening this degree and awarding a Ph.D. in 1930 (Bobinski, 1986). Doctoral studies have been instrumental in giving the vocational programs of library economy into an academic, theoretical, and intellectually rich field of practice. This has heralded a movement of change and transformation, manifest in the labels and movements of library science, library and information science (LIS), and iSchools being a general umbrella for an over-encompassing field, interacting with diverse disciplines.

Graduate studies, as conceived in the North American tradition, covers degrees for Master and Ph.D. studies. Graduate studies are founded on the undergraduate program of studies and the LIS education is no exception to this norm. The difference is that the early bachelor degree of library science was later replaced by 6- and 5-year Master's studies and the foundation degree was preferred to be in any subject of natural, social and human sciences. The movement has been gradual and incremental, yet before 1960s graduate education was the only degree accorded

professional status and identity. ALA's accreditation practices have also evolved concomitantly and an ALA-accredited Master's degree has been an established credential for entry into professional cadres of LIS profession (Hayes, 1986). Since graduate studies are treated as naturally and innately akin, it is essential to examine evolution of Master's studies.

Master's Studies

Albany School had awarded 11 Master's degrees when it was a post-bachelor vocational education between 1905-26 (Robins-Carter & Seavey, 1986). These graduates were required to have a 5-year internship in library work and contribution of a research paper.

As an influence of Williamson Reports (1923), a number of universities assumed the role of offering Master's degrees, notably Columbia, Michigan, Illinois, California, Toronto and few others. With regard to number of graduates, a measure of wider visibility and influence, Michigan produced 466 graduates, followed by Columbia (436), Illinois (332) Chicago (138) and California (90). *Library Trends* published an issue on LIS education in 1986, and Robins-Carter & Seavey's paper provides detailed treatment of the curriculum, content, degree requirements and other details of Master degree.

Ph.D. Studies

It had been conceived, following an intensive engagement on a new paradigm for library education, that the shift to an academic context necessitates the development of Ph.D. studies. As Chicago School opened its doors, it envisaged its Ph.D. studies, awarding the degree in 1930. Danton (1959) conducted a comprehensive survey of PH.D. studies from its

beginning. It also analyzed enrollment and graduation patterns, areas of studies, use of research methods in thesis research, and other aspects of management. Bobinski (1986) conducted an intensive analysis of the evolution of doctoral studies from its early days of inception through 1980s.

Interestingly for more than two decades, Chicago remained the only school offering Ph.D. and awarding 65 degrees, followed by 1948 openings at Illinois and Michigan. Columbia, Case Western, and Berkley started during 1952-55. Then nine schools started offering Ph.D. during 60s and as many during 70s. Six schools initiated Ph.D. in 1969 and 1970. This is the era of boom in the award of Ph.D. Six of these schools closed down in 80s including Chicago, Columbia and Case-Western—listed as top-ranking programs. Paris (1991) analyzed the demise of these schools in her qualitative study. Saracevic (1994) analyzed the phenomenon, alluding to the yardstick of accreditation. ALISE (Association of Library and Information Science Education) keeps yearly statistics for enrollment and Ph.D. enrollments were in the range of a total of 489-518 during 1979-84 in 23-24 doctorate awarding programs. Those who received doctorates ranged 11-40 during 1961-69 whereas a significant increase was evidenced during 1970-81 with a range of 64-135. It is significant that the number of graduates exceeded 100 during 73-80. Only two years marked 97 and 98. Four of these schools—Chicago, Michigan, Columbia and Illinois produced more than half of the dissertation research. Pittsburgh had a much larger share as it posted 56 dissertations during 1980-84. The same period had a total yield of 345 doctorates in 24 schools. Interestingly, Library science doctorates were merely.55% in 1982 out of doctorates awarded in various fields in the US (Bobinski, 1986).

Schlachter & Thomison (1974; 1982) surveyed methodologies used in dissertation research during two periods of 1925-72 and 1973-81. Survey emerged to be the leading method of 44 and 56 percent in the two respective phases. There is only one distinct difference that historical method dropped from 30% to 15.4%. Experimental research (4 and 5.3%) and theoretical method (2.1 and 3.2%) were dismally low in both the periods. Use of operations, citation, and content analysis had some marginal variation. Seemingly research methods used in doctoral research did not exhibit any drastic change until 80s.

Abrera (1988) analyzed a body of doctoral dissertations of 1960-80. In a way it extended Danton's work of 1959, in a complementary fashion. She analyzed 61 dissertations for admission, courses, competencies, degrees, examinations, committees, faculty, recruitment, objectives, history, ranking, and contribution to the profession, and issues and problems. She also analyzed statistical data, subject/topic methodology, length of time to complete, published format, citation patterns, value/importance, and shortcomings.

Whitbeck (1991a) surveyed 16 doctoral programs, addressing a number of academic and administrative aspects of these programs. He focused on admission criteria, application of these criteria, prior experience of students, amount of time taken in completion of studies, and the administrative and academic problems doctoral students faced. In a subsequent study, published in 1991b, he explored perceived problems doctoral students faced, criteria for admission, curricular trends, and the employment opportunities.

Sugimoto, Rusell & Grant (2009) studied largest span of 3,014 dissertations completed in 38 schools between 1930-2007. They discussed changes in the research landscape in ten years, in addition to an evaluation of schools that produce future faculty for ALISE institutions. Results confirm the health and activity of LIS doctoral programs in North America. Out of 39 programs, 7 had ceased working. Four schools, at the bottom of the productivity ranking, produced little research. About 70% of dissertation research was done in eight schools that survived the wave of closings in 1980s. Names and number of dissertations of these schools are: Pittsburgh (358), Rutgers (243), Florida (217), Illinois (186), Michigan (167), Indiana (165), North Texas (144) and UC at Berkeley (101). The authors also noted that eight of the ten top-productive schools were part of the iSchool movement.

It is a matter of surprise as well as a sign of fundamental transition that almost all the 'LIS doctoral programs' have joined iSchool movement. Most of the founders of the iSchool caucus were deans/directors of earlier 'library schools.' This transition's most striking features are multi-disciplinarity, interdisciplinarity, broad-based disciplinary orientation, and adopting wider folds of information and knowledge sciences. iSchools website pronounces the claim of "connecting people with information by designing, developing, , and evaluating information technologies, systems, , and services." iSchools included the disciplines of library science, communication, computer science, and information systems (Mokros, 2008).

Jaeger, Golbeck, Druin & Fleischmann (2010) analyzed the status of iSchools and proposed that there was a need to encourage information

sharing and communication among faculty and students of iSchools. They expected that the remaining LIS programs would join this movement.

With regard to admission requirement, an accredited MLS is a standards practice. Also a large number requires GRE score and conduct in-person or phone interviews (Whitbeck, 1991b). Ph.D. students are generally keen to find those doctoral programs where they can find coursework in the intended area of specialization and faculty members who had specialized in these areas.

Current State

Ph.D. has been an integral arsenal of LIS education during the last 90 years. Some leading schools demised during 1980s, facing a number of challenges (Paris, 1991). A majority of the schools offering Ph.D. have been consistently functional and productive for more than 50 years. Changes in the content and conduct have been noteworthy since iSchools have assumed new role and identity; making them more prominent, visible, and engaging. None of the leading programs has faded out recently; indicative of their general health and robustness.

The demand for doctoral programs in the job market is increasing due to the changes in the organizational structures. LIS professionals have an important role in developing research and doctoral programs. Powell, Baker and Mika (2002) noted that these professionals have to read research journals and research-based articles and about half of them apply research results to their professional work. Fleming-May & Yuro (2009) found that academic librarians also had a role to assist doctoral students for the

development of their research facilities such as databases and online catalogs.

Attrition: Situational Realities

One of the issues has been attrition in Ph.D. programs. Gardner (2009) reported that in many cases almost 50% of doctoral students withdraw from the doctoral programs due to different challenges and reasons. Lovitts and Nelson (2000) stated that student's attrition might be attributed to poor relationship with the faculty advisor, the lack of integration into research community, and socialization factor. D'Andrea (2002) indicated that there are many obstacles that students face in completion of the doctoral degree in planning and writing research proposal, working independently, and financial and personal-relationship pressures. Doctoral students' advisors need to guide the students to develop their skills in critical thinking, research design, and dissertation planning and writing. Ehrenberg et al. (2005) identified additional factors that influence doctoral students' graduation probabilities including the absence of summer courses and advanced seminars while some students are unclear about faculty and advisor's expectations. Austin (2002) referred to public skepticism, demands for accountability, fiscal constraints, new technologies, diversity in student body, the increasing emphasis on learning over teaching, the emergence of postmodern ways of knowing, and dramatic shifts in the nature of faculty

> **Attrition: Reasons**
>
> Poor selection of school
> Confusion about structure
> Personal, familial and social obligations
> Issues in developing research proposal
> Absence of supervision/mentorship
> Financial constraints
> Socio-cultural impediments

81

Figure 3: Reasons for Attrition

Smith (2009) identified personal factors impeding student success with regard to their relationships with significant others, family responsibilities, support systems, employment responsibilities, financial constraints, time constraints and overload. Organizational factors were related to student selection process, program structure, ineffective advisors, ineffective mentors, inflexibility of the program, and poor community relations.

Adams (2002) identified areas where doctoral programs could improve by paying attention to the new faculty members' needs for teaching and research, developing students' research programs, educating students about the reality of expectations in academic life, assistance in job search and pursuance of academic careers. Gardner (2009) observed that the main reason of success in the humanities and social sciences was the need for students to be self-directed. They need to have adequate funding and support. Also, the atmosphere of the department should give a sense of family and companionship.

Designing Ph.D. Programs

Market Needs

Stakeholders

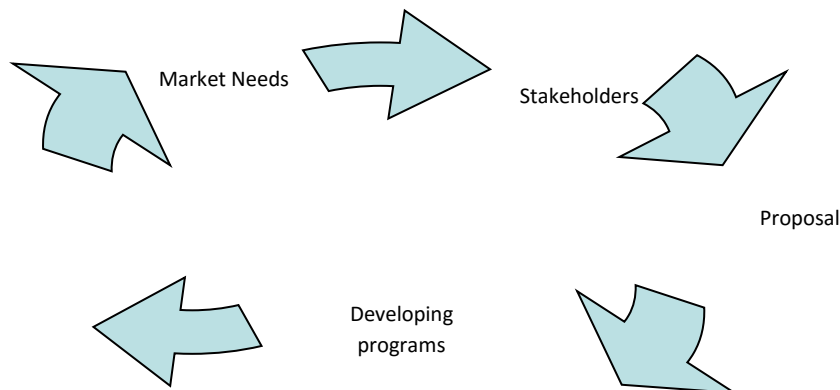Proposal

Developing programs

Figure 4: Design PhD

In this section, we will address the second segment of the chapter about designing doctoral program. Chapter 2 deals with the development of LIS programs. But Ph.D. studies have certain peculiarities that need to be addressed in particular terms. Design is contemplated around the steps of assessing market needs, developing proposal, converting proposal into a program of studies and implementation of the program.

In this section, we are considering as if a case is implemented in real terms. We will use it as a hypothetical case with a reality in view.

1. Market analysis and stakeholders

It is significant to analyze market needs. Stakeholders include the university, Master degree holders, alumni of LIS schools, professional community, faculty, employers, and corporate managers. The stakeholders could be wide, diverse and unwieldy. Approaching them and gathering pertinent could be challenging. Techniques for data gathering will 1nclude questionnaires, interviews, focus groups, reports and documentation. Demographic profiles of the stakeholders would clarify the compositions and attributes of the participants. Some possible areas for questionnaires and data collection may include as enumerated in Figure 5, a suggestive but not prescriptive proposition.
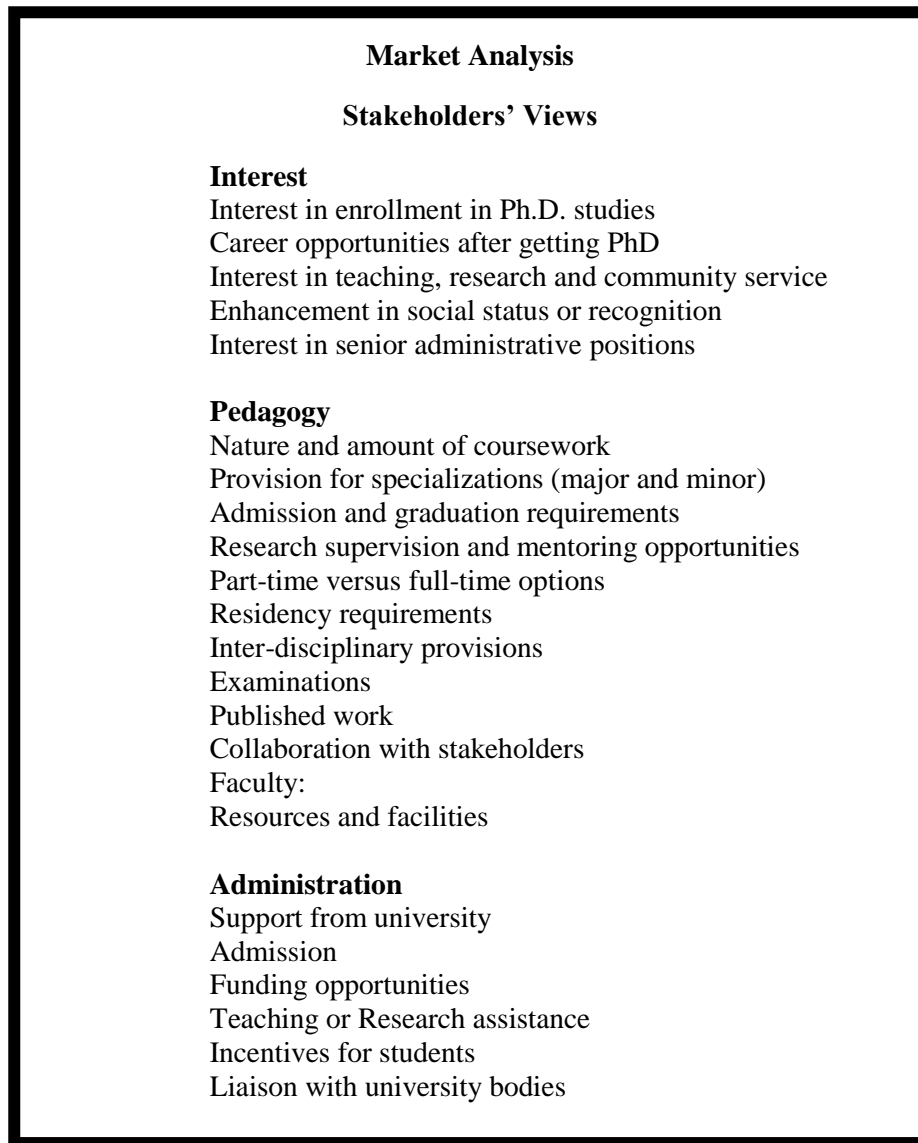
Market Analysis

Stakeholders' Views

Interest
Interest in enrollment in Ph.D. studies
Career opportunities after getting PhD
Interest in teaching, research and community service
Enhancement in social status or recognition
Interest in senior administrative positions

Pedagogy
Nature and amount of coursework
Provision for specializations (major and minor)
Admission and graduation requirements
Research supervision and mentoring opportunities
Part-time versus full-time options
Residency requirements
Inter-disciplinary provisions
Examinations
Published work
Collaboration with stakeholders
Faculty:
Resources and facilities

Administration
Support from university
Admission
Funding opportunities
Teaching or Research assistance
Incentives for students
Liaison with university bodies

Figure 5: Stakeholders' Views

The results of these assessments may be substantial and valuable in the process of the design of the PhD proposal. Most stakeholders are expected to have insightful input.

1. Proposal Development

Next logical step is developing proposal. A proposal has many segments, but market analysis and stakeholders' input are the primary movers and prompters.

The document is expected to have the following elements:

1. Background: There is a need to introduce the context, rationale and essence of the report.

2. Vision and mission statements: The statements should integrate with social and institutional milieu; delineating the primary value system and mission underlying the proposal.

3. Objectives: The statement should specifically outline the strategic objectives a Ph.D. proposal should achieve. The objectives are translated into tactical benchmarks.

4. Enrollment: The proposal should spell out general guidelines for incremental growth of the student body in about five year. Admission requirements need to be specified such as basic degree, minimum GPA, language, statistics, IT, GRE. Discussion about local and regional markets has to be added. Provisions for part-time studies also need to be explained.

5. Program Structure: Coursework—core/elective, and major/minor—have to be explained. Course titles and descriptions should indicate breadth and depth of specializations being covered in the program. Provisions for comprehensive or qualifying examination, defense of proposal, residency requirements, duration of program also need to be specified.

6. Dissertation research: Explanations need to be made about advisor

and advising committee, requirements of style and production, copyright, upholding of ethics, and requirement of published papers.

7. Faculty: An important segment of the proposal is about faculty members; their composition, size and expansions, research credentials, involvement in Ph.D. program, teaching load, etc.

8. Resources: The proposal should describe the facilities for teaching, laboratories, libraries, access to e-resources, seminar rooms, lounges, room for doctoral students.

2. Implementation

Final step in the cycle of developing Ph.D. programs is implementation the proposal. A proposal is developed keeping in view the indigenous context and circumstances. Requirements for the development of proposal also vary from place to place.

Implementation implies acceptance, adoption and adaptation of a proposal and its eventual implementation, keeping in vieww organizational structures and bureaucratic idiosyncrasies.

In the process of implementation, local academic administration and faculty members play a critical role. It is widely understood that part of faculty opposes whatever initiative is taken. Change is always resisted and faculty members are vocal in putting up strong opposition to any such idea. It sounds shocking that some academics take cover under the rubric of professionalism; countering research, theory development, and academic rigor. It is a reality of the academic life. Only strong academic leadership may be able to push through this initial phase. At his level, some mature

committee work may help in overcoming some of the challenges coming from inside quarters.

Graduate College on a campus is normally a proponent of a new program of higher studies, as it adds to their credit and credibility. Yet, divergent views come into play in committees, as many member are not as comfortable or considerate about a proposal from information or knowledge sciences. It is commonly felt that physical and applied scientists may not appreciate the value of soft and human sciences. Academic executives in graduate colleges may carry an influence in facilitating passage of the proposal.

Many factors play a role in getting final nod about the approval of proposal. Academic politics is a reality and it plays a big role in decision-making. One consideration is the availability of resources for a program. Support from outside university is always viewed as a vital consideration. Universities are keen if corporate world is forthcoming in financing economically viable programs.

In political dynamics different stakeholders are effective in playing a significant role. Professionals associations are in a position to exert influence on the decision-makers. Their voice, if heeded, may make the program responsive to the needs of professional community. They can also have some evaluation or self-correcting measures applied at the implementation stage. Alumni of a program abound in professional positions; some working in seats of influence. They have a stake in the development and implementation of the Ph.D. program.

In some countries, regional considerations also have a certain degree of influence. Ph.D. program in information studies at Nanyang Technological University selects students from many neighboring or

regional countries. Some regions are like one unit in geographic, linguistic and cultural aspects and any program of doctoral studies may serve the needs of a region.

Implementing a PhD program has its own demands and requirements. In many programs, attracting and enrolling potential candidates requires elaborate planning, proactive marketing, and extending incentives. It is always a concern in Ph.D. programs how supervision of dissertation research is distributed among senior faculty members. Doctoral Committees serve many functions such as admission, advising, distribution of course, and assigning supervisory roles. Quite justifiably, Ph.D. students have the liberty of choosing courses, area of specialization, supervisor, and conduct of examination.

It is common to appoint a professor as head of the doctoral committee. The Head and the committee oversee general management and conduct of the Ph.D. program at macro-level. Individual students are expected to have the flexibility and freedom in making significant decisions. No singly model provides panacea for developing and managing Ph.D. studies. Local and institutional imperatives are always supreme and binding.

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Chapter Five
INFORMATION ORGANIZATION
Abdus Sattar Chaudhry

Context

The terms 'information organization' and 'knowledge organization' are used interchangeably in this chapter. Knowledge organization is an important area in the field of information studies and is directly related to another important field, information retrieval that deals with the ability to locate information. Information and knowledge organization (IKO) focus on functions related to resource description and creation of bibliographic records. These records are considered backbone of information access and retrieval systems such as online public access catalogues in libraries and information centers.

IKO activities sometimes refer to subject analysis, indexing & abstracting, cataloguing, classification, etc. They are also mentioned with reference to standards and tools that are employed to perform IKO functions, for example, cataloguing codes, encoding standards, classification schemes, controlled vocabularies, etc. In the digital environment, some new terms have become more popular, these include metadata, taxonomies, social tagging, topic maps, etc. There are slight differences in the scope and orientation of these activities when performed in different information environment, e.g., digital libraries, archives & records, information architecture, knowledge management, etc.

IKO definitions by well-known authors from the field of library and information science (LIS) are helpful in determining the scope of work in a given environment. Mitchell (2007) defined information organization as the process of describing information objects and preparing surrogates records. This process can involve the assignment of contextual metadata to documents, structuring of information objects, creation of indexes, etc. Hjørland (2008) defined knowledge organization comprising activities such as document description, indexing and classification performed in libraries, databases, archives, etc. IKO activities are performed by librarians, archivists, subject specialists as well as by automated systems. As a field of study, knowledge organization is concerned with the nature and quality of such knowledge organizing processes as well as the knowledge organizing systems used to organize documents, document representations, and concepts.

IKO area is an important element of training and education of information professionals - domain of the field of LIS. Courses taught on knowledge organization have used different titles, e.g., information/knowledge organization, cataloguing and classification, bibliographic organization, indexing and abstracting, subject analysis, controlled vocabularies, etc. Recent developments in digitization and disciplinary shifts are making re-thinking necessary in information education including knowledge organization.

Bronstein (2006) reported that trends in LIS curricula around the world were changing and focusing more on user oriented approaches. Hjorland (2013) commented that the knowledge developed by LIS community ought to be amply applied and adapted for the digital environment. He emphasized

that the potential of faceted classification could be exploited for effective organization of digital collections. He suggested that changes were necessary in the area of knowledge organization to respond to digitization.

Chaudhry (2015) reflected on the scope and focus of the area of knowledge organization in IS programs with an objective to examine if the teaching of knowledge organization was in line with the evolving areas of expertise required of today's information professionals. He stated that knowledge organization had always been a main area of focus in the field of information studies (IS). He highlighted that in the traditional environment, knowledge organization work was exclusive to trained information professionals. User participation in this work has become a reality in the wake of social media and digital information imperatives. He suggested that IS educators need to redirect their thinking about knowledge organization work keeping in view the interdisciplinary shift, digitization, and social implications of information use. He also asserted that careful strategies would be necessary to integrate new topics in the existing curricula.

Chaudhry (2016) highlighted that knowledge organization also needs to change from strict adherence to standards and procedures to flexibility, use of multiple systems, and interoperability rather than rigidly following one system. Similarly, leveraging of collective (social) knowledge by allowing users to contribute towards knowledge through social tagging will be important in courses targeted to digital environment. Changing emphasis from use of tools to build and construct systems to suit specific organizations and environments will also be important consideration in IS curricula. Imperatives of the new environment make it necessary to develop competencies of knowledge organization with flexibility, openness, and a sense of entrepreneurship.

IKO is a core competency of professionals graduating from IS programs. Courses in this area are taught in a special context of information institutions: facilitating access to special collections for defined groups of users. It is also expected that IKO functions are performed using international standards of description to facilitate exchange of bibliographic records between information institutions. These standards are employed through specialized tools designed for specific functions: bibliographic tools such as Resources Description & Access (RDA) and subject analysis tools, such as classification schemes and controlled vocabularies. Figure 1 displays a framework of for IKO work in the field of information Studies.
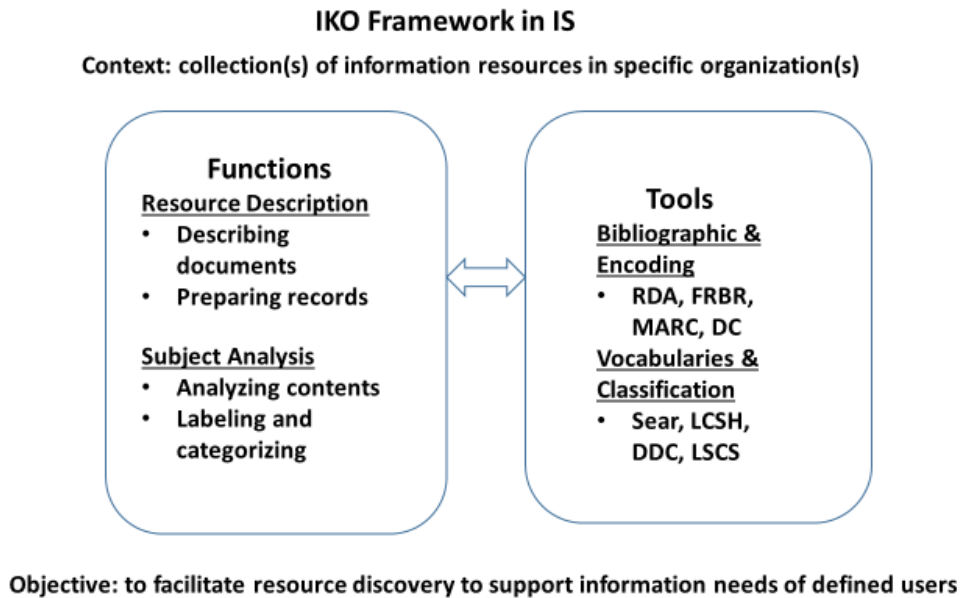
Figure 1: IKO Framework

While basic principles and practices remain the same, focus and scope of IKO activities vary slightly to suite specific information environment. IKO focus on descriptive and subject cataloguing in libraries and information centers and is targeted to produce online catalogues. In archives

& records, IKO activities focus more on producing finding aids, requiring additional details in bibliographic records. The indexing and abstracting aspects of IKO are emphasized more in the publishing environment. In digital libraries, taxonomies, categorization, and metadata are given preference and IKO work is aimed at aiding the navigation of repositories, portals, and other online sites.

This chapter provides guidelines for educators in curriculum design for IS programs keeping in view the broader scope and wider context of IKO activities. Main topics encompassing the substance of the IKO area are listed and strategies are proposed for coverage of these topics and their placement in appropriate courses. The chapter also provides suggestions in adopting teaching approaches more appropriate for the digital environment. Brief descriptions of selected teaching resources are provided with suggestions for their use in different type of IKO courses.

The targeted audience of this chapter are IS educators. The chapter will also be a useful source for practicing professionals involved in continuing education of information analysts. Issues raised and suggestions put forward are expected to be helpful in curriculum design and teaching courses keeping in view the imperatives of digitization and networked resources. While there is no intent to provide detailed description of concepts, methods, and tools; references are given to basic sources that will be helpful to gain further information on important IKO aspects.

Main Elements of IKO

IKO courses in the traditional environment covered the topics that focused on preparing catalogue cards and bibliographies of information

materials and the focus changed to include more topics related to conceptual issues. This progression has taken place in accordance with the development of the IS field. Some basic topics could not be dropped from these courses as these were needed for building a foundation. As a result, these courses became overcrowded (Chaudhry, 2010). Asghar and Rehman (2011) reported that the most frequently listed IKO modules included topics related to organization processes; controlled vocabularies, and public access catalogues. Latest IFLA guidelines on competencies for information professional listed the knowledge organization under information resource management to include organization, processing, retrieval, preservation and conservation of information in its various presentations and formats (Smith, Hallam & Gosh (2012). In a recent study, Al-Ajmi and Rehman (2016) reported that the majority of course content being taught in LIS programs focuses on the traditional functions of classification, cataloging, indexing, and bibliographic control. New modules, such as taxonomies, ontologies, and thesaurus, are not yet heavily emphasized in the coursework. Earlier studies have pointed out that stakeholders and employers view knowledge organization education, and more specifically core cataloging competencies, as being valuable for entry-level information professionals (Gathegi and Mwathi (2007) Hudon and Guitard, 2013). These findings suggest that new systems and tools related to IKO work are not being covered comprehensively.

A review of the above-mentioned studies indicate that IKO courses taught in LIS programs provide coverage of the following topics in most of the courses: bibliographic control, classification, metadata, and subject access and vocabulary control. There is, however, a great variation in topics covered. Several other studies have also surveyed the main topics being

covered in different IS programs. Notable among these studies are: Lasic-Lazic, Slavic, and Zorica (2003). Saumure and Shiri (2008), Pattuelli (2010). While a diversity prevails, the substance remains more or less the same. Based on these studies, main elements of IKO represented by the topics covered in LIS programs can be summarized as shown in Figure 2.

1. Key concepts and fundamentals: definitions of relevant terms and review of history and development of bibliographic control systems
2. Resource description: methods for describing documents and principles of determining access points
3. Authority control: guidelines for establishing forms of heading and mechanism for consistency and uniformity
4. Bibliographic tools and techniques: frameworks for preparing bibliographic records and guidelines for contents of these records (ISBD, RDA, FRBR, FRDA)
5. Encoding of bibliographic information: MARC formats and alternatives such as metadata standards (Dublin Core, LOM, etc.)
6. Bibliographic utilities and other bibliographic support systems: pools and sources of records and automation systems for creation of bibliographic records (OCLC and other similar systems)
7. Principles and practices of subject analysis: classification & categorization and indexing & abstracting
8. Knowledge organization tools: controlled vocabularies, classification schemes, taxonomies (examples of frequently used tools include (LCSH, LCCS, DDC).

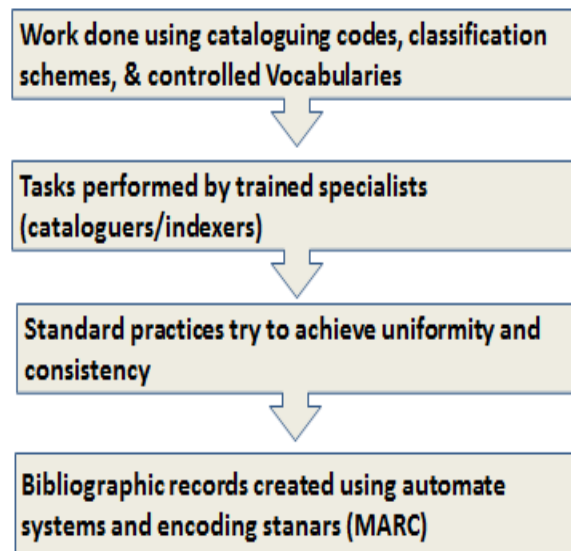*Figure 2:* Elements of Information and Knowledge Organization

The topics listed in Figure 2 represent broad areas that are expected to be covered in all education and training programs designed to prepare information professionals with proper understanding of role of IKO. But all the listed elements are not necessarily to be taught in all programs. The coverage will depend on the orientation of the program and the placement of topics will vary in accordance with the program structure. A desirable objective is to expose all graduates to most of the topics through core and elective courses. Selection of topics and their placement in relevant courses

is also expected to keep in view the transformation of IKO activities as a result of changes in the work environment.

Effect of Transformation of IKO

Professional practices were transformed in line with the development of technologies, tools, systems and standards in the field of IS. Chaudhry (2010) reported that introduction of library automation systems made it possible to create MARC records using computerized systems. As a result, most IKO work was done by para- professionals instead of trained cataloguers and indexers. This caused a sort of de-professionalization of IKO. This progression appears to be a natural and logical result of changes in the work of information institutions and expectations of end users. This trend was reversed with the introduction of digital libraries where IKO work made a comeback. Figure 3 shows how transformation of IKO activities influenced the focus of curricula.

Figure 3: Transformation of KO Practice

Work done using cataloguing codes, classification schemes, & controlled Vocabularies

↓

Tasks performed by trained specialists (cataloguers/indexers)

↓

Standard practices try to achieve uniformity and consistency

↓

Bibliographic records created using automate systems and encoding stanars (MARC)

Studies indicated that changes in the course titles were also in correspondence with the changes in the field and the expected outcome. These changes were highlighted in a number of studies. Morgan & Bawden, (2006) reported this trend highlighting that having information organization skills was becoming fundamentally more important due to emerging demand for innovative information services in the digital environment. Survey of course contents by Pattuelli (2010) also showed that the contents of introductory courses mostly included bibliographic formats and standards and a variety of tools. In advanced courses the spectrum of topics was broader and included emerging areas and topics that have implications for electronic resources and digital libraries. Soergel (2008) also highlighted the introduction of new topics such as taxonomies, ontology, topic maps as result of changes in the digital environment. Aytac et al (2012) suggested merging of both traditional and emerging trends in the course curriculum in order to prepare information professionals for the digital environment.

Strategies for Coverage

There is a need to keep the basic topics and at the same time add new topics such as metadata, information architecture, taxonomies, ontologies, etc. This makes it very important to deploy appropriate strategies for placing knowledge organization topics in different courses. At the same time, strategies will have to be deployed to expanding skill set and competencies of information professionals to address the needs of the new environment. It will prepare information graduates to take advantage of the opportunities being made available with the initiatives of digital libraries and knowledge management systems. Chaudhry and Khoo (2008) reported variations in the level of treatment of such topics (introductory, intermediate and advanced). Introductory and overview type of materials are shorter and have less detail. Advanced materials are likely to be covered only in one course within a program. They also reported that knowledge organization topics are sometimes covered in other electives in information studies and knowledge management programs.

In a recent survey, Al-Ajmi and Rehman (2016) noted that a majority of information schools no longer require a fixed set of core courses dedicated to knowledge organization education. They observed that instead IS programs have expanded their elective offerings related to information and knowledge organization. The core courses have not vanished altogether, but the structure and character of curricular cores have changed. Information studies programs have diverse priorities, and these are reflected in how they formulate their cores. They noted that more than half of the information

schools surveyed do not consider information and knowledge organization worth including in the core.

A practical approach for IS programs could be that topics related to theoretical underpinning and conceptual frameworks are integrated in introductory or foundation courses that are expected to be taken by all students. It will help develop a general understanding among all information professionals about the role of knowledge organization activities in facilitating access and use of information. This type of knowledge is important in policy formulation and managerial decisions. Knowledge organization activities that focus on preparation of bibliographic records and use of relevant tools and techniques are more appropriately to be included in required or elective courses expected to be taken by information professionals preparing to work in library and information centres. For those information professionals who are planning to work in technical services areas, a second layer of elective courses focusing on advanced applications of specific tools, techniques, and methods will be necessary (e.g., use of classification schemes and resource description tools). Similarly, a second course in indexing and abstracting will be more appropriate for graduates aspiring to work in non-library information environments and a course on taxonomies and classification theory will be useful for professionals in digital information environment. A separate layer of specialized courses will be necessary for information professionals preparing to work in knowledge management positions. They need to focus on ontology, topic maps, taxonomies, information architecture, and other similar topics. Specialized courses targeted to these environments will be oriented to construction of tools and building of systems for navigation of organizational sites, such as websites, intranets, and portals. Specific placements of topics into courses

will vary according to the duration of the program and structure of the curriculum. In schools where more than one programs are offered, some topics may be appropriate in non-library programs.

Creative Use of Tools

In addition to placement strategies, use of knowledge organization tools in an innovative manner is also necessary to keep these courses relevant to the digital environment. Inadequacies and need for re-tooling of knowledge organization tools have been pointed out by a number of authors. Rehman and Al-Ajmi (2017) pointed out that fundamental structure of basic tools is somewhat consistent with the older versions. For example, headings with single and double subdivisions, rules with an emphasis of ISBD specifying that our punctuation goes contrary to normal language usage. Similarly, insistence on a database structure of early 1960s is indicative that librarians have conveniently made systems suited for their needs, seemingly captives of some conservatism. This critical view is shared by Bhojaraju and Urs (2006). These issues tools need to be discussed in seminar classes.

While considerable changes have already been made in knowledge organization tools, there is a need to re-thinks about their approach and introduce some re-tooling to make them more useful to the new environment. For example, despite some shortcomings, controlled vocabularies and classification schemes have tremendous potential for building organizational taxonomies. Likewise, authority control guidelines provided in resource description tools could be of great help in content management on portals, intranets and repositories. But the realization of this potential will depend on appropriate placement of relevant topics and

teaching the use of tools with a different mindset. Some examples of using classification schemes and thesauri for building organizational taxonomies are provided in papers by Chaudhry (2008), Chaudhry, Wang and Khoo (2010), Khoo, Wang, and Chaudhry (2012), and Wang, Khoo, and Chaudhry (2014).

Model Courses

Keeping in view the challenges discussed in the preceding section, some examples are provided in this section that can serve as model course template. Three examples are given that provide information on different components for designing a course. The first example is of a basic course, expected to be offered as a required course. The second example is of a specialized course, to be offered as an elective course targeted to students intending to work in libraries and information centres. The third example is of a specialized course, to be offered as an elective.

Example One
Basic Course on Information Organization

Description

This course provides an overview of the principles and methods of organizing information resources in different types of information institutions. The course introduces basic frameworks such as ISBD and FRBR and theory of developing cataloguing codes. It also covers standards and tools used to describe documents and to perform subject analysis for effective bibliographic control. The course focuses on practical steps for tasks of describing documents, determining access points, creating MARC records, assigning subject headings, and classifying documents.

Objectives

At the end of the course, students are expected to understand key concepts related to organization of information and knowledge; to become familiar with the tasks involved in resource description and subject analysis; and to learn using AACR, MARC, LCSH and DDC for bibliographic control

Basic Readings

This course can benefit from basic text books listed in the section on teaching resources. In addition, five information and knowledge organization tools (RDA, MARC, LCSH, LCCS, and DDC) may be helpful in developing practical skills.

Basic course, preferably as a core course to be taken by all students (the future information professionals). This course is aimed at providing an overview of most relevant concepts. The approach is to prefer breadth over depth. Students are exposed to all important tasks and activities related to information and knowledge organization. Though practice gets precedence but this is with an objective to learn principles by doing things. This overview will provide general knowledge so as to be able to participate in policy formulation and decisions related outsourcing of bibliographic work. This is no expectation that by attending this course graduates will be able to perform information organization work. They will require further training if they were to assignment responsibilities of performing technical work.

Example Two
Elective (specialized) Course on Cataloguing and Classification

Course Description

This course provides an in-depth coverage of practical and theoretical aspects of cataloguing and classification. It focuses on the application of major tools of descriptive cataloguing and systems of subject analysis for organizing information resources in a variety of formats. Theoretical foundations of bibliographic control systems and classification schemes are also discussed. Hands-on sessions focus on creating bibliographic records using international standards and tools with an emphasis on use of Anglo American Cataloguing Rules (AACR), Library of Congress Subject Headings (LCSH), and Library of Congress Classification Scheme (LCCS). Role of automation systems, bibliographic utilities, and organizational policies and procedures are also discussed.

Objectives

This course is aimed at developing an understanding of theory and practice of descriptive cataloguing, understanding the process of subject analysis, appreciation of theoretical underpinning of cataloguing codes, controlled vocabularies, and classification schemes, and building capability of application of bibliographic and subject analysis tools. In addition, this course is expected to focus on understanding the role of automation systems and organizational policies in cataloguing and classification

Instructional Approach

This course may be more appropriate as a seminar using a variety of instructional approaches. Student participation will be an important part of the learning experience. The lab and tutorial work will focus on the practical application of tools for cataloging of material in different formats. Tutorials should preferably be supplemented with take-home exercises. Some sessions should be assigned for student presentations (based on their term papers) and guest lectures (aimed at providing an overview of local cataloguing systems). This course requires equal emphasis on theory and practice. Students are expected to prepare written comments on assigned readings for class discussion. Examination should focus on theoretical aspects of cataloguing work.

Readings

This course will benefit from guides on bibliographic and subject analysis tools and guidelines prepared for bibliographic in special format of information materials. In addition, books focusing on theory of information and knowledge organization will be helpful in building a theoretical foundation in graduates.

The course proposed in example 2 is recommended to be conducted as an elective, a specialized course for graduates expected to work in library and information centers. These graduates will be expected to perform technical work without further training. Therefore, depth is preferred over breadth in this course. This is also reflected in the suggested readings. These readings are guidelines to use bibliographic and subject tools and course is recommended to be conducted as a seminar. Students will be encouraged to do extensive readings and prepare papers for presentations and ready to reflect on others' presentations. At the same time, they are expected to do more detailed practical work under the supervision of instructors and keep a portfolio of practical of work for assessment. Even though there appears some overlap (which is desirable) with the basic course but the actual difference is in the treatment, in-depth and more detailed coverage.

The proposed course is targeted to library environment. On the same pattern, IS program targeting other information environment, such as publishing and online database are encouraged to offer specialized courses on indexing and abstracting and subject analysis.

Course Description
This course provides an overview of knowledge organization systems. It covers the various schemes, services and structures for organization and discusses the principles and practices important in development and applications of these tools. Tools to be covered include controlled vocabularies, classification schemes, taxonomies, and ontology and topics maps. Course also covers metadata with an emphasis on discovery of information and knowledge. The application and use of tools and techniques are discussed in this course for organizing contents on intranets, portals, web sites, and repositories. The course emphasizes on building simple faceted classification schemes organizational taxonomies.

Objectives
This course is aimed at appreciate the role of organization of knowledge resources in leveraging the intellectual capital in an enterprise, learn about schemes and systems of knowledge organization such as controlled vocabularies, classification schemes, taxonomies, and metadata, and develop competencies to use knowledge organization tools for organizing contents on organizational sites: portals, intranets, and repositories.

Instructional Approach
This course takes a project centric approach. Students will construct a simple knowledge organization tool by choosing a system from the following types: vocabularies; classification schemes; taxonomies; or ontology. They can also select a knowledge domain of their choice (a subject area) and identify the type of organizational site for possible application of this tool (intranet, portal, web site, repository, etc.). Identification of domain and site is for providing a context for the tool. No special expertise in the subject area or technical knowledge about the type of site chosen is expected. Details about the steps to be taken for building the tool will be covered in detail in lectures and assigned readings. Assessment of projects will be based on oral presentations and final submission of written reports.

Readings
This course will be required specialized course materials. Only a limited number of books are available which are directly related to this course. Most readings will be drawn from journal articles and online resources. Some examples are listed in the section on knowledge resources.

Figure 5: Model Elective Course on Taxonomies and Metadata

The course proposed in example 3 is targeted to online information environment. Graduates are expected to focus more in specialized systems taking advantage of tools studied in basic information organization course. This will require a project centric approach. Students will be required to build knowledge organization tools such as personal or organizational taxonomies, specialized thesauri, etc. making use of the features of classification schemes and controlled vocabularies.

Most of the Information Organization courses in the four schools focus on teaching practical skills and are quite similar in the topics covered. Information Organization can also be taught from a theoretical perspective

(e.g. classification theory, and theoretical underpinning behind cataloging codes). Such treatments are found in courses at the advanced Master's or PhD level. The Knowledge Organization course in the KM program in Singapore also takes a more theoretical perspective.

It is notable that most topics and tools used are similar in all the three courses proposed. The actual difference is in the level of treatment (introductory, intermediate, and advanced) differs in the three courses. This approach implies different depth or level of detail. In the basic course orientation is introductory requiring less detail. In the advanced (specialized/elective) courses topics are likely to be covered in more detail. Information and knowledge organization is a pervasive issue in the IS field, and many courses in a program contain treatments of some aspects of information organization but with a different orientation and treatment. There is overlap between the courses in the coverage of information organization topics—some topics are covered in greater depth in one course but at an introductory level in another course. *Information Organization* and *Cataloging and Classification* courses cover Dewey Decimal Classification (DDC) in depth; the *Metadata and Taxonomies for Knowledge Organization* course has only a superficial, introductory treatment of DDC. Similarly, this courses cover metadata in some depth and more detail (while this is treated only briefly in the basic course *Information Organization*. Only introductory material for metadata standards is presented in the *Information Organization* course.

Educational Resource

Selection of education resources to support courses on information and knowledge organization is challenging. There are classic books about the history and development of bibliographic tools and systems that are already dated. Not many new books have been written in this area particularly on new trends in the field. Also, a single textbook may not suffice for a course. On the other hand all chapters of a selected book may not be relevant to the topics included in the courses. In most cases, additional readings from a variety of sources would need to be suggested to provide adequate support for the topics covered.

There are books on basic cataloguing and classification that are more suitable for library and information centers but may not be very attractive for students preparing to work for other information environment. For such students books on information and knowledge organization may be more attractive. These books may not include topics on basic bibliographic control theories which is still considered important for a strong foundation in information and knowledge organization. Also, non-book resources, e.g., websites and databases have become more important in these courses.

A list of selected teaching resources is provided in this section with some comments to provide a context for creative and innovative use of these resources for teaching information and knowledge organization courses.

Basic Textbooks

Chan, L. M. (2007). *Cataloging and Classification: An Introduction.* 3rd ed. Lanham, Maryland, Scarecrow Press.

Fotis Lazarinis. (2014). *Cataloguing and Classification.*

Harvey, Ross & Hider, Philip. (2004). *Organizing Knowledge in a Global Society: Principles and Practice in Libraries and Information Centers.* Waga Waga, NSW, Australia: Center for Information Studies, Charles Sturt University.

Taylor, A. G. and Joudrey, D. N. (2009). *The Organization of Information*. 3rd ed. Westport, Connecticut: Libraries Unlimited.

Books on Cataloguing and Classification

Hsieh-Yee, Ingrid. (2000). *Organizing Audiovisual and Electronic Resources: A Cataloging Guide. Littleton, Colo.: Libraries Unlimited.*

Chan, Lois Mai. (2005). *Library of Congress Subject Headings: Principles and Applications.*
Westport, CT: Libraries Unlimited.

Maxwell, Robert L. (2004). *Maxwell's Handbook for AACR2: Explaining and Illustrating the Anglo-American Cataloguing Rules through the 2003 Update*. Chicago: American Library Association.

Chan, Lois Mai;, Intner , Sheila S., and Weihs, Jean. (2016). Guide to the Library of Congress Classification, 6th Edition.

Moulaison, Heather Lea. (2015). *Crash Course in Basic Cataloging with RDA.*

Figure 7: Cataloguing & Classification

Books on Knowledge Organization Theory

Svenonius, Elaine. (2001). *Intellectual Foundation of Information Organization.* Cambridge, MA: The MIT Press.

Hlava, M. (2015). *History, Theories, and Concepts of Knowledge Organization.* San Rafael, California, USA: Morgan & Claypool Publishers.

Smiraglia, R. (2015). *The Elements of Knowledge Organization.* Springer International Publishing.

Books on Specialized Topics

Lambe, Patrick. (2007). O*rganizing knowledge: taxonomies, knowledge and organization effectiveness.* Chandos: England.

Willer, M. and Dunsire, G. (2013). Bibliographic Information Organization in the Semantic Web. Cambridge, UK: Woodhead Publishing Limited.

Zeng, Marcia Lei & Jian Qin. 2008. *Metadata.* New York, NY: Neal-Schuman.

Murtha Baca, e*ditor. (2008). Introduction to Metadata Version 2.0, Getty Information Institute.*

Figure 10. Books on Specialized Topics

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Websites and Databases

Biblioset
An open source metadata editor. Includes MARC records.

The Dublin Core Metadata Initiative
The Dublin Core Metadata Initiative, or "DCMI", is an open organization supporting innovation in metadata design and best practices across the metadata ecology.

Encoded Archival Description (EAD) Tag Library
It is the international metadata transmission standard for hierarchical descriptions of archival records. This tag library represents version EAD3 of the Encoded Archival Description schemas, released in August 2015.

Librarians' Toolbox
Links to popular OCLC resources. Includes a section on cataloging tools.

Cataloguing Aids Blog
A blog with links to cataloging aids.

WorldCat.org
Lets you search the collections of libraries around the world

Databases

Cataloger's Desktop
Almost 300 cataloging and metadata resources including the Anglo-American Cataloguing Rules (AACR2), Describing Archives, a Content Standard (DACS), Library of Congress Rule Interpretations, and Subject Headings. (Note: Contact the library for user name and password. New users will be asked to set up an individual account.)

RDA Toolkit
RDA provides a set of guidelines and instructions on formulating data to support resource discovery. RDA is a new cataloging standard that will replace the Anglo-American Cataloguing Rules (AACR). (New users will be asked to create a User Profile.)

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Considerations in Future Courses

Knowledge organization work in bibliographic control systems emphasized strict adherence to standards and procedures. Flexibility and compatibility instead of use of the same standards and formats by all organizations is desirable in the digital environment. Libraries and information centers focused more on use of tools and systems. In the digital

environment focus needs to shift to building tools and constructing systems to suit specific needs of organizations. Also, use of multiple systems and interoperability has become more desirable in the digital environment. Therefore, knowledge organization competencies are desired to be developed with flexibility, openness, and a sense of entrepreneurship. This will require a new mind-set and rethinking about the knowledge organization curriculum. Instead of focusing on tactical efforts such as encoding data in a particular way or applying a cataloging standard, the presentation will emphasize a holistic approach to organizing information and knowledge in order to support research, decision making, and information use.

Traditionally, knowledge organization functions were performed focusing on collections of libraries and information centers. In the new environment, personal information management has also become important and necessary to be addressed by information professionals. Change in context from institutions to individuals will require adding new competencies for information professionals. They have to learn how to construct the tools and design systems to go beyond library collections and focus on facilitating personal information management.

Change in context also desires a major shift requiring work in a collaborative environment where users will contribute to knowledge organization work instead of monopolistic environment where IKO work was exclusively done by trained professionals. Leveraging of collective wisdom and social intelligence is becoming practical requiring user contributions through social tagging, etc. Khoo (2011) suggested that in the changed context, knowledge organization would have to be taught with a different mind-set to address the challenges of the digital environment. He

proposed to develop theoretical thinking, acquire a multidisciplinary perspective, exploit faceted classification, and explore theories from other fields, e.g., cognitive psychology, anthropology, and computer science.

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Chapter Six

BUSINESS INFORMATION

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This chapter provides an overview of information sources and services related to the business community. The chapter is organized in two parts. The first section introduces to the concepts of business and business information and the second section covers main components of a business information course. These include information needs, information sources, information finding, and strategies for information support services. The chapter is concluded with suggestions for teaching business information courses. Among other things, examples of courses in universities worldwide are described and links to courses are provided. A list of books that can be used to support business courses is also given. The chapter will help understand the nature of information used by the business community; identification of information needs of individual or a group of businesses; familiarity with a variety of information sources in disciplines related to business; and knowledge of information sources relevant to the needs of clients from the business community.

Introduction to Business

What is a business?

A business is generally an organization engaged in producing goods and services to make a profit. It is an organization that combines inputs of labor, land, capital, and enterprise skills to produce outputs of goods and services

that satisfy customers' needs in order to earn a profit. Business organizations are structured in different forms of trade, commerce, craftsmanship, profession or any activity carried on for the purpose of gain. Business companies are also referred to as enterprises and firms. Business organizations range from small sole traders/proprietorships and partnerships to large private companies and public corporations. The following readings provide good information on business structures:

- Businesses http://en.wikipedia.org/wiki/Business
- Types of Business Organizations
  http://taxes.about.com/od/taxplanning/a/incorporating_2.htm

What is business information?

Business information relates to factors which have a direct commercial significance and generally includes information related to buying and selling of goods and services and the means through the application of economics and management techniques. In other words, anything the businessman requires to further the day to day running of his business will be business information. Business information assists in management and survival, increases knowledge, reduces uncertainty, updates existing information, aids planning, and increases controls. Research has shown that companies that value information as a competitive tool grew faster, earn higher revenues and are more productive than the others.

The following article provides an overview about business information.
https://en.wikipedia.org/wiki/Business_information

Information Needs

In this section, the information needs and information behavior of business professionals will be discussed. It is aimed at understanding the nature of information needed by business communities. Chaudhry and al-Ansari (2013) identified the following common categories of business professionals: financial advisors/analysts, fund managers, investment professionals, financial consultants; bank managers, business managers, entrepreneurs, etc. A variety of position titles are used in the literature representing a discipline or industry, e.g., accountants, real estate specialists, market researchers or other similar groups.

The term information needs in this chapter is used as an umbrella term. The other related or similar concepts expected to be used in the professional literature include information behavior, information seeking behavior, and use of information. Information behavior is a process to recognize a need of information, identify it, investigate, formulate search strategy, collect information and complete the task by using information. Skyrius and Bujauskas (2010) state that information behavior has three main components: information need, seeking, and use. Information needs are discussed at the cognitive level represented by questions or topics - need often arises when people are involved in such tasks as planning and decision making. Information seeking refers to a goal-oriented process to search for information to satisfy a certain need. Information use occurs when the recipient of the information processes that information within a larger social and cultural context (Wilson, 2000).

Information professionals should know how to determine the information needed, how to access the information effectively, and how to evaluate the sources to use the information ethically. At the individual level, the outcome of information use is a change of state of knowledge (increase, awareness, understanding of a situation), or a capacity to act solve a problem or make a decision. Information need is, in a way, recognition of inadequate knowledge to satisfy a goal, and information seeking as a conscious effort to acquire information in response to that knowledge gap.

Information behavior encompasses information seeking as well as other unintentional or passive behaviors. Information behavior therefore refers to how people need, seek, manage, give, and use information in different contexts. It focuses on realization for information needs, identifying relevant information sources, finding and using information to make decisions and solve problems.

Figure 1 shows how information seeking effects the efficiency of business professionals and makes contribution in organizational effectiveness of businesses.
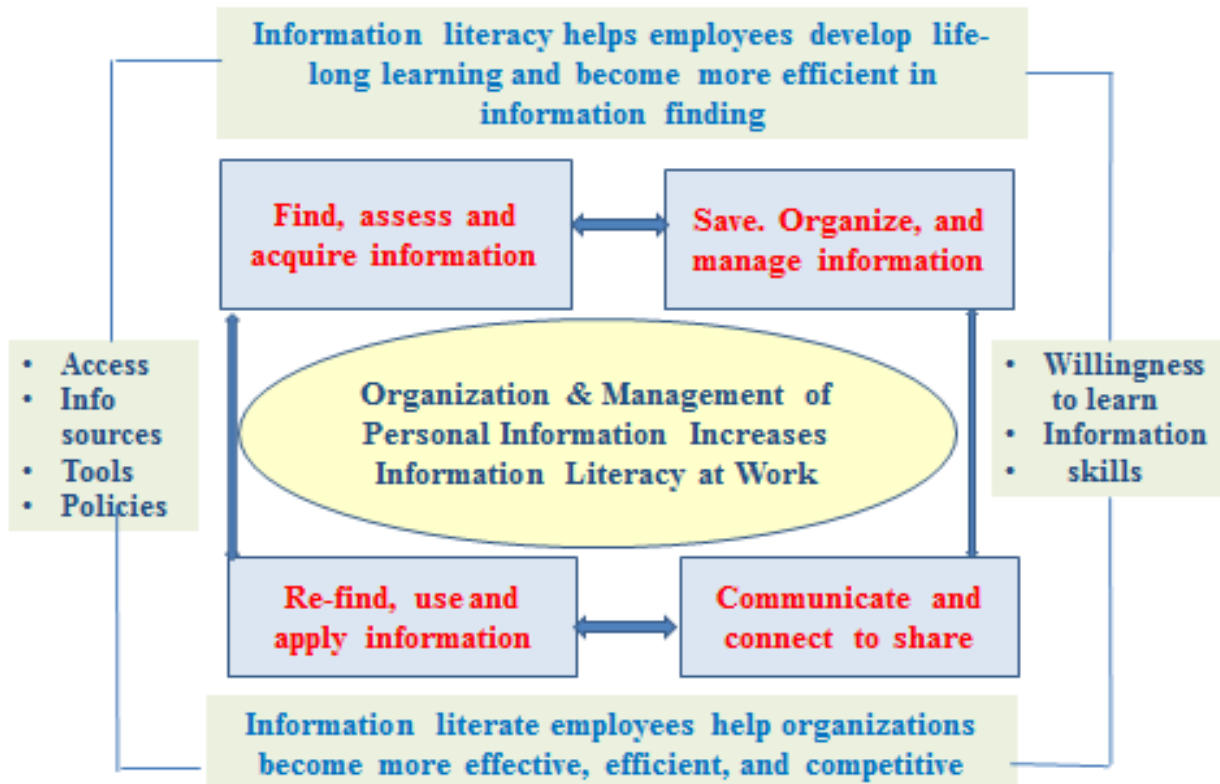
Figure 1: Information Seeking Framework

The following considerations are Important in business information needs:

– Understand the information seeking processes with a view to improve information literacy at work.

– Use and user studies aspects are important to better understand the information behavior.

– Different approaches are needed to organize and retrieve information needed to carry out personal or professional tasks.

– More effective management becomes essential with the overwhelming amount of information being produced in the digital environment.

Chaudhry (2016; 2017) reported that the following types of information is helpful in fulfilling the needs for information of business communities:

- Local information
- Company information
- Investment information
- International information
- Geographical and weather information
- Company credit histories
- Demographics
- Trends in procurement and acquisitions

Chaudhry and Al-Ansari (2016) reported that entrepreneurs are particularly interested in the following type of information:

- Access to financing
- Local support for entrepreneurs
- Basic infrastructure
- Livable communities
- Skilled workforce
- Networking opportunities
- Market, industry and competitor information
- Access to markets
- Training in all aspects of business

In general, businesses need information on customers, competitors, characteristics of the market, the trends and developments in the industry.

The following activities are important in identifying the business information needs:

– Tour of worksite

– Discussion with selected employees

– Surveys

– Interviews with management and employees

– Focus group discussion with management

– Collection and review of workplace materials

Direct observation, questionnaires, consultations with specialists, review of relevant literature, interviews, review of records and reports, work samples, and business audits help identification information needs of specific categories of businesses and business professionals.

Information Sources

This section is written from an objective to gain knowledge about information sources related to the various disciplines in the field of business. These include accounting & auditing, banks and banking, entrepreneurship, investment, marketing, stocks and bonds, insurance, real estate, etc.

The information sources can be identified using general and specific guides and bibliographies of references sources such as directories and guides, databases, and web sites of business libraries. Libraries provide listing of information sources targeted to students and faculty of business management schools. Information may have to be collected from multiple sources to provide a good description of the main features of information

sources. It is important to compile information on description of main features and evaluation of quality based on several criteria, including currency, relevance, authority, accuracy, and purpose. The features of each source selected should be described precisely followed by comments on the quality to assess the usefulness of the sources.

The following types of information sources are important for businesses:

- Bibliographic or full-text
- Primary and secondary
- Business reference sources
- Information sources by field of study
- Sources for company information
- Sources for industry information

Among references sources the following are important for businesses: guides, bibliographies, dictionaries, almanacs, encyclopedias, handbooks, and databases. The following databases are particularly relevant to business information:

ABI/Inform - contains bibliographic references to journal articles and selected full-text documents on business and management.

Datastream - provides international financial, economic, stock market and company data. Includes coverage of equities, stock market and bond indices, economic statistics, foreign exchange rates, interest rates, fixed income instruments and derivatives.

Factiva - contains full text of local and regional newspapers, trade publications, business newswires, press release wires, media transcripts, news photos, business-rich web sites, investment analyst reports, market research reports, country and regional profiles, company profiles, historical market data

LEXIS-NEXIS Academic - offers many full text articles from journals, newspapers, magazines, government documents and reference books.

RDS Business Reference Suite - contains company and industry news, management practices and market research data, U.S. and international coverage.

Thomson Research via World scope - contains basic financial information on public companies worldwide. It includes full-text annual reports, disclosure statements, newspapers and wire service articles

Other frequently used business information sources include:

- Dun and Bradstreet International Business Locator
- Standard & Poor's Register of Corporations, Directors and Executives
- Thomas Register of Manufacturers
- Hoover's Handbook of Emerging Companies
- Principal International Businesses
- D & B Business Rankings

The following readings will also provide useful business information:

1. Business Information Sources http://www.rba.co.uk/sources/
2. Major Sources of Business Information on the Internet
   http://www.rba.co.uk/publications/free.htm

3. Business Information on the Internet
   http://www.crosscut.net/research/business.html

4. Business Sources on the Net http://www.rba.co.uk/sources/

5. Business Essentials on the Web http://bl-business-essentials.wikispaces.com/

6. A one-stop shop for website listings for entrepreneurs and SMEs
   http://www.bl.uk/bipc/dbandpubs/Industry%20guides/industry.html

Information Finding

Finding specific information on companies, industries, countries, products, and stocks from specialized information sources is particularly helpful for business professionals. Information support services should try to teaching both information professionals and business professionals on specialized information sources related to the aforementioned areas and compare the coverage in these sources. In addition, they should be able to find specific information quickly and be able to interpret it for application in business decisions. In the remaining part of the section, specific areas where information is crucial are described and major sources in these areas are identified.

Company Information

Companies constantly require information about other companies to monitor the activities of competitors, to market their products to them, and to buy goods from them. Requests for company information are generally diverse, from basic details to full company profile. It is any information sought by a second party about a certain company pertaining to company

address, activity, location, products, market share, management, and employees. The following specific information is sought about companies:

- – Registration and statutory data

- – Legal status (current, dormant, dissolved)

- – Basic details (name, addresses, registered number, etc.)

- – Ownership details (parent, subsidiary, group structure, issued capital, shareholdings)

- – Financial details (breakdown of income, assets, expenditure, profits)

- – Personnel (e.g. managing director, head of sales, purchasing)

- – Other specific facts (e.g. details of plant, employees, professional advisors, policy and record in charitable giving)

- – Operating methods (ethics, advertising, management style and structure, salaries)

To obtain the above information, it is important to consult company snapshots consisting of financial statements such as income statement, profit and loss statement, cash flow statement, etc.

The following sources can be used for seeking company information:

Annual Reports

- • Puts on public record facts relating to a company which are of relevance to anyone dealing with the company or is otherwise concerned with it.

- • Provide information about the financial position, performance, and changes in financial position useful to a wide range of users in making economic decisions.

- Annual reports can be found from Company Websites "About Us" or AR Sites http://www.annualreports.com/

Company Information Sources

- HOOVER'S ONLINE http://www.hoovers.com
- SEC Database http://www.sec.gov/
- Companies House http://www.companieshouse.co.uk/
- International Directory of Companies History
- European Business Register http://www.ebr.org/
- Nelson's Public Company Profiles
- Standard & Poor's Corporate Descriptions
- Standard & Poor's Corporate Register
- Research reports such as Jupiter Research, Gartner.com, and Economist Intelligence Unit (EIU)

The following readings are also useful for company information:

1. Justia.com (Virtual Chase) – General Company Information http://virtualchase.justia.com/wiki/general-company-information
2. Suite101.com – How to find company information on the Internet http://www.suite101.com/article.cfm/librarians_information_science/55396
3. Research Companies Online http://www.learnwebskills.com/company/

Industry Information

Industry information on a group of companies in a given sector and also proves list of companies in an industry. This type of information provides a

description of where the industry has been, forecast of where the industries are going, how the industry is segmented, and provides industry averages for financial performance and measurement ratios. Information is also made available on industry size in unit sales or monetary units, regulations that apply to the industry. Sources of information focus of industry identification. Like companies there is a wide variety of sources on industry. It is therefore important to define the industry narrowly.

The North American Industry Classification system, known as the NAICS code, is the standard used in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data. The NAICS codes were developed to replace the Standard Industrial Classification system (http://www.census.gov/eos/www/naics/index.html). It is used by statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data. Information provided includes definitions for each industry, background information, tables showing changes and a comprehensive index.

Another important source for industry identification is Standard Industrial Classification (www.osha.gov/pls/imis/sicsearch.html). It is a system for classifying industries by a four-digit code to classify industry areas. SIC code is being supplanted by the six-digit NAICS code, but certain government departments and agencies still use the SIC codes. The SIC codes can be grouped into progressively broader industry classifications: industry group, major group, and division.

The other major type of information is about industry overview. ABI/Inform Trade and Industry publications and ABI/Inform Dateline

provides coverage of local, city, state, and regional business publications, Other sources include Industry Surveys from Market Line, Global Insight and EIU Economist Intelligence Unit Industry Forecasts. ML profiles on industries worldwide and on industries in specific countries. Industry Survey Locator covers industry organization, structure, background, development, and current conditions. Industry snapshots provide statistics and key facts as well as information on key issues facing the industry.

The following information sources provide information on other aspects of industries:

- *Investext plus* provides research reports written by analysts at leading investment banks, brokerage houses and consulting firms (current and historical reports).
- *Standard & Poor's netAdvantage* provides information on current trends, how the industry operates, downloadable company data and links to industry trade associations.
- *Value Line* provides market and financial data on companies, industries, mutual funds and other securities. Frost & Sullivan reports cover technology and market trends in various technology, energy and manufacturing related fields.
- *Gartner Research* provides technology-related information and insights to help clients make informed decisions related to information technology. Reports contain research findings and advice on technology markets, topics, and industries.
- *Mintel oxygen* reports provide information on markets for consumer products, travel, lifestyles, and leisure. Each report combines data & analysis of the competitive landscape and consumers.

- *Market Share Reporter* is an annual compilation of reported market share data on companies, products, and services. It is organized by SIC code.

- *TableBase (Part of RDS Business Suite)* provides data in tabular and chart form. Market share, advertising expenditures and other marketing related statistics from trade magazines and reports.

Many trade association websites provide statistical information, industry overviews, or links to other useful websites. Associations unlimited contains information and descriptions of industry trade associations worldwide. Selected industry associations on the Industry Survey Locator contain links to association websites that contain research and statistics about their respective industry.

Country Information

Information needed in relation to countries other than company's own is inevitably country-specific. Businesses need country information for becoming international, having global strategic perspective to cope with international competition, exploring safe business opportunities and new resources in emerging markets, and multinationals looking for expansion, relocation, better decision-making. With regard to countries, information about business potential and investment possibilities cover the following:

- Political
- Culture, history, values
- Environment, climate
- Geography
- Economics

– Business law and legislation

Primary resources for country information are Governments, organizations and associations, inter-governmental organizations (e.g., World Bank, IMF, and OECD), bilateral associations, multilateral associations, and industry associations. Secondary sources include general purpose sources and country briefings that aim to brief the business person on all aspects. There are several series, Economic Intelligence Unit is one of the best. Series differ in geographical coverage and in the range and type of information provided. The following reference sources are also useful for country information:

- *Countries of the World and Their Leaders 2004: Compilation of U.S. Department of State.* Reports on contemporary political and economic conditions, government personnel and policies, political parties, religions, history, education, press, radio and TV, climate, and other characteristics of selected countries of the world; together with travel alerts, passport and visa information, world health information for travelers, customs and duty tips for returning residents, and world climate highlights. Also includes lists of chiefs of state and cabinet members of foreign governments.

- *The Statesman's Year-book: Statistical and Historical Annual of the States of the World.*
  Brief information on historical events, territory & population, social statistics, climate, constitution & government, recent elections, current administration, defense, international relations, economy, energy & natural resources, industry international trade, communications, social institutions, culture, and diplomatic representatives.

- *The Europa World Year Book.* Information on climate, language, religion, history, economic affairs, defense, government, education, public holidays, statistical surveys (population, health & welfare, industries, finance, external trade, tourism, etc.), the constitution, directory of government ministries, publishers, newspapers, broadcasting & communications, trade & industry, transport, and tourism.

The following Internet Resources are also useful for finding country specific information:

- CIA WORLD FACT BOOK

  https://www.cia.gov/library/publications/the-world-factbook/

- COUNTRIES A-Z: ALTAPEDIA@ONLINE

  http://www.atlapedia.com/online/country_index.htm

- CURRENT INFORMATION ON COUNTRIES

  http://www.nationsencyclopedia.com/

- COUNTRY STUDIES - LIBRARY OF CONGRESS

  http://lcweb2.loc.gov/frd/cs/cshome.html

- IPL PATHFINDER http://www.ipl.org/div/pf/entry/48458

- COUNYRY PROFILES http://www.cp-pc.ca/

- COUNTRY ANALOYSI BRIEFS http://www.eia.doe.gov/emeu/cabs/

- COUNTRIES & REGIONS - WORLD BANK.

  http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/0,,pagePK:180619~theSitePK:136917,00.html

- IMF COUNTRY INFORMATION

  http://hdr.undp.org/statistics/data/index_countries.cfm

The following readings are useful for country information:

1. Country Information
   http://217.154.230.218/NR/rdonlyres/07E96CAE-A3DE-4FB5-A871-D29ED0916426/0/Countryinformation.pdf
2. Find Country Information
   http://www.slwa.wa.gov.au/find/guides/business_information/country_information
3. **How to Find Country Information**
   http://libguides.depaul.edu/countryinformation

Product Information

All businesses exist to sell their products or services. Product is the most frequently sought after category of business information. Product is anything that can be offered to a market that might satisfy a want or need. It is much more than just a physical object. It is the complete bundle of benefits or satisfaction that buyers perceive they will obtain if they purchase the products. Goods are physical objects that are available in the marketplace. This differentiates them from a service, which is a non-material product. A service is the non-material equivalent of a good. Service provision has been defined as an economic activity that does not result in ownership. This is what differentiates it from providing physical goods. Information about products and services is needed for selecting and acquiring (sourcing). It provides criteria to match between organization's needs and available products.

Information about products and services help make decision with regards to the following:

- ✓ Alternatives
- ✓ Performance
- ✓ Cost
- ✓ Ethics and legality
- ✓ Conditions of purchase or products

Proper production information is important for awareness of existing competitive and substitute products and services, new and future competitive and substitute products, and monitoring technological developments which could affect products. In the remaining section, main sources of information on products and service are described.

Trade Literature

Trade or 'product' literature is produced by companies to describe and market their products and services. It may be a single sheet or a brochure or separate sheets of technical data or detailed information about prices, installation, maintenance, etc. Trade literature is also available in supplier's websites. Sometimes sample collections and catalogues by agents and retailers are also available.

Product Pick up Services

A number of information providers include product pick up in their range of services. An example is Mintel associates IIS Ltd. The leading product pick-up and product watch service for the world's packaged industries. It has 450 field representatives in 130 companies. It obtains samples for competitive evaluation, analysis and quality assurance. These services can have the product available for physical examination within days from different parts of the world.

Trade Directories

These are standard secondary sources of basic product information. These are the first resources for day to day purposes on role and scope, selectivity of compilation access methods, and level of detail.

Package Libraries

These are ready-made alternatives to in-house collections of trade literature. Collections of trade literature in package libraries are also useful. They face problem of difficult task of acquiring and storing a paper collection removed. Job of indexing and whole collection is reduced to microform

Test and Evaluation Services

These are mainly consumer goods. They test its performance, value for money and reliability. One source is Consumer Reports Online http://www.consumerreports.org/cro/index.htm

New Product Monitoring Services

These include trade journals and industry newsletters. This service focuses on new products developments. They provide enquiry services and consulting services. Here is selected list of information of this category:

- *Baxter International - Product Pipeline Review*
  http://www.sbwire.com/press-releases/baxter-international-inc-product-pipeline-review-2012-146013.htm

- *Strategic Business Insights (SBI)*
  http://www.strategicbusinessinsights.com/
- *Trade and Brand Name Directory* http://tradenames.kompass.com/
- *Thomas Global Register* www.solusource.com
- *Brands and Their Companies database*
  http://library.dialog.com/bluesheets/html/bl0116.html

The following readings are also useful for finding information on products

1. How to Find Product Sources
   http://www.entrepreneur.com/article/69902
2. Donovan, Nicholas, and Roos. Sources of product information used by consumers when purchasing kitchen cabinets
   http://donovan.hnri.info/pubs/fpj_04.pdf
3. Building Information: Where the building industry finds and shares information.
   http://www.bcbuildinginfo.com/display_topic.php?division_id=1&topic_title_id=36&topic_id=152
4. How to Find Product Sources
   http://www.entrepreneur.com/article/69902
5. Who Cares: Sources of Information About Health Care Products and Services http://www.ftc.gov/bcp/edu/microsites/whocares/index.shtml

Stock Market Information

A stock represents a single unit of ownership (i.e., a stake) of a particular company. Companies issue stocks in the thousands, millions, and

billions. Companies issue stocks in return for contributions of work, ideas, money, or anything else that can improve the economic circumstance of business. Majority of stocks are issued in return for money used to acquire assets, pay expenses, etc. There two main types of stock. Common stock – normally a single class only and preferred stock – usually pay a fixed dividend, established at the time the stock is issued. Stocks are also referred to as securities. Security is a financial instrument that represents an ownership position in a creditor relationship with governmental body or a corporation or rights to ownership – a negotiable financial instrument that represents some type of financial value. Bond is also a related term to stock. Bonds are akin to loans made to a company (a corporate bond) or other organization - different kinds of bonds have varying levels of volatility, risk, and return.

The trends of prices of shares going up and down are referred by using two terms. Bull market expression is used for prolonged period of increasing stock prices. Generally thought of as a time when one or more major stock index increases by 20% or more. Bear market expression is used to refer to a time where stock prices decline or remain stagnant over a long period of time. A market condition in which the prices of securities are falling or are expected to fall. A downturn of 15–20% or more in one or more major indices is considered an entry into a bear market.

Companies periodically declare dividends, which may be in the form of cash or stock, a way of rewarding shareholders. The Board of Directors of a company decides: if it will declare a dividend, how often it will declare it, and the dates associated with the dividend. Dividends are usually declared quarterly, annually or semiannually. A stock exchange or bourse is an

exchange where traders and brokers can buy and/or sell stocks or shares), bonds and other securities. Stock exchanges may also provide facilities for issue and redemption of securities and other financial instruments. Securities traded on a stock exchange include stock issued by listed companies, pooled investment products. Stock exchanges often function as "continuous auction" markets, with buyers and sellers consummating transactions at a central location.

Stock Prices Indexes

A stock index or stock market index is a measurement of the value of a section of the stock market. It is computed from the prices of selected stocks (typically a weighted average). It is a tool used by investors and financial managers to describe the market, and to compare the return on specific investments. Dow Jones and Standards & Poor are examples of stock prices indexes. The following indexes are frequently used:

Dow Jones Industrial Average

- Computed since May 26, 1896 (oldest) by Charles Henry Dow – 40.94
- Best known and most widely quoted – managed by the editors of the Wall Street Journal
- Computed by adding the stock prices of 30 major "blue-chip" industrial companies and dividing by a divisor (price-weighted index)
- Changes to constituents are made infrequent
- Dow Jones Transportation Average (originally, the Dow Jones Railroad Average)
- Dow Jones Utility Average

- 15 large electricity and natural gas utilities
- Dow Jones Tiger Titans represents companies whose blue-chip stocks are traded on the major exchanges of Hong Kong, South Korea, Singapore and Taiwan

Nasdaq Composite Index

- Began on February 5, 1971, with a base of 100.00
- Value weighted; measures all Nasdaq domestic and non-U.S. based common stocks listed on Nasdaq
- Includes approximately 5,000 companies, more than most other stock market indexes
- Broad-based, and therefore widely followed and quoted
- Eight Nasdaq sub-indices (Bank, Biotechnology, Computer, Industrial, Insurance, Other Finance, Telecommunication, Transportation)

S&P 500 Index

- Benchmark for U.S. equity performance
- Not simply the 500 largest companies on the NYSE, AMEX, & Nasdaq 500 most commonly held U.S. based common stock
- Leading companies in leading industries
- Close association with Vanguard 500
- S&P is a unit of McGraw-Hill

Other indexes include Dow Jones Wilshire 5000 Composite Index (US market), Russell 2000 (small cap US stocks), FTSE 100 (footsie, by LSE and FT), Hang Seng (33 companies; Hong Kong), Nikkei 225, SGX All Equities Index, KL Composite Index (KLCI) .

The following information sources are useful for finding stock market information:

1. Bloomberg – http://www.bloomberg.com/
2. Reuters – http://www.reuters.com/
3. Yahoo! Finance – http://finance.yahoo.com/
4. Google Finance – http://finance.google.com/
5. MSN Money – http://moneycentral.msn.com/

Information Support Services

Information support refers to systems and services that help manage internal information and facilitate access to external information. Businesses need to deploy strategies for access to external information and need to put systems in place to manage internal information. External information about markets, customers, and agencies that have impact on starting and running businesses is important for all businesses. Internal Information is created as by-product of transactions or report required by legal requirements.

Chaudhry (2017) stated that employees in businesses use information from inside as well as from outside their own organizations. A variety of external information sources may be helpful. These include abstracts and indexes, bibliographies, biographical sources, databases, directories, encyclopedias and dictionaries and more. Businesses attempts to make these sources available through appropriate arrangements to ensure access. These arrangements may include establishing in-house libraries and information centers, initiating collaborative arrangements with information services outside companies,

outsourcing information support functions to providers and acquiring/accessing specific sources through vendors and aggregators.

King (2011) highlights that it is important that the information service is offering what the business needs and should respond to the constantly changing demands of businesses. These services should focus on delivering value-added relevant support direct to staff who are undertaking work for clients. Jurick (2009) suggests that information sources must be critically analyzed and their attributes reviewed for reliability of content and coverage. Sullivan and Porter (2016) suggest that business information professionals should be proactive to find collaborators who are interested in exploring ways to evaluate information and focus their attention on cultivating partnerships. Information professionals can benefit from outsourcing if the right tasks are outsourced. Clegg (2013) outlined key challenges in the implementation of information services and systems and provided an overview why businesses looked to outsource and what they expected from their outsourcing.

A recent study of information support service by Chaudhry (2017) indicated the following trends for access to external information:

- Most preferred sources of information in businesses are company and industry reports. The other information sources preferred by the businesses are government reports and reference sources. Bibliographic databases and business information sources were reported to be the least preferred.
- The three main approaches used to arrange access to external information include links through websites, information centers, and outsourcing to information providers. For arrangements to make external information to business employees on timely basis, some viable options could have

included partnerships, memberships, and use of aggregators but surprisingly these appeared on the bottom of the list of strategies used by business organizations in Kuwait.

– Most businesses prefer their information support services focus more on compiling information on competitors, preparing alerting briefs and adding value to social media content. Procuring information sources, delivering information on mobile devices, and using cloud computing to store information were not the preferred services in Kuwaiti businesses.

– Facilitating access to information using mobile devices and using cloud computing for storage of information was expected to be the top services expected from the business information support services. Similarly, smart search tools and user-friendly navigation systems for quick discovery of information are considered important in modern information systems and services.

Internal information includes employee and customer satisfaction data, purchase histories, financial and personnel information and data on marketing, purchasing, sales, manufacturing, and administration. Brahem (2013) asserts that internal information can provide important insights into employee and customer issues. Bono and Arnold (2010) highlight that management of internal information is of vital importance for businesses. The ability to manage information effectively can help make the right decisions and achieve company objectives and its timely availability to employees will help achieve company targets. Internal information helps build collective intelligence vital to the long-term development of companies.

Businesses need to take steps for effective management of internal information to leverage it but face numerous challenges in managing

information. These include disparate information systems, little system integration, poor quality of information content, lack of corporate-wide taxonomy to categorize information, and lack of clarity in organizational strategies and directions for defining information. Proper mechanisms (systems, plans, policies and procedures) need to be put in place to facilitate recording, managing, and making available internal information to relevant stakeholders. Effective information management is helpful to improve the efficiency of business processes, meet the demands of compliance regulations, and fulfill the desire to deliver new services. Menzer (2009) suggested guidelines for managing financial information in business organizations.

The systems and functions that are frequently referred to in the context of management of internal information include archives & records management, document management, content management, enterprise content management, web content management, and management of digital assets. While there can be slight differences in these systems/functions, increasingly in the digital operating environment the lines between them are blurred. Mostly an integrated approach to the management of digital information assets is more appropriate regardless of how it is produced and what form it takes.

Chaudhry (2017) surveyed the best practices of managing internal information in Kuwaiti businesses and reported the following trends:

– Most businesses considered records management, archiving and document management as the most important functions for managing internal information. Record management focused on keeping records for long time use because of regulations of business practices while document

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management was being used for storage of aggregate data with ability to extract data selectively.

– Archiving was done for saving and keeping content for preservation. Websites, portals, and institutional repositories were perceived as less important for managing internal information. Web sites were being used for creation, review and publishing of web-based content, enterprise portals were used as online sites for a single gateway to company information and knowledge. Content management focused more on administration - creation & editing - of digital content.

– A majority of businesses preferred to manage internal information in relevant units using database management systems or other specialized applications. The second preferred approach was to use an integrated system that receives information from relevant units and makes it available as and when needed to relevant sections or staff.

– Use of company websites and enterprise content management systems were the other preferred approaches. Some companies considered that an enterprise-wide content management system is more efficient for managing documents, records and digital assets.

– In majority of businesses information management work was overseen by a senior level officer. In most companies, this was assigned to the Chief Technology Officer (CTO) and only a small number of business have Chief Knowledge Officers (CKO) or Chief Information Officers (CIO). This might indicate that information management work was still perceived related to technology and there was less emphasis on the content.

– The second popular approach for managing information work was assignment of these responsibilities to information professionals. These included IT specialists, records managers, archivists, content managers, and web developers. This also indicates that business organizations perceive information management more relevant to websites and other online sites.

Information support services surveys conducted by Chaudhry (2017) helped compile best practices of information support in leading companies. This will be a useful source for decision makers for formulating guidelines for information support in local and regional companies. In addition, the project report will be very good source for teaching courses related to business information. The report is based a questionnaire survey. This has provided very useful information with regard to the preferences for information sources, strategies for arranging information access, and introducing useful functions and services in information support services in companies.

Suggestions for Teaching Business Information

Courses on business information can be taught from two perspectives: with a focus on developing collections of business information resources or emphasize finding specific information on different aspects of businesses. For both types of courses, understanding of how businesses operate, how business professionals seek information; and what are the major sources available in the filed of information. Understanding of these aspects provides a good foundation on finding information in specific business areas including companies, countries, industries, products, and stocks.

A quick survey of information education programs in reputable university showed that more than half offer a three-credit business information course.

Leading programs currently offering a business sources course include Indiana University, University of Illinois at Urbana-Champaign, University of Michigan, UNC Chapel Hill, Simmons College, University of Pittsburgh, and Syracuse University. In addition to these, there are other examples of business information courses. LIS 693 Business Information Sources and Services at University of Hawaii http://www.hawaii.edu/lis/content/syllabi/693_flynn.pdf) focuses on study of key sources of business information in business studies with a focus on meeting the user needs for specific types of business information, including those of management executives and other professionals, entrepreneurs, individual investors, and researchers. LIS 520 Business Information Sources (http://gse.buffalo.edu/admissions/course-descriptions/9451) at Graduate School Education of University at Buffalo also focuses on sources of business information in different business disciplines but also covers forms of business organization, uses and users of business information and the role and function of a business library or information center. GLIS 638 Business Information course offered at Graduate School of Information Studies at McGill University of Canada (https://www.mcgill.ca/sis/courses) provides a survey of the literature used in business including bibliographic and non-bibliographic data bases. This course also covers key publications and selection of a basic business bibliography to do reference work. A course at Nanyang Technological University in Singapore (H6723 Business & Management Information Sources & Services) provides an overview of the wide world of business information sources and services. It covers a wide variety of topics including business information services, print resources and databases, economic and industrial indicators, investment information resources, corporate information needs and services, competitive intelligence and intellectual property issues are also covered (http://www.wkwsci.ntu.edu.sg/aboutus/Pages/About%20Us.aspx).

The author of this chapter has been teaching a course on business information sources for the last 10 years. Major challenge has been to find suitable text book for the course. Most books are outdated while the nature of business information desired that up-to-date readings are used. A list of latest books after a though search has been compiled. This listing is given below. These books are expected to provide good support for teaching business information courses:

1. Naatta, Stephanie. (2014). *Business Information Sources and Services: An Introduction.* Chicago: ALA Neal-Schuman.
2. Forte, Eric and Oppenheim, eds. (2012). *The Basic Business Library: Core Resources and Services.* 5th ed. Santa Barbara, CA: Libraries Unlimited.
3. Heckman, Lucy. (2011). *How to Find Business Information: A Guide for Business People, Investors, and Researchers. S*anta Barbara, CA: Praeger.
4. Moss, Rita and Emsthausen, David. (2012). *Strauss's Handbook of Business Information*. 3rd ed. Westport, CT: Libraries Unlimited.
5. O'Hare, C. (2008). *Business Information Sources: A Beginner's Guide.* London: Facet Publishing.
6. Ross, C. (2013). *Making Sense of Business Reference: A Guide for Librarians and Research Professionals.* Chicago, Illinois: American Library Association.

I have also experienced that students need to be exposed to practical information finding practices and should be asked to interpret information from financial reports such as annual reports, profit and loss statements, balance sheet, etc. In addition, they should review information sources and

prepare reviews and annotations to be able assess the quality of information. They also need to have a good understanding of information needs and information seeking behaviour of business professionals. A helpful assignment for this purpose is to review literature on information needs of group of business professional or in a discipline related to business studies. It is also important that they survey how selected businesses provide information service.

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Bono, C. and Arnold, K. The evolving value of information management and the five essential attributes of the modern information professional. Financial Times Corporate. https://www.sla.org/wp-content/uploads/2014/03/FT-SLA-Report.pdf

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Chaudhry, A. (2017). Best practices in managing internal information in businesses. Accepted for presentation at KMIS 2017, Portugal.

Chaudhry, A. (2016). Information finding practices of knowledge workers in the field of business and economics. *OALib Journal*

Chaudhry, A. (2017). Information support services in business organizations in Kuwait. *International Journal of Innovative Business Strategies (IJIBS),* 3(1). http://infonomics-society.org/ijibs/

Chaudhry, A. & al-Ansari, H. (2016). Information behavior of financial professionals in the Arabian Gulf Region. *The International Information & Library Review*, 48(4).

Chaudhry, A. & Alansari, H. (2013). Use of digital and electronic information by investment professionals in Kuwait. *Library Review,* 62(3).

Clegg, Helen. (2013). Building an outsourced research capability. *Business Information Review,* 30(2), 71-77.

King, Emma. (2011). Research and information services: Demonstrating commercial relevance. *Business Information Review,* 28(2) 112-118.

Jurick, John Eric. (2009). Access to grey literature in business: An exploration of commercial white papers. *Journal of Business and Finance Librarianship,* 28(2), 112-118.

Menzer, D. Managing Your Agency's Financial Information. *American Agent & Broker, March 5, 2009.* http://www.optisins.com/articles/managing_your_agencys_financial_information.pdf

Skyrius, R. and Bujauskas, V. (2010). A study on complex information needs in business activities. *The International Journal of an Emerging Transdiscipline,* 13:1 (2010). http://www.inform.nu/Articles/Vol13/ISJv13p001-013Skyrius550.pdf

Sullivan, Brian & Porter, Karen. (2016). From one-shot sessions to embedded librarian: Lessons learned over seven

Wilson, T.D. (2000). Human Information Behaviour. *Information Research. Volume 3, No. 2.* http://inform.nu/Articles/Vol3/v3n2p49-56.pdf

Chapter Seven

CULTIVATING RESEARCH SKILLS

Sajjad ur Rehman

Key Concepts

The term research has been defined and used with varying perspective. In broad and general terms, Merriam-Webster defined research as" 1: careful or diligent search. 2: studious inquiry or examination; especially : investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws (https://www.merriam-webster.com/dictionary/research). Cambridge English Dictionary (dictionary.cambridge.org/dictionary/english/research) defined that research is a detailed study of a subject, especially in order to discover (new) information or reach a new understanding.

From these two definitions, a number of keywords are discerned: search, inquiry, examination, investigation, experimentation, discovery, interpretation of facts new facts, revision of theories or laws, practical applications, detailed study, subject, discover, new information, understanding.

A review of these terms indicates that these are dispersed; yet these provide us general parameters for discussing this topic in this chapter. Elkinn (1999) used the following coherence while defining research:

Research is to be understood as original investigation undertaken in order to gain knowledge and understanding. It includes work of direct relevance to the needs of commerce and industry as well as to the public and voluntary sectors; scholarship; the invention and generation of ideas, images, performance and artifacts including design, where these ideas lead to new or substantially improved insights; and the use of existing knowledge in experimental development to produce new or substantially improved materials, devices, products and processes including design and construction (Elkin, 1999, 212).

Research Methods

Our treatment of the topic is from the viewpoint of methods used in research. Instruction is generally centered on methods applied in the conduct of research. One of the primary ways of classifying is theoretical and applied bodies of research. Theoretical is also identified as academic or scholarly, using a crude understanding. Applied can be equated with problem-oriented or action-oriented research.

Why Do We Conduct Research

Faculty members working in LIS education programs are keen to do research and publish in academic and scholarly outlets. It given them recognition and they are also promoted to higher ranks that involve rigorous evaluation of research work faculty members have accomplished. In academia the notion 'publish or perish' provides immense challenges to faculty members.

Powell, Baker and Mika, (2002) argued that research is necessary to create new knowledge and thereby contribute to the growth of LIS as a profession or discipline –to improve problem-solving and decision making in the workplace, to make professional practitioners critical consumers of the research literature, and to better equip librarians to provide optimal information services to researchers in other fields.

Academic research has been considered to be scholarly and theoretical in its character, yet we find a major bulk of that dealing with professional issues and problems. Practitioners working in libraries and information organizations are justifiably more concerned with the issues they are confronted with in their day-to-day occupation. This results in a body of published literature that is applied or action-oriented. This serves the needs of the professional community befittingly.

Cullen (1998) was critical, based on her comparison with other disciplines, that LIS professionals did not make enough use of research to improve services or practice. She further stated that this lack of research was due to the fact that LIS research had not changed practice. She offered several reasons for this shortcoming including lack of incentives, absence of urgency and accountability, and difficulties in measuring services.
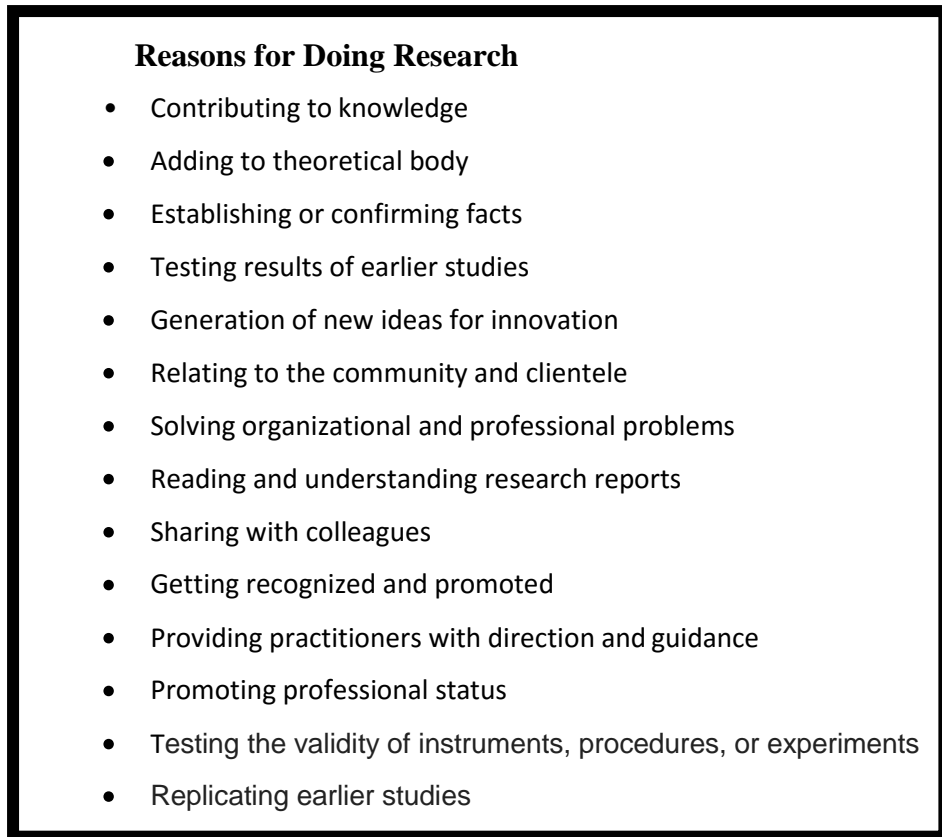
Figure 1: Reasons for doing research

Riggs (994) also observed that LIS professionals paid less attention to research. Molholt (1998) also noted the paucity of research in the field; she criticized the field for its lack of research-mindedness and called for a research infrastructure.

Weak Theoretical Studies

Since LIS is a professional field, applied aspects of operations and services were frequently covered in the bodies of research and published knowledge. Debate about theory or practice is not alien to LIS only, but it has generated points of controversy in other applied domains such as business, education, applied health, nursing, etc. The academics are always

keen that the academic and theoretical thrust should be applied in fields of practice. LIS is no exception in this widely held view.

Kumasi, Charbonneau & Walster (2013) termed LIS research as fragmented, narrowly focused and oriented to practice. Many other writers shared the same view (Hassell, 2015; Hider & Pymm, 2008; Hjørland. 1998; Jarvelin & Vakkaari, 1993; Kumasi, Charbonneau & Walster, 2013). Feehan, et al. (1987), based on his study of LIS research of 80s, had noted that LIS body of literature lacked support from a viable theoretical foundation. Haynes, Streatfield and Cookman (2000) also contended that, traditionally, LIS has lacked research culture and research credibility. Riggs (1994) also observed that LIS professionals paid less attention to research. O'Connor and Park (2000) had also questioned the ability of the LIS discipline to conduct substantive and meaningful research pertinent to how we were able to perform in a world of new technologies. They claimed that changing technologies had the potential to disrupt established policies and practices.

> **LIS Research: Theoretical Orientation**
> **Points of Criticism**
> Weak body of theories
> Fragmented body of knowledge
> Applications devoid of theoretical thrust
> Lacking theoretical rigor
> Weak coherence or integration
> Few journals focusing on theoretical content
> Fewer studies using experimental empiricism
> Emanating from professional practice
> Limited inter-disciplinary discourse
> Low impact factor of academic journals
> Few centers of research in universities

Pettigrew & McKechnie (2001) had analyzed 1160 journal articles published between 1993 and 1998 and found that 34.1% of the articles claimed to be theoretical though there existed divergent views about the connotation of theory. Kim and Jeong (2006) examined theoretical content of 1984-2003 LIS literature, again using a broad and indefinite definition, and reported that 41.4% of the studies claimed theoretical orientation. Apparently a growing body of research claims having theoretical content or identity, yet an acceptable criterion of rigor in theoretical character is not as evident.

Instruction of Research in LIS Programs

It is pertinent to examine the treatment of the instruction of research in LIS programs. iSchool movement has caused major changes in curriculum during the last decade. Nevertheless research appears to be a constant element, attracting a consistent approach across various identities of these education programs. It is revealing to note that Chu (2006), examining close to 3,000 courses, both required and elective, listed in each curriculum of the 45 ALA-accredited LIS master's programs in the USA identified changes in cores and electives. Cores were becoming smaller, allowing more freedom for selecting electives. Interestingly, among core courses, research ranked 4th and it was part of required component in 22 out of 45 schools.

Obviously research competence is perceived to be significant among educators. Park (2003) had also confirmed that in many library and information science (LIS) programs in the United States and Canada research methods course was not required. Park was a strong proponent of making research a part of core and referred to the fact that research methods

was a required course in many science programs, most social science programs, master's in business administration (MBA) programs, and graduate social work programs. Also accreditation standards in business and social work reinforce an individual program's need to require research methods. In graduate education programs, Park noted the need of developing research competencies among MLS graduates, as it would accrue sustained benefits to the field. Park even proposed that If the LIS programs were reluctant to include research methods as a core course, then the American Library Association (ALA) may need to make this a requirement for accreditation. In another wiring Park (2004) was skeptical about the current teaching practices of research methods in the LIS of US and South Korea. Instruction in both the countries faced methodological uncertainty where dominant methods taught were not necessarily applied in graduate studies. Instruction provided opportunities for defining problems and understanding the research process. Park proposed expanding the range of topics and providing a greater depth of coverage for different topics.

Luznic & Urbanja (2003) also considered research skills significant for LIS curriculum. They conducted a case study about need and provision of a research course in an LIS program. They noted that LIS programs are expected to provide students with the right skills

Nature	Methods
Quantitative	- Survey - Experimental - Bibliometrics - Valuation studies - Assessment and measurement
Qualitative	- Case study - Historical - Content analysis - Focus groups - Ethnography - Delphi

to become information specialists. The specific skills are related to problem definition, use of various methods and report writing. It is expected that a graduate program needs to produce a publishable paper as a graduation requirement.

Powell, Baker & Mika (2002) noted the need for more and better research in the field of library and information science (LIS). They studied the use of research in a survey of professionals and revealed that 90% of LIS practitioners in the United States and Canada regularly read at least one research journal, nearly 62% regularly read research-based articles. They also found that approximately 50% of professionals occasionally applied research results to professional practices, and 42% occasionally or frequently performed research related to their job or to the LIS profession.

Research Methods in LIS research

Research course is essentially labeled as *research methods*; implying that methodology is a major bulk of course. A variety of methods have been covered in the course. New methods, primarily qualitative as a class, have found their place in the coverage of the course, Figure 3 displays prevalent use of methods.

Powell (1999) examined emerging use of various research methods in LIS and noted a shift in the focus in identification of methods appearing in the qualitative research literature. New methods employed in research included phenomenological methods, hermeneutics, ethnomethodology, reflexivity, discourse analysis, and semiotics

Additionally, methods of discrete choice analysis, log analysis, protocol analysis, and geographic information were also covered. Fidel (1993) had examined use of methods in information retrieval research. Qualitative research was noted to be on rise that was more suitable as it was non-controlling, holistic, case oriented, open and flexible, diverse, humanistic, inductive, and scientific. These characteristics made qualitative methods the best for exploring human behavior in depth, and thus it was conceived to be of great relevance to IR research.

Liebscher (1998) investigated the use of *grounded theory method* in LIS research and noted that there had been a considerable number of studies in the LIS that have successfully employed Grounded Theory. Yet, there was not a unanimous agreement on the usefulness of this methodology in the research community. Nevertheless, these arguments did not diminish

the value of Grounded Theory but also helped grounded theorists to enhance this methodology's credibility and trustfulness.

For data analysis, inferential statistics is useful in explaining contribution of variables and testing hypothesis about associations and causation. Recently an increase is noted in the instruction and use of inferential statistics. Dilevko (2007) examined the extent to which inferential statistics were used in research articles published between 2001 and 2005 in professional journals. Compared with the findings of studies conducted in the 1970s and the 1980s, an increase was noted in the use of inferential statistics, implying that learning about inferential statistics should become an important component of librarian's education.

LIS Collaborating with other Disciplines for Research

A number of social science disciplines have a great of resemblance with LIS research, as is evident in socio-human variables, prompting use of similar methodologies. Academic disciplines of education, psychology, sociology, mass media and communication, economics, history, GIS, etc. have a great deal of commonness with LIS. It is no surprise that textbook titles of educational research and psychology are popular propositions among LIS researchers and educators. Dalrymple (2001) had examined introduction of social science methods in LIS research. There was a marked emphasis on *user-centered* research, as an influence of Douglas Zweizig and Brenda Dervin who had identified shortcomings in the body of LIS research and knowledge-base in their writings. A lot of research and writings have been focused on *information behavior*, which is essentially a social science concern, using a broader perspective.

Research skills are developed among university students, across various disciplines. *Library research* is a commonly used term for the textbooks used for library as a resource and instrument for conducting research. Larking and Pines (2005) surveyed psychology course and reported that the information literacy course can be befittingly used for developing inquiry skills among social science undergraduate students. They proposed a model for engaging faculty in the task of incorporating information retrieval into a social science research project so that literacy becomes an intrinsic part of the course assignment. In this study, students showed significant gains in database search and assessment skills with minimal investment of classroom time.

Nursing is an established profession in the health sector. Its service orientation bears resemblance with the ethics LIS practitioners are supposed to have. It has been emphasized that nurses also possess research skills and a course may be introduced in their degree education. It was proposed that a course in the educational program designed for clinical nurses might facilitate and support their own research efforts as well as enhance their commitment to research in general. Also in their professional conduct, they need to adopt research-based practices (Adamsen, et al., 2013).
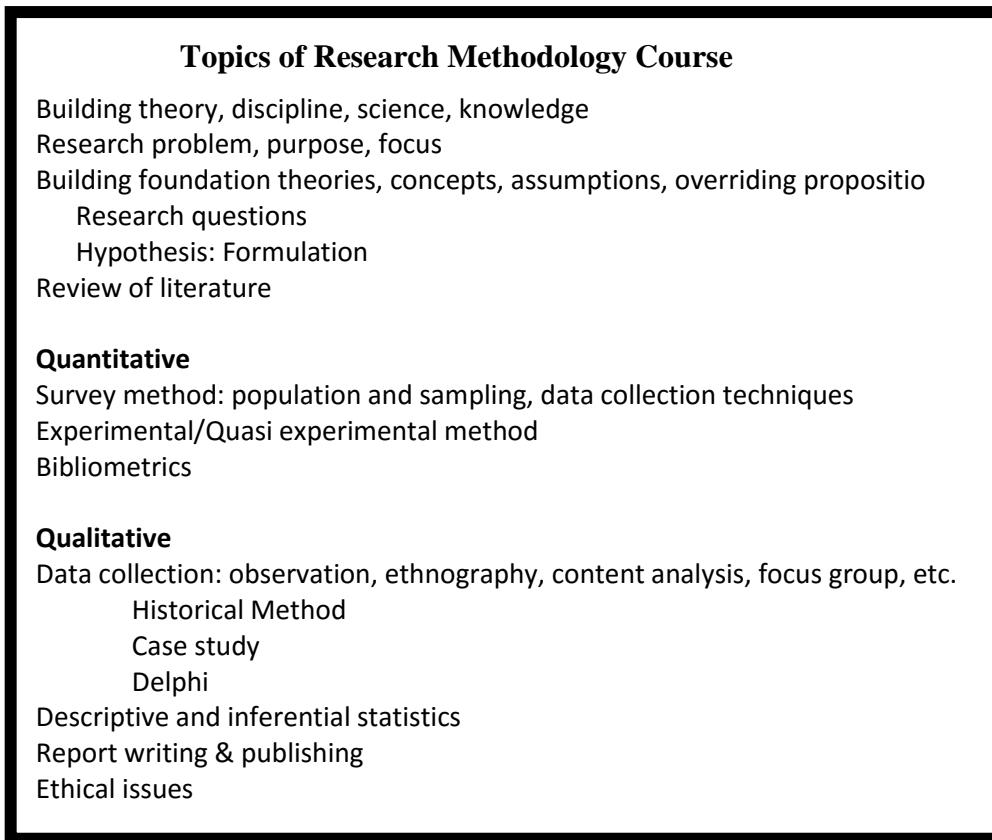
APPLICATION IN TEACHING

Topics of Research Methodology Course

Building theory, discipline, science, knowledge
Research problem, purpose, focus
Building foundation theories, concepts, assumptions, overriding propositio
    Research questions
    Hypothesis: Formulation
Review of literature

Quantitative
Survey method: population and sampling, data collection techniques
Experimental/Quasi experimental method
Bibliometrics

Qualitative
Data collection: observation, ethnography, content analysis, focus group, etc.
      Historical Method
      Case study
      Delphi
Descriptive and inferential statistics
Report writing & publishing
Ethical issues

Figure 4: Topics in a Course

In this section we will propose a model for teaching research methodology course, based on the prevalent practices in LIS program. A common denominator in the instruction of this course is developing a research proposal by taking students through a variety of steps. Development of a proposed is normally pursued through the steps of: having a conceptual frame for defining problem or purpose of the proposal, configuration of hypothesis or research question, review of literature, delineation of procedures, proposed analysis, and provisions for interpreting results. Other details may be related to defining limitations, projecting into

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┌─────────────────────────────────────────────────────┐
│        Coursework                                     │
│ Lectures                                              │
│ Discussions                                           │
│ Assignments around four modules for developing research proposal │
│         problem statement                             │
│         research questions                            │
│         review of literature                          │
│         procedures                                    │
│ Accessories: assumption, variables, definitions, significance │
│ Critiques and reviews of research papers              │
│ Complete research proposal                            │
│ Presentation                                          │
└─────────────────────────────────────────────────────┘
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Figure 5: Coursework Elements

implications, and adherence to a style, prescribed in a manual, for writing reports and documenting references.

We examined syllabi of six LIS courses and the preceding descriptions are based on it. Most syllabi mention a number of methods covered in instruction around quantitative and qualitative methods. In survey method, construction of questionnaire is emphasized. Two courses mentioned coverage of inferential statistics for analysis of data. Normally, independent courses for teaching of statistics are prescribed for graduate studies.

There are some trends in the teaching of topics. Qualitative methods are increasingly used in the instruction of research course. As far as pedagogical aspects are concerned, academic freedom is evident in the fact that each teacher uses a unique and distinct approach in the coverage of topics and delineation of coursework design. Widely used methods include coursework elements of assignment, discussions, presentations, projects, lectures, tests and many more. Review and critique of research reports is also widely used. There is no single panacea that can be diagnosed as a viable approach for teaching. A combination of different methods, keeping in view the contextual variables, is always a practical approach.

In Figure 6 we are presenting a case study, displaying the approach of a typical research course taught as a preliminary or foundation course in a

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Case Study

Context

A core course in a typical 36-credits Master's program; changed its name and program recently from LIS to a new nomenclature; a well-established program with more than 20 faculty members--eight in the ranks of associate and full professors.

Instructor

The instructor is a professor with an experience of 3-4 decades; having strong credentials in research, publishing and academic management. The instructor has taught basic research course of three credit hours for more than 30 times.

Course Description

Basic concepts of developing knowledge through theories; Research process: scientific method, problem identification, methodological design, data collection and analysis; Study of selected research methods used in LIS (quantitative and qualitative); Introduction to methods of statistical analysis; Ethical issues; Development of research proposals and writing of research reports.

Corse Objectives

1. To elaborate the need of research, its types, and status of library and information research.
2. To describe different research methods and their application in library and information studies.
3. To develop skills for research proposal writing and presentation.
4. To introduce descriptive statistical techniques and their application in library and information research.

Content

Similar to Figure 4 of this chapter

Pedagogy

Similar to Figure 5 of this chapter

Figure 6. Presentation of a Case

Master program. The case is not a model for implementation, but it presents some ideas for review, consideration and possible application. The instructor of the course has requested for not disclosing the identity. Names and affiliations have not been disclosed i the description.

Use of Readings

We have identified few titles that can be exclusively used as textbooks for the research course outlined in the case description in Figure 6. We reviewed the proposed textbooks in six course outlines and preferred to list them without any editing or preferential treatment. Figure 7 lists these courses. The list does not appear to be exclusive or suggestive.

Textbooks Listed in Outlines of Six LIS Schools

Alreck, P. L.; Settle, R. B. (1995). The Survey Research Handbook: Guidelines and Strategies for Conducting a Survey. 2nd ed. Chicago, IL: Irwin. 470 p.

Beck, S. E., & Manuel, K. (2008). *Practical research methods for librarians and information professionals* (pp. 109-129). New York, NY: Neal-Schuman Publishers.

Connaway, L.S. & Powell, R. R. (2010). Basic Research Methods for Librarians, 5th ed. N.Y.: Libraries Unlimited.

Creswell, J.W. (2013). Research design: qualitative, quantitative and mixed methods, approaches. Thousand Oakes, CA: Sag

Hinton, Perry R. Statistics Explained: A Guide for Social Science Students. New York, NY: Routledge; 1995. 322 p.

Rowntree, D. (2004). Statistics Without Tears: a primer for non-mathematicians**.** 2004

Schutt, R. K. (2012). Investigating the Social World: The Process and Practice of Research, 7th ed. Los Angeles: Sage.

Wildemuth, B. M. (Ed.). (2016). *Applications of social research methods to questions in Information and library science*. ABC-CLIO.

Figure 7: Readings

Since LIS research has commonness with social science, we have listed a few titles that are commonly listed as probable readings. These may have some usefulness for the instruction of research course in LIS, Titles published in social science are numerous and the following titles are not in any way suggested for a preferential treatment.

Social Sciences Titles

Berg, B. L. (2009). Qualitative Research Methods for the Social Sciences. 7th ed. Boston MA: Pearson Education Inc.

Bhattacherjee, A. (2012). Social science research: Principles, methods, and practices.

Bryman, A. (2015). *Social research methods*. Oxford university press.

Creswell, J. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, California: Sage Publications.

Patton, M. Q. (2005). *Qualitative research*. Wiley.

Some Useful Articles in LIS Research

Articles about LIS research, methods, and evaluation run into hundreds. We have identified some articles that may help educators in picking readings. The list is merely suggestive, based on personal and random selections.

Ashcroft, Linda, and McIvor, Stephanie (2000), "LIS Research and Publishing: The Forces of Change", *Library Review* 49(9), pp. 461-69.

Dilevko, J. (2007). Inferential statistics and librarianship. *Library & information science research*, *29*(2), 209-229.

Fidel, R. (1993). Qualitative methods in information retrieval research. *Library and Information Science Research*, *15*, 219-219.

Grover, R. & Glazier, J. (1986). A conceptual framework for theory building in library and information science. Library and Information Science Research. 8(3), 227-242

Hernon, P, and, Schwartz, C. (1993), "Library and Information Science Research: What Do We Need?", *Library and Information Science Research* 15, pp. 115-6.

Hider P. & Pymm, B. (2008). Empirical research methods reported in high-profile LIS journal literature. Library & Information Science Research. 30(2),108-114.

Juznic, P., & Urbanija, J. (2003). Developing research skills in library and information science studies. *Library Management*, *24*(6/7), 324-331.

Julien, H., Duggan, L.J. (2000) A longitudinal analysis of the information needs and uses literature. Library & Information Science Research. 22(3),291-309.

Julien, H, Pecoskie, J. J. L. & Reed, K. (2011). Trends in information behavior research, 1999-2008: A content analysis. Library & Information Science Research. 33(1),19-24.

Kim, S.J. & Jeong, D.Y. (2006). An analysis of the development and use of theory in library and information science research articles. Library and Information Science Research. 28(4), 548-562.

Koufogiannakis, D., Slater, L. & Crumley, E. (2004). A content analysis of librarianship research. Journal of Information Science. 30(3), 227-239.

Kumasi, K. D., Charbonneau, D.H.,& Walster, D. (2013). Theory talk in the library science scholarly literature: An exploratory analysis. Library & Information Science Research. 35,(3), 175-180.

Liebscher, P. (1998). Quantity with quality? Teaching quantitative and qualitative methods in an LIS master's program. *Library Trends*, *46*(4), 668.

Line, M, B (1991), Research Policy in Librarianship & Info Science: Keynote Address in *Research Policy in Librarianship and Information Science*, Colin Harris (ed), pp. 1-10.

Luo, L. & Mckinney M. (2015). JAL in the past decade: A comprehensive analysis of academic library research. The Journal of Academic Librarianship. 41,123-129.

McGrath, W. E. (2002). Current theory in Library and Information Science. Introduction. Library Trends. 50(3), 309-316.

McKee, Bob (2001), "LIS Research: Mapping the Gaps", *Library Association Record* 103(6), p. 324.

McNicol, S., & Nankivell, C. (2003). The LIS research landscape: a review and prognosis. *Birmingham, UK: Centre for Information Research, CIRT, University of Central England*.

O'Connor, D., and Park, S. (2001). Crisis in LIS Research Capacity. Library and Information Science Research. 23, 103-106.

Park, S. (2003). Research methods as a core competency. *Journal of education for library and information science*, 17-25.

Pettigrew, K. E., McKechnie, L. E. F. (2001). The use of theory in information science research. Journal of the American Society for Information Science and Technology. 52(1), 62-73.

Powell, R. R, Baker, L. M, and Mika, J. J (2002), Library and Information Science Practitioners and Research. *Library and Information Science Research* 24, 49-72.

Shenton, A. K. (2004). The analysis of qualitative data in LIS research projects: A possible approach. *Education for Information*, *22*(3-4), 143-162.

Stoker, D. (1998), A Strategy for LIS Research in the Next Century. *Journal of Librarianship and Information Science* 30(1), 3-5.

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Bernhard, P.((1993). In search of research methods used in information science. Canadian Journal of Information and Library Science. 18(3), 1-35

Chu, H. (2006). Curricula of LIS programs in the USA: A content analysis. In C. Khoo, D. Singh & A.S. Chaudhry (Eds.), Proceedings of the Asia-Pacific Conference on Library & Information Education & Practice 2006 (A-LIEP 2006), Singapore, 3-6 April 2006 (pp. 328-337). Singapore: School of Communication & Information, Nanyang Technological University.

Cullen, R. (1998). Does performance measurement improve organizational effectiveness? In *Proceedings of the Second Northumbria International Conference on Performance Measurement in Libraries and Information Services* (pp. 3 – 20). Newcastle upon Tyne, UK: Information North.

Dalrymple, P. W. (2001). A quarter century of user-centered study: the impact of Zweizig and Dervin on LIS research. *Library & Information Science Research*, *23*(2), 155-165.

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Chapter Eight

COLLECTION DEVELOPMENT OF E-BOOKS

Shaheen Majid

Introduction

Since ancient times, books have been considered the most important medium for knowledge dissemination. Innovation of Gutenberg press in 1440 in Germany by Johannes Gutenberg revolutionized the publishing industry and created the first ever information explosion. Handwritten books, once a privilege of religious leaders, scholars and elite class, were now accessible to general public. Over the centuries, printing industry became very sophisticated but the production process was still time consuming and expensive. Many authors, particularly from developing countries, were unable to publish their intellectual works due to limited resources. However, ICT revolution in early 1990s was a game changer for the publishing industry. Availability of inexpensive computer storage, advances in imaging technology, and speedy access to telecommunication networks made production and distribution of e-books a reality. During the last two decades, e-books have gained popularity and acceptance of a wide range of readers due to many benefits associated with this format.

An e-book is a book in electronic format which can be downloaded and read on a variety of devices including PCs, notebooks, tablets, dedicated devices (e.g. Kindle), and other gadgets. Nevertheless, availability of

affordable smart phones with several advanced features, acted as a catalyst for the e-book industry. Many libraries, particularly academic libraries, are now spending a considerable proportion of their book budgets on acquiring e-books. The e-publishing industry is also flourishing at an enormous pace and in the USA alone e-books revenue is estimated to grew from 2.31 billion dollars in 2011 to 7.6 billion in 2016 (Statista, 2017a). Similarly, in 2008 only 10.3 million e-books were sold in the USA which jumped to 500 million copies in 2013. A survey conducted in 2014 showed that the most prolific e-book readers in the USA were persons in the age group of 18-29 years, while the least frequent readers were persons more than 64 years old (Statista, 2017b).

Several factors have contributed towards the popularity and use of e-books. Some studies suggest that size of e-book collection has a direct impact on their level of use (Lamothe, 2013; Mulholland, 2014). This means it is necessary for libraries to first develop a critical mass of e-books to gain attention of their users. In addition, rigorous efforts are required to adequately promote e-books to their potential users. Yalman (2015) found that only 6% of the education students in Turkey had sufficient knowledge of e-books and, as a result, only a small percentage of them were using these books.

Books play an important role in personality development and cognitive growth of children. Reading stimulates their thinking and reasoning skills which can make them good learners. However, many parents and teachers are concerned that leisure reading among children is declining. The major reason given for this decline is an easy access to a wide variety of electronic gadgets using attractive colours, innovative designs, fascinating animations,

and other attention grabbing applications (Majid, 2017). E-books with multimedia features have the potential to help regain attention of children by satisfying their curiosity. Many e-books also provide a variety of interactive features which can make reading more engaging for children thus increasing their attention span.

E-books can also play a very important role in helping reluctant readers. Children can either choose to read an e-book themselves or listen to the text by using its speech function. However, some scholars feel that high interactively and a variety of moving images, bright colours and sound effects can actually distract children's attention as they are less likely to focus on book content. Nevertheless, it is a fact that e-books are going to stay due to their enormous advantages; therefore, we need to create awareness, particularly among children, that interactivity and multimedia features are basically to facilitate and promote reading and e-books should not be considered as another form of computer games.

E-Book Use Patterns

Many benefits associated with e-books make them distinct from their print counterparts. Initially the e-format was considered more useful for technical and academic books, however, the last one decade has seen a big jump in fiction and children e-books. However, the data regarding the use of e-books is inconclusive. Some e-book publishers, vendors, and online bookstores claim a big increase in the sale of e-books. In fact Amazon.com, one of the leading online bookstores, reported that its sale of e-books has already outnumbered hardcover books in July 2010. The number of e-book users in the USA is expected to grow from 89.05 million in 2015 to 112.05 million in 2020, excluding the readers of e-magazines and e-newspapers

(Statista, 2017b). A majority of the academic libraries are quickly expanding their e-book collections, particularly the number of e-textbooks and the current use of e-books in academic institution is either equal or more than print books.

On the contrary, a survey conducted in 2014 in the USA showed that, despite the popularity of e-books, hardcopy books are still preferred by many readers (Statista, 2017b). This survey revealed that 46% of the respondents were reading only print books, while 6% reported reading e-books only. An objection to e-book sales and use statistics provided by some e-book publishers and suppliers is that these figures are usually exaggerated for business purposes. This ambiguous situation is further complicated by the fact that, several scholarly studies on the use of e-books present conflicting and inconclusive findings. Kazuo (2015) reported that despite many benefits of e-books, the share of e-titles in Japanese book market was still only 6%. Brown (2013) asserts that, although e-books are gaining popularity, their acceptance is not yet universal. Ahmad and Brogan (2012), based on their analysis of e-book transaction logs, reported that around 62% of the Edith Cowan University population was not using e-books. Gilbert and Fister (2015) investigated the perceived impact of e-books on research and recreational readings of students. They found that although students expressed fairly high interest in e-books, they felt that the use of e-titles for research purposes would be limited. A study of teenage female students in Singapore showed that 82.5% of them preferred print books for leisure reading (Majid, Kai-Jie & Ying, 2016). On the whole, the literature suggests that despite several strengths of e-books, their use has not yet reached to a desired level.

The data regarding preferred subjects for reading e-books is also inclusive. A study by Al-Suqri (2014) showed that the use of e-books was higher among arts and humanities, business, law, physical sciences, and engineering faculty. Miller (2015) reported that the use of e-books in a big public university in the USA was more popular in the disciplines of fine arts, language and literature, and medicine. Another study in Turkey showed that e-books were more frequently used in the subject areas of medicine, education, and language and literature (Tonta, Al & Soydal, 2010). It appeared that apparently e-books are comparatively more popular in medicine, languages, and literature. The popularity of e-books in the discipline of languages and literature could be due to the fact that many classical literature e-books are now easily available in public domain.

Advantages and Disadvantages of E-Books

Reader-specific Advantages

Mobility. Readers can now easily carry many books downloaded into their mobile devices. It allows students, senior citizens, and physically weak individuals to carry many books without considering their size and weight.

Accessibility. Readers can access e-books anytime anywhere if the Internet connectivity is available. They do not need to worry about library opening hours.

Convenience. Easy and instant downloading eliminates the need to physically visit a library or bookstore.

Audio and video clips. Availability of sound, videos, and animations has made reading more interesting and engaging. In addition to attracting children and reluctant readers, the multimedia features are also very useful

for knowledge communication in many disciplines. For example, a biology student can read about the digestive system as well as view what happens to food when going through various digestion stages. Similarly, multimedia features are also very useful in several other disciplines such as medicine, sciences, engineering, sports, music, weather, etc.

Interactive books. Many e-books now provide higher level of interactivity to keep their readers involved and to make reading more meaningful. Some textbooks provide quizzes and tests to allow students check their knowledge and learning outcomes. Some fiction books provide an interesting feature where, at each critical stage of the story, authors provide several possible paths and readers can decide what scenario to follow. This way readers become part of story building, which can provide them a unique learning experience as well as help develop their cognitive capabilities.

Language conversion. It is now possible to read books written in other languages. Although the current language conversion programs may have some issues, they are likely to substantially improve in the coming years.

Customization. Display of e-content can easily be adjusted by readers through changing font type and size. This means libraries do not need to separately purchase and maintain large-print books for senior citizens and visually impaired individuals, which was previously a concern due to odd size of such books.

Readability. An objection to using e-books is glare and fatigue associated with screen reading. This problem can be reduced to some extent by changing image contrast and screen brightness.

Access to reference tools. Readers can now easily use hyperlinks to access dictionaries, encyclopedias and other reference sources to check meanings of difficult words and unfamiliar concepts.

Bookmarking. It is possible to save the last reading point, mark multiple sections, and put signposts for subsequent reading.

Searching. Now there is no need to use book indexes to find the desired concepts discussed in various chapters of a book. A reader can quickly search text in the whole book or in a particular chapter.

Easy navigation. Readers can easily jump back and forth between different chapters, glossary and other sections of a book by using hyperlinks.

Personal notes. Some user interfaces allow highlighting text and taking personal notes.

Free access. Thousands of free public domain e-books are easily accessible to readers.

Censorship. Several books, particularly in developing countries, are banned by governments due to their anti-government stance. Readers can now easily get access to such books through the Internet. However, this freedom to access and read information can be abused by some irresponsible authors who use e-books to propagate hate, violence, pornography, morally corrupt practices, and religiously and racial-sensitive topics.

Library-specific Advantages

Multiple simultaneous users. It has always been a concern for libraries to decide how many copies to purchase for each title, particularly due to limited library budget. Now multiple users can access and read e-books simultaneously.

Space saving. Previously availability of adequate shelf-space was one of the factors in deciding whether or not to purchase a book. Now physical space is not a concern while selecting e-books.

Less busy circulation desk. For e-books users do not need to wait in a queue to check-out books. Similarly, libraries do not need to put additional staff at the circulation desk during the peak hours.

No re-shelving. No need to deploy staff for re-shelfing of returned print books. E-books can also solve the problem of wrong book shelfing.

Collection usage statistics. It is usually difficult for libraries, without a good library automation system, to collect circulation statistics which can be used for multiple purposes. Almost all e-book vendors provide comprehensive usage reports to library management for decision making.

Economical. Usually prices of e-books are less than their print counterparts due to low production cost and no delivery charges.

Faster access. Production and delivery of e-books is less time-consuming and a published title can immediately be made available to readers.

Weeding. Weeding is a time-consuming and labor-intense activity. For e-books, we just need to either unsubscribe a title or delete it from our server. There is no need to physically remove and dispose of the deselected items.

Environment friendly. E-books are considered more environment friendly as no paper and ink is used for their production. E-books also do not generate any discarding trash.

Preservation. Libraries do not need to spend money and effort on repairing or rebinding of damaged books.

Access to old manuscripts and rare books. Libraries can now easily provide access to old manuscripts and rare books. Many of such items are now even available in public domain without any copyright restrictions.

Disadvantages of E-books

It is desirable that where we have discussed many advantages of e-books, we should also consider certain disadvantages associated with this format. However, it is worth noting that most of these disadvantages are related to individual readers and not directly to libraries.

Expensive. Although generally e-books are comparatively less expensive, we need a reading device which could be less affordable to some segments of a society.

Changing technology. Reading devices, including smart phones, quickly become outdated. A personal e-book collection needs to be migrated to the new device.

Low battery life. Though there is a considerable improvement in battery life of smart phones, iPads, and other handheld devices, their prolonged use for e-book reading can quickly deplete their batteries.

Format compatibility. Some reading devices can only support limited number of e-book formats which could be annoying for readers.

Eye strain. Prolonged reading of e-books can cause fatigue and tiredness due to screen glare. This problem is particularly serious for smart phones due to their small screens.

No shelf browsing. In many situations shelf browsing is very useful in locating books on a similar topic. Although some modern OPACs can show the retrieved book as well as images of adjacent books, it is not as convenient as physical shelf browsing.

Low IT literacy. Some segments of a society, even in developed countries, such as senior citizens and under-privileged classes may not have the basic IT literacy and know how to use e-books effectively. This problem is particularly severe in many developing countries.

Widening digital gap. Some publishers have decided to only publish e-books which may cause digital divide as many developing countries are unable to provide uninterrupted access to the Internet. Similarly, a majority of the citizens living in these countries are less likely to have access to reading devices. Frequent power breakdowns is another problem faced by these countries. All these factors are likely to intensify digital divide between developed and developing countries.

Aesthetic appeal. Many readers still like to hold a physical book and have a feel and touch of printed books.

Faulty device. Many bookstores and e-publishers do not have a clear policy for the replacement copy if a device storing purchased e-books starts malfunctioning or lost. Similarly, it may be an issue if a reader buys a new mobile phone or a reading device and wants to re-download already purchased e-books.

Accidental deletion of files. There is also no clear policy if bookstores or e-publishers will allow buyers to re-download accidentally deleted e-books.

Complex business model. Publishers and vendors provide various pricing models to libraries for accessing their e-books. Though these pricing models provide some flexibility to libraries, they are often quite complex and confusing.

E-Book Pricing Models

Libraries in developed as well as developing countries are steadily increasing their e-book collections. The process involved in procuring e-books is considerably different from their print counterparts. Libraries, according to their unique situations and clientele, use various methods for procuring or providing access to e-books. Some factors libraries should consider before purchasing or getting access to e-books are: expected number of simultaneous users; whether a particular title is useful for short- or long-term use; and which pricing model will be more appropriate. Libraries can use a variety of methods for providing access to e-books, including ownership, short-term loans or rental, book subscriptions, evidence-based acquisitions, and Demand Driven Acquisition (DDA). Many libraries often use a combination of these methods as they have their own strengths and weaknesses. If a library is certain that the selected title has a higher likelihood of frequent use, it may directly purchase it. However, if the use of an e-book is expected to be limited, a library may consider certain short-term loan options. The following are some of the popular methods for acquiring or providing access to e-books:

Ownership (Perpetual Access)

This is one of the most popular methods for buying e-books. In this method, based on the selected pricing model, multiple library users can have uninterrupted access to a procured e-book. The price depends on the number of simultaneous users of an e-book at a given time. A library can purchase access rights for a single user, three users, or unlimited number of users. Some leading library vendors, such as EBSCO and ProQuest, provide these options. In addition, ProQuest offers a 'non-linear' e-books procurement option. However, it could be challenging for libraries to correctly anticipate the expected number of simultaneous users for a particular e-book. The following are explanations of these options:

a. **Single user access:** This is the most economical option but only a single user can have access to an owned e-book at a given time. This model is very close to purchasing hardcopy of a print book. If an e-book is already under the use of a library patron, the next interested user needs to wait for his/her turn or can put this book on hold. This model is more suitable for small libraries with limited clientele. Other libraries can also use it for minor subjects with limited demand.

b. **3-User access:** In this model three users can simultaneously access an e-book. This option is more suitable for popular titles with high demand. If the number of simultaneous users for an e-book reaches to its limit, additional users can put this book on hold. Libraries with medium to large clientele can consider this option.

c. **Unlimited access:** This model allows unlimited simultaneous access to owned e-books. This option is more suitable for high demand e-

books as no user is declined from using a title at any time. As a result, readers do not need to wait or put a book on hold. This model is more suitable for large public and academic libraries.

d. **Non-linear access:** This model is more useful to academic libraries. In this model, offered by ProQuest, multiple users can simultaneously access an e-book. However, there are a fixed number of lending days per title per year, typically up to 325 lending days (ProQuest, 2017). This option provides more flexibility to e-books with possible peak and dormant use periods in a year. For example, use of a textbook may be very high during one semester and less in another semester or during holidays. A library can decide how many loan-days to allow to patrons each time a non-linear copy is used. After 12 months, the lending days are automatically reset to zero. If a library reaches the maximum use limit of an e-book before the end of scheduled 12 months, it can supplement the non-linear access with short-term loans.

Short-Term Loans (STLs)

Short-term loan is a cost-effective method for providing access to a wide range of e-book titles, without any purchase commitment. This method is more suitable if a library user is interested in a particular e-book but his/her library is uncertain of its possible future use. Some vendors also offer STLs as part of their Demand Driven Acquisition (DDA) plan. In such cases, after exceeding the allowed number of STLs, a book is considered purchased. EBSCO allows short-term loans for one day, fourteen days and twenty-eight days (EBSCO, 2017). ProQuest allows libraries to choose the number and duration of short-term loans, based on certain parameters such as price,

publication date and subject area of e-books (ProQuest, 2017). Usually rental fee is 5-10% of the e-book price for one day and 20% for one week.

E-book Subscriptions

This method functions on the same lines as subscription to e-journal packages. In this model e-book packages are offered as annual subscriptions with unlimited simultaneous users. These packages include a large number of e-books from a broad range of subjects. However, some e-books may be repeated in more than one package. Similarly, some vendors may include high quality as well as average titles in the same package. Usually new books are added in these packages quite frequently without additional charges. This method allows libraries to build their core collections in broad subject areas, without going through the hassle of selecting individual e-book titles which could be very laborious and time-consuming.

The following are some of the e-book packages offered by ProQuest:

- ***Academic Complete –*** covers all academic disciplines and provides e-books from major publishers.
- ***College Complete –*** more suitable for community, technical and vocational colleges.
- ***Schools and Educators Complete –*** this package includes e-books to satisfy diverse needs of K-12 students and teachers.
- ***Public Library Complete –*** provides a wide range of non-fiction books to a public library community.

- ***<u>Safari Books Online Basic Tech Library</u>*** – includes e-books and videos on a wide range of information technology topics.

- ***<u>Safari Books Online Business Library</u>*** – provides access to e-reference sources on critical business topics.

- ***<u>Safari® Public Libraries</u>*** – covers topics such as improving career skills, organizing personal electronics and finances, learning social networking, or starting a business.

- ***<u>University Press Ebook Subscription</u>*** - provides access to high quality materials from selected university presses of prestigious academic institutions.

Evidence-based Purchases

Some publishers such as Elsevier, Wiley, and Cambridge University Press offer this unique e-book pricing model. In this model, a library signs an agreement with a publisher or vendor to provide MARC records of e-books in certain specific subject areas. These MARC records are uploaded in the library OPAC. A library needs to make an upfront advance payment, usually based on the number of selected titles and their expected usage. The usage of uploaded e-titles is recorded and periodically reported to the library. Based on the usage 'evidence' for a specified period of time, usually one year, the library decides what e-books to purchase. The cost of the purchased books is adjusted against the advance payment. Usage of the remaining books, not considered suitable for purchase, is settled as short-term loans.

Demand Driven Acquisition (DDA)

Demand-Driven Acquisition (DDA), sometimes also called Patron-Driven Acquisition (PDA), is one of the popular and cost-effective methods for building e-book collections as libraries only purchase those books which have exceeded a pre-defined 'significant' use level or have reached at a 'purchase trigger point'. DDA is a participatory selection approach where library users play an active role in developing e-resources. In this model, only those e-books are bought which were used at least a few times by a single or multiple users. This selection method is quite similar to 'just-in-time' approach than 'just-in-case' selection. The DDA model is more suitable for academic and research libraries as information needs of their users are usually more explicit and focused. As a result, it is much easier for these libraries to develop their interest profiles which publishers and vendors will use for providing MARC records of the matching e-books. However, now several public libraries have also started implementing this method to develop part of their e-book collections.

How the DDA Model Works?. Libraries always value input from their patrons in the selection of library materials. Patrons are encouraged to make recommendations and libraries usually acquire the suggested books if these titles meet their book selection policy and criteria. From another perspective, the traditional 'approval plans' for the selection of print materials are also quite close to DDA. In the approval plan method, a library prepares an interest profile and outlines the criteria for inclusion and exclusion of materials, such as subject, publisher(s), publication year, price range, and other parameters. The library vendor delivers books, meeting the library specified criteria, and the library has the right to only accept those

books which are considered relevant and useful. Almost the same approach is used in DDA but the actual purchase of an e-book depends on the agreed upon 'trigger' points with the supplier. In fact, this approach is slightly better than approval plans as books in this method are only purchased after their actual use. However, a carefully developed interest profile is a pre-requisite so that only relevant and quality e-books are offered to users, thus reducing the chances of spending money on irrelevant or low quality titles.

The final purchase of an e-book could be mediated or unmediated. In a mediated purchase, even if a book has reached its trigger point, a designated librarian reviews the title and decides whether or not to allow its purchase. This way purchase of unnecessary books can be minimized. On the other hand, in the unmediated method, an e-book crossing its trigger point is automatically considered purchased and immediately made available to the reader. Some libraries only mediate those purchases where the price of an item is more than a specified amount (e.g. $50 per title).

Why DDA Approach is Considered Better?. In the collection development of print books, usually a library selects materials according to its collection development policy and the selection criteria outlined in it. This selection is based on the assumption that the selected books will be useful to its users. A big objection to this selection approach is that many acquired books are never used by library patrons. The often-quoted Kent's 80/20 rule states that 80% of the circulated books are based on only 20% of library collection (Kent, 1979). A more striking finding is presented in an OCLC report which suggests that 80% of the circulating books actually come from only 6% of the collection

(Gammon & O'Neill, 2011). Similarly, some other collection evaluation studies report that often 50% of the print books in many libraries do not circulate at all. These studies reflect a serious problem that, in spite of a well-written collection development policy and rigorous selection criteria, a considerable proportion of collection development budget is wasted on unsolicited books.

In contrast, it is certain that the titles procured through DDA are used at least once by library users. A study by Tyler et al. (2010) claims that the titles acquired through DDA tend to circulate more often than those selected through traditional book selection methods. Similarly another study has shown that 59% of the e-books purchased by Stetson University, USA were used more than once during the pilot study period (Dinkins, 2012). A study by Miller (2015) showed that e-books acquired through DDA got repeat uses – 98% e-books recorded 2-9 use sessions while 50% e-books received 4 sessions each.

The following are some of the benefits of using DDA selection approach for acquiring e-books:

 i. Many titles can be made available to users but the library is only charged if these are actually used.
ii. Books made available through DDA method are immediately accessible to their users. On the contrary, the traditional book procurement method involves several steps such as order generation, receiving books, and technical processing, which are likely to take considerable time before a print book could be made available to its

users. The DDA method can substantially reduce patrons' waiting time by immediately providing access to the needed titles.

iii. Almost all suppliers provide transaction history of 'loaned' and 'purchased' e-books which could assist in decision-making by the library management.

iv. On the whole, the DDA method helps libraries better utilize their budgets as no money is wasted on purchasing unsolicited titles.

v. DDA method also saves time of library staff as they do not need to individually select and procure e-books. A carefully developed interest profile can ensure that only relevant titles are offered to library patrons.

The DDA Procedure. The following steps are involved in running a Demand-Driven Acquisition program:

a. Develop an Interest Profile

This first step plays a crucial role in the success of a DDA program. A detailed and carefully developed profile will help publishers and library vendors to offer relevant titles matching the library specified criteria. A well-developed interest profile can help reduce the chances of acquiring irrelevant e-books. Some elements that can be included in an interest profile are:

i. **Subject area:** It is necessary to clearly identify the subject areas to be included in a profile. Instead of using broad subject categories such as biology, it would be better to use narrow terms such as ecology, cytology, taxonomy, molecular biology, etc. If a library

has used the Conspectus approach to indicate collection intensity in its collection development policy, the same classification ranges can be considered for developing a DDA interest profile.

ii. **Publishers:** It would be better to include reputable publishers known for producing quality titles. E-books published by comparatively less familiar publishers can be acquired through other methods discussed earlier.

iii. **Price:** If necessary, indicate the maximum price limit for individual titles. It is more important if a library is using an unmediated approach for procuring e-books. If an upper price limit is not indicated, expensive e-books may be bought without the notice of a library which may disturb its collection development budget.

iv. **Publication year(s):** Indicate the range of publication years, e.g. since 2012.

v. **Language:** Indicate the language(s) of e-books.

vi. **Other restrictions**: If necessary, a library may also impose additional restrictions on the materials to be offered through DDA, such as no fiction and paperbacks.

b. Select an E-book Publisher/ Vendor

The success of a DDA program also depends on the experience and service quality of publishers and library vendors offering e-books. Care should be exercised while selecting vendors and preference should be given to those who can provide quality titles from many reputable publishers. Usually libraries are expected to pay one-time 'platform fee'

of several thousand dollars to the vendor as well as open a DDA account with sufficient funds. In order to ensure good quality service, libraries should periodically evaluate the performance of its e-book vendor(s). Similarly, libraries should also regularly monitor the quality of MARC records provided by their vendors and notify them if any changes are desirable.

c. Negotiate the 'Trigger' Points

In addition to certain management related matters, a library should carefully negotiate different 'trigger' points with its vendor. Some vendors may propose slightly different trigger points which should be carefully reviewed. These trigger points may be based on different e-book use factors, such as number of users who have viewed an e-title, time spent on each title, number of pages viewed, and number of pages printed or downloaded. Once the use of an e-book has reached to its trigger point, either it is bought immediately (unmediated purchase) or a request is sent to a designated librarian to make the final decision (mediated purchase). For EBSCO, a trigger point is reached when a patron: (a) downloads an e-book, (b) views an e-title for more than 10 minutes, (c) views more than 10 pages, or (d) print, email, or copy & paste a portion of an e-book. Some e-book vendors are flexible and ready to negotiate the trigger points to match these with the specific needs of a library.

d. Upload MARC Records into Library OPAC

The MARC records of the selected e-books are made available to the library. Either the library will directly upload all the MARC records provided by a vendor into its OPAC or it will first scrutinize these to

remove irrelevant titles. Either the library or its vendor will upload the MARC records into library's OPAC. Each OPAC record, in addition to book metadata, will also provide a URL for accessing the e-book. A library can also negotiate with its vendor that how frequently new titles will be uploaded into its OPAC, how long each DDA title will stay in the OPAC (usually 6 months to one year), and how to monitor usage of the offered e-books. Once an e-book is purchased through DDA (after reaching its trigger point), a library may decide to edit its MARC record to make it consistent with other OPAC records.

e. Accessing E-books under DDA

Once MARC records are uploaded in a library's OPAC, these will be accessible to all library patrons. While searching the library OPAC, a user often cannot differentiate between an e-book 'owned' (purchased) by his/her library or available through its DDA program. On clicking the URL, the selected DDA e-book is made available to the reader immediately.

Some vendors, such as ProQuest, allow combining short-term loans with DDA. A library can negotiate how many short-term loans (STLs) would trigger an automatic purchase and the length of each STL. Price of a 24 hours short-term loan is usually from 5% to 10% of the listed book price. ProQuest charges 10% for one day and 15% for one week loan of the listed price (ProQuest, 2017). However in the DDA model, a library has to pay both short-term loan fee as well as the listed price of a book, which makes it more expensive than direct purchase of this e-book.

f. Removal of Unsolicited Titles from the OPAC

It is important that e-titles offered through a DDA plan should be regularly refreshed. A library should also negotiate with its vendor that who will and how frequently the unsolicited titles will be removed from the library OPAC. It is important as uploading of MARC records, tracking the use of offered e-book titles, and removing unsolicited titles could be quite tedious and time-consuming.

Challenges of Using DDA Method. No doubt that many benefits are associated with using the DDA approach for providing access to e-books. Nevertheless, libraries may face some challenges associated with this method. The following are some of the possible problems of using this method:

- The DDA method is more suitable for meeting immediate information needs of current users which may not match with the long-term goals of a library or needs of potential future users.

- A DDA license could be confusing as it may include various trigger points, certain use restrictions, and a confusing pricing structure. It is, therefore, desirable that libraries should carefully review and negotiate various clauses of their DDA licenses.

- The MARC records provided by a vendor may not fully match with library records, thus needing some 'cleaning' of the provided records.

- A robust budget management system is required as many books at a given time period could be at different trigger levels and may result in unpredictable budget utilization.

- If a library implements an unmediated approach for purchasing e-books, it may undermine integrity of its e-collection. For other book selection approaches, libraries usually use their selection criteria as well as follow their collection development policies. Giving full authority to library patrons for e-book selection may create serious problems in implementing a collection development policy. It may become challenging to fully adhere to collection intensities for different subjects referred to in the policy. As a result, a library collection may slowly become a 'popular collection' and not a planned and systematically developed collection.

- Depending on the pricing model, a DDA book purchase may become more expensive due to cost of short-term loans and then full price of an e-book.

- Availability of e-books in different subject areas could be considerably different, resulting in an imbalanced collection.

- Some active users may frequently access e-books offered through DDA and, as a result, library collection may become their sub-collections.

- Uploading and subsequently deleting unused titles from the library OPAC is laborious and time-consuming.

- Some publishers may delay e-version of a book to first sell its print copies.

- Some publishers/vendors may continuously 'push' old or irrelevant books with new titles to improve their sales.

Strategy for Developing an E-Book Collection

E-book is now an established and preferred format and libraries in many developed countries are spending substantial proportions of their budgets on purchasing e-books through different methods. Although we still lack conclusive data on the acceptance of e-books by library users, the e-book industry is likely to grow at a very high pace thus making it necessary for all libraries to consider this format more seriously.

Procurement or providing access to e-books could be a challenging task for libraries in many developing countries due to their limited library budgets, inadequately trained library manpower, lack of reliable IT infrastructures, and low IT literacy of library patrons. It is, therefore, desirable that libraries in these countries should come up with a comprehensive plan to overcome these barriers otherwise the digital divide between developed and developing countries is likely to further worsen. It is particularly important because several publishers have announced that in future they will only publish e-books. However, at the same time, libraries in the developing countries should not blindly follow the 'digital rush', which may deplete their already limited collection development budgets. There is a need that libraries in developing countries, particularly academic libraries, should keep watching the emerging trends and start collecting e-books on a small-scale to assess users' response and acceptance.

Libraries, both in developed and developing countries, should continue creating awareness among their users and prepare them for the digital revolution. Some libraries, following the footprints of certain big libraries, are hastily switching from print to e-books. Such a move, without considering patrons' level of preparedness and acceptance, can create

'digital fatigue' among them. It is not uncommon that usually users need considerable time to get familiarized and accept a new format. Therefore, depending on the users' profile, libraries should come up with a comprehensive plan to gradually introduce e-books in their collections. At the same time, it is necessary for libraries to strengthen their user education programs to provide basic information literacy skills to their users to effectively use a variety of formats, including e-books.

Libraries can consider the following points for successfully implementing an e-book collection program:

i. Conduct a fresh community analysis to determine IT and information literacy skills of your users and their preparedness to use e-books.

ii. Create awareness among the library users, particularly about short-term loans and DDA trigger points, so that they may not unintentionally continue consuming library budget.

iii. Select an e-book vendor who is flexible and willing to customize his pricing models to suit your library needs.

iv. Carefully review all the clauses of your e-book license as it is a legal document. It would be useful to first familiarize yourself with the basic clauses of an e-book license. For this purpose, online model licenses from ALA, various libraries, and e-publishers could be a good starting point.

v. For DDA and evidence-based acquisitions, develop your interest profile carefully and provide as much details as possible. Instead of providing broad subject areas, consider more specific and narrow subject areas.

vi. Before uploading MARC records, carefully examine the e-book titles offered by your vendor to check their relevance to your library patrons. If the proportion of irrelevant titles is high, make necessary adjustments in your interest profile.

vii. Initially implement a 'mediated' approach and appoint an experienced collection development librarian to review and approve all e-books before their purchase.

viii. For the DDA method, provide timely prompts to your users once they are close to a 'trigger' point. A message such as "*Any further use of this e-book will initiate its purchase process. Please stop using it if you don't want library to purchase this book*" could be useful to reduce unintentional purchase of e-books.

ix. Initially experiment with all relevant e-book purchase models to determine their suitability to your library.

x. Initially provide access to e-books on a small scale to understand its intricacies, how to handle different issues and challenges, and what adjustments are desirable to enhance their usage.

xi. Initially it would be more appropriate to provide access to e-books in a few selected subject areas to gauge users' response and acceptance. Based on the composition of your library community, select those subject areas where more e-books are available and library users are relatively more active, IT savvy, and open to new formats.

xii. Ask your vendor to provide detailed e-books usage statistics which will help determine the usage pattern as well as budget spent on this format.

xiii. Establish an interest group of library professionals providing access to e-books in your region to share best practices and lessons learnt, how to handle various challenges, and to exchange tips for developing a successful e-book collection.

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Chapter Nine

DATABASE SEARCHING AND INFORMATION DISCOVERY

Shaheen Majid

Introduction

Exponential growth in knowledge has made it necessary to properly identify, process, and manage all the scholarly literature for its future discovery and use. Advances in information technology have now made it possible to develop and maintain an inventory of human knowledge in the form of scholarly databases. These databases can be used by scholars, researchers, academicians, students, professionals, and others to discover what has already been published in their area of interest, what gaps exist, and emerging areas of potential research. A properly constructed database search can reduce the chances of missing useful information as well as can help avoid duplication of efforts thus saving precious time and resources.

As the number of records in databases is growing rapidly, it is becoming challenging to retrieve all the relevant literature on a particular topic. It is like finding a needle from a huge haystack. Missing relevant literature could be detrimental as it may result in the duplication of efforts, misdirected research, and inaccurate decision-making. On the contrary, retrieval of irrelevant documents is likely to mislead and waste time of researchers, and may also result in information overload. It is, therefore, desirable that end-users of scholarly databases should possess basic database

searching skills to independently conduct their own literature searches. Such skills are particularly useful to academics, researchers, students and other individuals involved in scholarly research. Library and information professionals need to possess advanced skills to conduct more complex searches using multiple sophisticated databases.

This chapter discusses the basic database searching skills to enable information professionals as well as end-users to conduct effective database searchers. Although the focus of this chapter is on searching scholarly databases, this knowledge can also be applied for using other popular search engines.

Becoming an Effective Database Searcher

For conducting successful database searches, a user needs to possess the following knowledge and skills. Lack of these skills may either result in retrieving irrelevant items or missing important documents. These knowledge and skills can be improved over the time period by conducting a variety of searches on multiple databases.

Knowledge of Developing Search Strategies

It is very difficult for any searcher to correctly predict how many relevant documents on a particular topic are available in a database. It is, therefore, desirable that before embarking on a database search, the searcher should have a basic knowledge of the searching process and various search options provided by different retrieval systems. Developing a search strategy is like a problem-solving process where a searcher analyses a search topic and considers different search options to obtain the desired result. It is not uncommon that two experienced searchers may use different search

approaches for conducting their searches. However, for this purpose an understanding of the search process and knowledge of various search features is a pre-requisite. A basic understanding of database design and how different indexes are created and used for fast and accurate information retrieval would be useful.

In addition, it is desirable that a database searcher should be familiar with certain common searcher features shared by all retrieval systems, such as Boolean operators, proximity operators, use of wildcards and truncations, nested searchers, design and use of database thesauri, and measures required for refining search results. Once a searcher is familiar with the technique of developing search strategies, this knowledge can be applied on all retrieval systems.

Knowledge of Retrieval Systems

For developing effective search strategies, a searcher needs to have a thorough knowledge of various search features provided by different retrieval systems. Although the retrieval systems of many established database vendors, such as EBSCOhost and ProQuest, have several common search features, they also provide certain unique features. It is, therefore, necessary that a searcher should be fully aware of the unique features provided by a particular retrieval system. Once a searcher is familiar with these search features, this knowledge can be used for searching all databases using the same retrieval system. Some unique features provided by different retrieval systems include: types of available searches (e.g. natural language, basic, advanced search), user interface, number and syntax of proximity operators; search history, and database alerts.

Knowledge of Databases

All databases, even provided by the same database vendor, have their own distinct features. For example, databases can have different number of data fields, access points (searchable fields), stop words, subject coverage, time coverage, type and number of items included (e.g. journal articles, conference papers, book reviews, reports, news, patents, etc.), and language and geographical coverage of documents. Knowledge of different databases allows a searcher to select an appropriate database which is likely to provide access to more relevant records. This knowledge is also useful in deciding what access points to use for retrieving more relevant documents from a particular database.

Domain Knowledge

Though not essential, basic subject knowledge can be an asset for a searcher. For example, for searching a law database, familiarity with basic law terminology could be useful in selecting appropriate search terms. Subject knowledge will also be useful in refining search results by selecting appropriate narrow or broad search terms. For library and information professionals, a familiarity with subject jargon can help in communicating and understanding the information needs of their users.

The Search Process

In order to obtain the desired search results, it is necessary to apply a systematic approach for conducting database searches. Some individuals ignore this process and directly jump to actual searching, without initial thinking and preparations, which may not yield the desired results. It is, therefore, desirable to systematically go through the search process which

will help develop an appropriate search strategy as well as refine the search result, if necessary. The following steps are involved in conducting a successful database search:

Scoping the Search Topic

Before embarking on a search, it is necessary to adequately understand and scope the search topic. A too broad topic is likely to yield many hits with a possible higher proportion of irrelevant documents. More time and effort will be required to review and remove irrelevant documents from the retrieved records. On the contrary, a too narrow search topic is likely to retrieve fewer documents with the possibility of missing some useful records. It is, therefore, necessary to properly scope a search topic so that adequate number of relevant documents can be retrieved.

Theme Identification

Once we know our exact search topic, we can now identify possible themes in it. This step will ensure that all important themes are adequately reflected in our search strategy. Missing an important theme or unnecessary use of certain themes could be problematic. We can categorize the identified themes into major and minor themes. Usually more attention is given to major themes while minor themes are only used in situations where major themes have either resulted in too many hits or several less relevant documents are retrieved. However, care should be exercised as in some situations a theme could actually be a pseudo-theme. Such pseudo-themes apparently look important but they are unnecessary for searching and may

result in missing some useful documents. The following example will illustrate different types of theme in a search topic:

>**Example:** *Problem of child smoking in developing countries.*

In this topic, 'child', 'smoking' and 'developing countries' are valid major themes while 'problem' should be treated as a pseudo-theme. Although in this topic the word 'problem' looks important, it should not be used in actual searching as it may considerably reduce the number of hits. This issue will be further explained in the section on Boolean 'AND' operator. A major advantage of theme identification is that all important subject areas can be identified and used for searching, covering all desired aspects of a search topic. It can also help in result refinement as a searcher can review and modify keywords used for different themes.

Identification of Synonyms

Usually several terms or synonyms can be used to represent a particular theme. Synonyms are alternate words used in the literature by different authors to discuss a topic. For instance, for handheld telephones, authors based on their personal preferences may use different terms such as 'mobile phone', 'hand phone', 'cell phone', 'i-phone', 'smart phone', etc. Similarly, certain terms are more popular in some countries while scholars in other countries may like to use a different term. For example, authors from different geographical regions may use terms 'Lady's finger', 'Okra', 'Okro', 'Bhindi', '*Hibiscus esculentus'* (technical name), etc. for the same green seed pod vegetable. If a searcher is interested in different diseases of

this vegetable, it will be necessary for him to use all possible synonyms or alternate terms for this vegetable otherwise some useful documents may not be retrieved.

Writing Search Statements

Once synonyms of all the selected themes are identified, these terms are connected using different Boolean or proximity operators. When all synonyms of a particular theme are connected (in this case by using the Boolean 'OR' operator), it is called a search statement and can be entered in a retrieval system for searching. Usually it is more appropriate to write a separate search statement for each theme as it will help in reviewing and refining the search result. If a search statement retrieves only a limited number of records, we can consider adding more synonyms. On the contrary, if a search statement retrieves too many items, we can consider removing comparatively less important synonyms for that theme.

Conducting a Search

The search statements developed for different themes can now be combined to get the final result. At this stage, certain other conditions or limitations on a search strategy can be applied to retrieve more relevant documents. For example, some search limit options provided by *Academic Search Premier* database through EBSCOhost include: full text documents, scholarly journals, published date, publication type (e.g. periodical, newspaper, book, etc.), document type (e.g. article, book chapter, case study, etc.), language of documents, and pdf full text. These search limiters provide an easy way to control the search results.

Refining the Search Result

In many situations it is likely that the original search strategy may not provide the desired result. Various additional measures and options can be used to bring search results close to the acceptable level. These search refinement measures will be discussed separately in one of the following sections.

Basic Search Skills

This section discusses the basic database searching skills that can help conduct a successful database search.
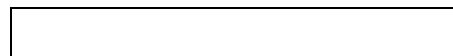
Boolean Operators

The Boolean operators, sometimes also called connectors, are used to connect different search terms to achieve the desired result. Care should be exercised as wrong use of Boolean operators can completely change the search results. Most databases use three Boolean operators, i.e. AND, OR, and NOT operators.

Boolean 'AND' Operator. The Boolean AND operator allows combing two or more terms and retrieves only records containing all the specified terms. Use of each AND operator will narrow down the search result. For example, we are interested in finding articles on "the use of Facebook by students". We can search such documents by using keywords Facebook (term A) and students (term B), combined with an AND operator. A simple search statement (without considering all possible synonyms) will be: 'Facebook AND Students' or in other words terms 'A AND B'. As can

be seen in the below Venn diagram (Figure 1), this search statement will only retrieve documents containing both the keywords, the area marked as 'AB'.


Figure 1. 'A' AND 'B'= AB
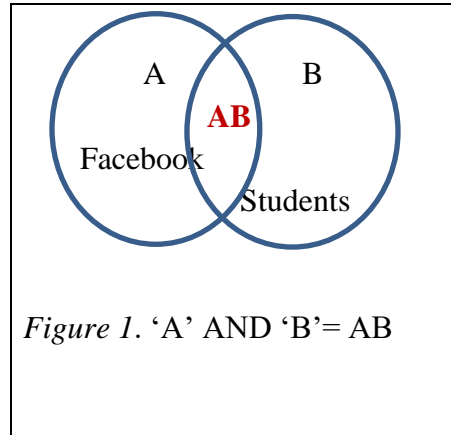
If we revise our topic to "the use of Facebook by students for studies", it will result in adding another theme 'studies' (term 'C'). In this situation, only documents containing all the three specified terms will be retrieved (Figure 2). It is important to note that although some relevant documents may be available under the area 'AB' (Facebook AND Students), these will not be retrieved. Any additional use of AND operator will further reduce the number of retrieved documents. It is, therefore, important that unnecessary use of AND operator should be avoided as it may result in missing some partially relevant documents.

Figure 2. 'A' AND 'B' AND 'C'= **ABC**
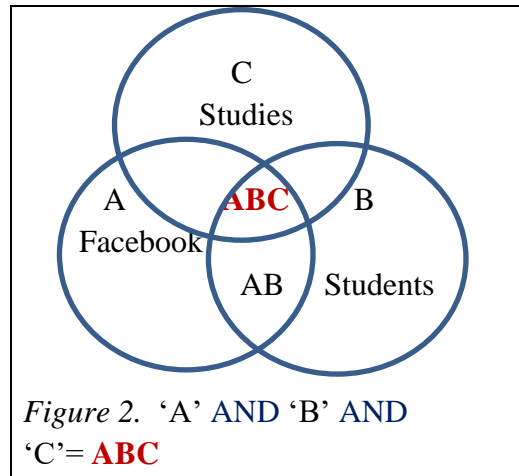
Search Tip: Use Boolean AND operator to only connect two or more search themes.

Boolean 'OR' Operator. The Boolean OR operator allows combing two or more terms and retrieves records containing either one or some or all the specified search terms. Use of OR operator expands the search result. It is mainly used to connect various synonyms representing the same search theme. For instance, if our selected theme is building lifts, we can identified its possible synonyms and connect these with OR operator. As shown in Figure 3, documents containing either the word lifts (term A) or elevators (term B) or both the words (terms AB) will be retrieved.

Figure 3. 'A' OR 'B'= **A, B, AB**
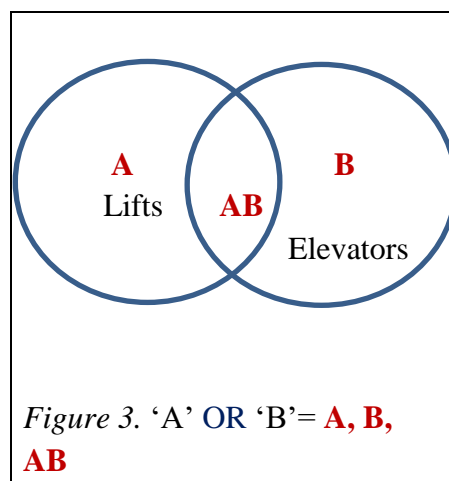
If we use several synonyms of the same theme, we are likely to retrieve more records. For example, several terms can be used to represent handheld calling devices such as hand phone, mobile phone, cell phone, smart phone, etc. (Figure 4). Documents containing any one of these terms or a combination of them will be retrieved. However, unnecessary use of OR operator for less appropriate synonyms is likely to retrieve some irrelevant records.

Figure 4. 'A' OR 'B' OR 'C' OR 'D'= All documents using a single specified term or multiple terms will be retrieved.
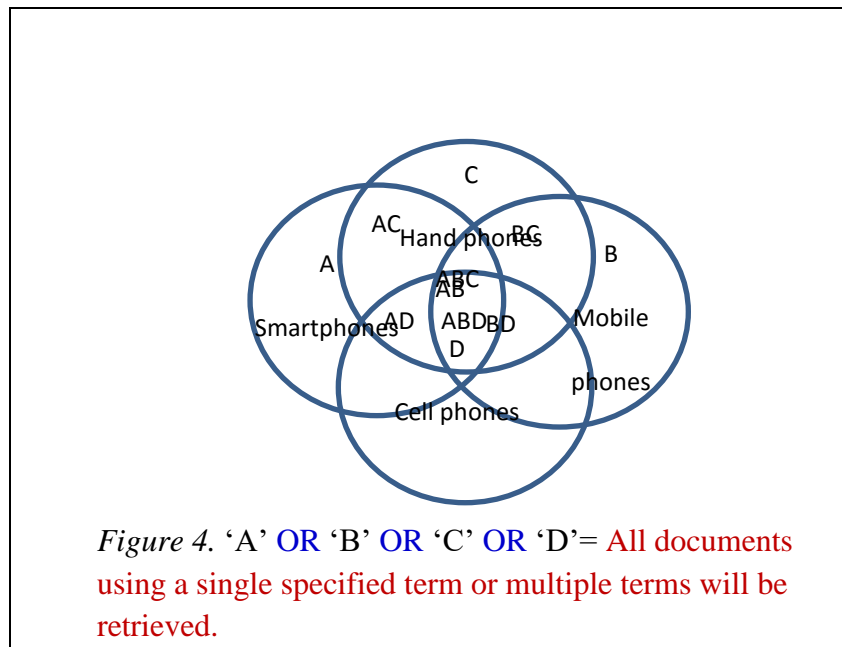
Search Tip: Use Boolean OR operator to connect synonyms of the same theme.

Boolean 'NOT' Operator. It is used to connect two or more search terms and retrieves only records containing the first term and not records containing the second term or both the specified terms. For example, we wish to find documents on "students expect teenage students". In this case all records containing the word teens (or teenage) will be removed, irrespective of the fact that these documents are also discussing students in

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other age groups (Figure 5). The Boolean NOT operator is used to narrow down the scope of a search. In this example, the overlapping area of AB will not be retrieved as word teens has appeared in these documents.

Figure 5: 'A' NOT 'B'= **A**
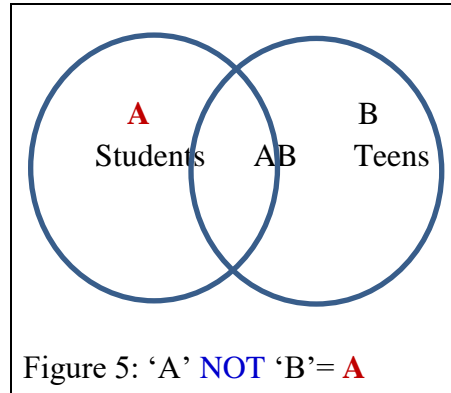
Even if a document states that 'this article discusses the knowledge sharing behavior of students from all age groups except teenage students', it will be excluded as the word teenage has appeared in it. Although this article is exactly matching our needs, it will not be retrieved. It is, therefore, necessary to carefully use the NOT operator as we are likely to miss some useful documents.

It becomes more risky if we use multiple NOT operators in a search strategy. For instance, we are interested in documents on tropical fruits, except documents discussing bananas, mangoes, and papayas. As it can be seen in Figure 6, several documents discussing tropical fruits will not be retrieved because names of the excluded fruits were mentioned in these documents. Some retrieval systems, instead of NOT operator, use 'AND NOT' label for the same functionality.

Figure 6. 'A' NOT 'B' NOT 'C' NOT 'D'= **A** (Even overlapping areas where term 'A' is also available will not be retrieved).
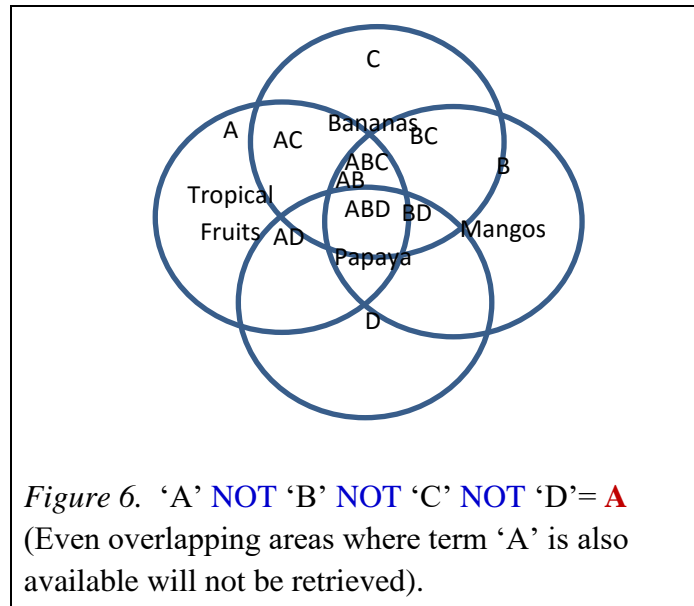
Nested Boolean

For effective searching it is also important to understand how Boolean searches are actually executed by retrieval systems. The order in which different Boolean operators are used in the same search statement can give completely different results. The following example will illustrate this point (ignoring other search features):

Search Topic: *Export of Vegetables and Fruits*

(We are interested in documents discussing export of vegetable or fruits or both the commodities)

The following are two possible ways of searching this topic:

a. Export **AND** Vegetables **OR** Fruits
b. Vegetables **OR** Fruits **AND** Export

A retrieval system will execute the above two search statements quite differently. For the search statement 'a', it will initially execute the first part of the search statement, i.e. 'Export AND Vegetables' and then add documents discussing all aspects of fruits (not only confining to export of fruits). The search statement 'b' will be interpreted and executed very differently. The retrieval system will first search documents containing the terms 'Fruits AND Export' and then add all documents on vegetables (not only on export of vegetables). This example clearly indicates that location of Boolean operators in a search statement is very important in obtaining the desired result.

The following are general rules for the execution of Boolean operators:

- AND and NOT operators have equal precedence and are searched first, followed by Boolean OR operator.
- If equal precedence (e.g. AND and NOT operators used in the same search statement), search will be conducted from left to right.
- Parentheses (Nested Boolean) have the highest priority and searched first.

We can use the following search statement which will tell the retrieval system how to execute it.
Export **AND** (Vegetables **OR** Fruits)

In the above search statement, first documents on vegetables or fruits or on both the commodities will be searched as these terms are enclosed within parentheses (highest priority). The interim result of this search will contain all documents on vegetables and fruits. In the second step, this set of documents will be searched for the term 'export'. The final result will retrieve documents containing the term export and either the terms vegetables or fruits or the both. Thus by using parentheses we can clearly tell the search engine how to execute our search statement.

Search Tip: It is always safe to put all synonyms of a theme within parentheses to create a separate sub-set by using Boolean OR operators. Then sub-sets of all the themes can be combined with Boolean AND operator. This technique, also called Block Building technique, is very useful in conducting a systematic search, particularly for complex topics. It is also helpful in diagnosing and rectifying problems in a search strategy.

Search Exercise

Topic: *Investigating income of female employees in third world countries.*

There are three themes in this topic: Income; Female; and Third World Countries. The keyword 'investigating' is a pseudo-theme and should be ignored. We can construct separate search statements for the identified themes and then combine these with Boolean AND operators.

Theme 1 (Income): (pay* **OR** income **OR** earn* **OR** salar*
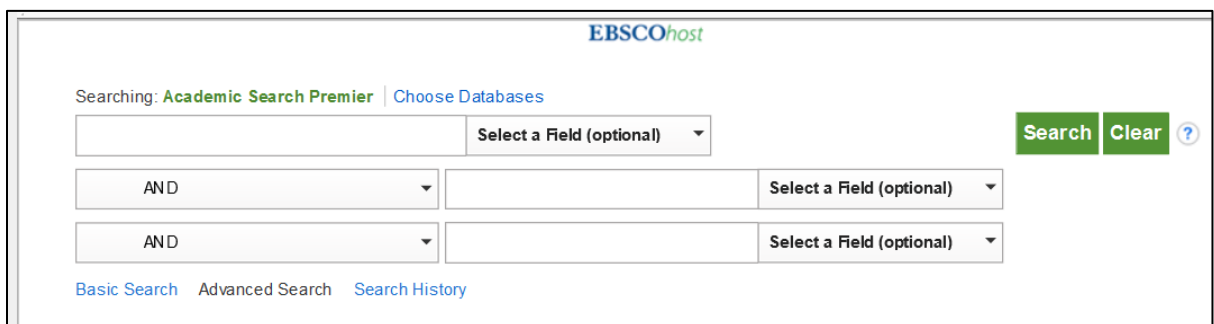**OR** wage*)

AND

Theme 2 (Female): (wom?n **OR** female **OR** girl* **OR** lady
OR ladies)

AND

Theme 3 (Third World Countries): (("third world" **OR**
developing **OR** emerging **OR**
underdevelop* **OR** poor **OR** "less
developed") **W3** countr*)

(Note: See explanation of the proximity operator 'W3' and
truncation symbols '*' and '?' in the following sections.)

Actually most of the popular search engines have indirectly implemented
this technique in their user-interfaces. Each search box can be used for a
single theme with Boolean OR operators. Many retrieval systems provide
Boolean AND as the default connector between search boxes, which can be
changed if needed (Figures 7-8). Such interfaces allow searchers to handle
each theme separately and then use Boolean AND operators to get a
combined final result.

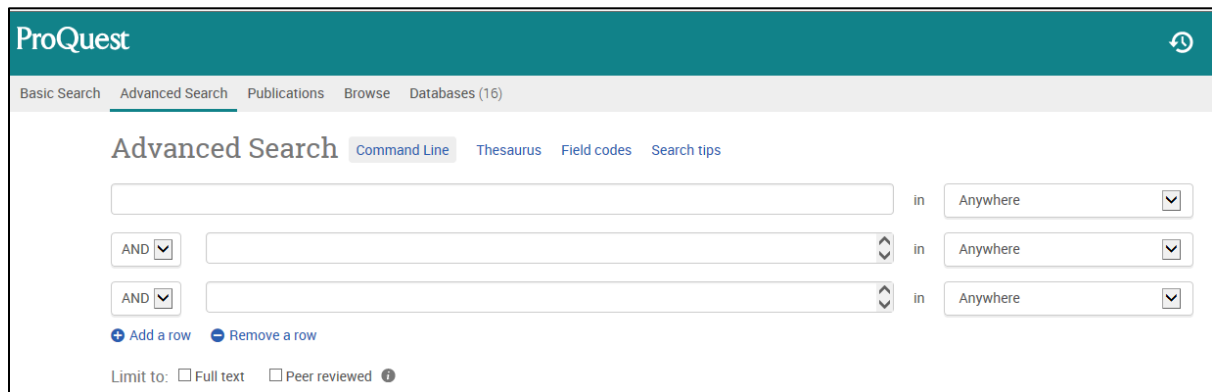*Figure 7.* EBSCO*host* Advanced Search Interface

Figure 8. ProQuest Advanced Search Interface

Proximity Operators

In addition to Boolean operators, we can also use proximity operators or connectors to obtain the desired search results. Actually the function of proximity operators is the same as an AND operator because the retrieved records must contain all the specified terms with certain additional restrictions. One weakness of Boolean AND operator is that it cannot consider the context of search terms. The only requirement is that the specified terms should be available in the field(s) used for searching. For instance, if we use a statement 'Children AND Vaccination' to search the abstract field, documents having these two terms anywhere in their abstracts will be retrieved. It is possible that these terms might be used in completely different contexts and, as a result, some irrelevant documents may be retrieved. Proximity operators, which act as conditioned ANDs, are likely to overcome this problem to some extent. Most of the proximity operators specify the following to two conditions:

      a. Order or sequence in which the search terms should appear, and

      b. Physical distance between the search terms

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The above two conditions are likely to improve search results as sequence and closeness of search terms are more likely to share the same context thus reducing the chances of retrieving irrelevant records. Although in many situations proximity operators are more powerful than Boolean AND, even many experienced information professionals do not frequently use them. One major problem is that sometimes different proximity operators are used by major retrieval systems for the same functionality. For example, the function of proximity operator 'WITHIN' in EBSCOhost is the same as operator 'PRE' in ProQuest. Two different labels for the same function could be confusing for some searchers. Similarly, as illustrated below, the way these operators should be used (search syntax) could also be quite different:

- Child **WITHIN3** Education   or   alternatively Child **W3** Education (EBSCOhost)
- Child **PRE/3** Education   or   alternatively Child **P/3** Education (ProQuest)

Behavior of some popular proximity operators (EBSCOhost) are discussed below:

Proximity Operator WITHIN (W): The terms should occur next to each other within the <u>specified distance</u> and in the <u>indicated order or sequence</u>.

Example: We are interested in documents discussing the concept of Information Management. However, we not sure how different authors have used this concept in their publications. In order to avoid missing useful records, we may write our search statement using the WITHIN operator.

Information **W4** Management

The above statement tells a search engine to retrieve documents where word 'Management' has appeared within four words after the word 'Information'. This statement will retrieve documents containing the following expressions:

- Fundamental of **information management**
- Problem of **information** quality and its **management**
- **Information** acquisition and **management**

Proximity Operator NEAR (N): The terms should be next to each other within the <u>specified distance</u> but in <u>any order or sequence </u>(either side).

Information **N4** Management

The above statement will retrieve documents where the word 'Management' has appeared within four words on either side of the word 'Information'. This statement will retrieve documents containing the following text:

- **Management** of confidential **information**

- Skills required for the **management** and categorization of **information** resources

- Corporate **information** assets and their **management**

Some retrieval systems may use several additional proximity operators, suitable for searching their specific content. For example, some additional proximity operators provided by LexisNexis are: **W/p** (within the same paragraph) and **W/s** (within the same sentence).

Phrase Searching

Some concepts, such as intellectual freedom, global warming, economic reforms, interest rates, knowledge management, personal information management, etc. are better represented in multiple words or phrases. Using these terms individually and combining them either with Boolean AND operator or even proximity operators could retrieve some irrelevant records. If search terms are enclosed in double quotation marks (some systems also accept single quotation marks), the search engine will look for these terms in the provided order. Some retrieval system are more flexible and treat multiple words, even without quotation marks, as a phrase.

Most retrieval systems ignore stop words used in a phrase. For example, in the phrase "Memorandum of Understanding" only keywords 'Memorandum' and 'Understanding' will be used for searching while 'of' will be ignored as it is a stop word. Similarly, a Boolean operator used in a phrase will also be ignored.

Stop words

Some word are not considered useful in searching and, therefore, not included in database indexes which are used for information retrieval. Such words are called stop words and mostly include commonly used words such as articles, pronouns, prepositions or conjunctions (e.g. the, they, it, if, is, are, was, after, for, that, etc.). Stop words used in a phrase are ignored but counted in a proximity search. Care should be exercised as use of stop words in a search statement can yield a zero result because these words are not included in database indexes. All databases have their own stop word list which should be consulted to avoid unexpected results.

Using Truncations and Wildcards

Proper use of truncations and wildcard symbols can help retrieve the needed records with less time and effort. These symbols can be used to represent certain unknown characters, to handle spelling variations, and to allow different forms of a word.

Wildcards. Wildcard symbols are used to replace a single or multiple unknown characters in a search term. For example, EBSCOhost retrieval system provides two wildcard symbols which can be used in different situations. The wildcard symbol '**?**' is used to replace each unknown character in a search term. For instance, **ne?t** will replace the wildcard symbol '**?**' with a single character and will retrieve words such as **neat**, **nest**, **next**, etc. Similarly, **wom?n** will retrieve **woman** and **women**. This way a searcher does not need to type multiple words. However, it will not retrieve the word **net** as a character must replace the wildcard symbol '**?**'.

Another wildcard used by EBSCOhost is the hash symbol (#) which allows alternate spellings. For example, an expression **clo#r** will retrieve both **color** and **colour**. In this case the hash symbol will only replace a character whenever it is available.

Word Truncation. It is very useful when we need to use different variations of a term. Here we enter a common part of a term (also called word root) which can have several variations. Many search engines use asterisk (*) as their truncation symbol. For example, the expression '**Comput***' will search all terms sharing the specified starting characters, such as compute, computer, computing, computation, computerization, etc. The search engine will automatically use Boolean OR operators to connect these terms. In other words, use of truncations will expand a search and more records will be retrieved.

However, it is important to truncate a term at an appropriate location otherwise it will retrieve irrelevant documents. For instance, truncating at '**Comp***' will also search terms such as composition, comparison, competition, compilation, etc., which will result in retrieving irrelevant records.

Using a Database Thesaurus

Most of the reputable databases use a controlled vocabulary to represent themes discussed in their documents. A controlled vocabulary could be as simple as a list of selected keywords or as sophisticated as subject headings or a database thesaurus. A controlled vocabulary can be used by database producers for subject indexing of their records/documents as well as by

database searchers to identify and select appropriate terms for their search strategies. A controlled vocabulary is needed because bibliographic information of documents may not always fully represent their content. For example, in some situations either titles of documents do not provide complete information or they are misleading. For instance, a journal article used the title "Milk that grows on plants". If a searcher is interested in all articles on milk and uses this term (milk) for searching, this article will also be retrieved. However, this article is irrelevant because its major theme was actually the production of soya bean crop, which can also be used for producing soya milk. It is, therefore, necessary to use a control vocabulary to identify appropriate descriptors or subject headings to represent all important themes discussed in a document.

A database thesaurus is different from a language thesaurus as it also shows hierarchies of terms and their relationships with other terms. A searcher can use database thesaurus to select appropriate terms for building his search strategy. A typical thesaurus term may use the following type of relationships:

- Hierarchy relationship
- Equivalence relationship
- Associative relationship

Every relationship has a reciprocal (pair) property which indicates how a terms is related to another term. For example, all broader terms (BT) have their narrower terms (NT) and all narrower terms have their broader terms. In other words, there are no standalone terms (terms without any

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relationship) in a thesaurus. In addition to showing relationships, some thesauri also provide additional information about the scope of certain terms, which can help indexers and searchers in selecting appropriate terms. For example, the scope note of the term 'Physical Disabilities' in ERIC thesaurus mentions:

Scope Note: *Disorders that result in significantly reduced bodily function, mobility, or endurance (Note: Avoid misindexing "Hearing Impairments" or "Visual Impairments" with this term).*

Thesauri are considered living documents and they should regularly include new terms from emerging disciplines, reflect changes occurring in languages, and echo developments happening in certain societies. A term used in the past may not be considered appropriate now. Some thesauri provide evolution and progression of certain themes and changes occurring to their associated terms over the time period. For example, once the term 'Negroes' was used to represent African Americans. However, this word was later considered offending and humiliating and stopped appearing in the literature. The process of refining this term also continued in thesauri and different terms were used during different time periods. For example, the terms used by ERIC thesaurus in the past were: Negroes (1966-1977), Black American (2004), and Afro American (2004), etc. Similarly, some terms previously used for the theme 'developing countries' were: poor countries, under-developed countries, less developed countries (LDC), third world

countries, etc. Availability of scope notes and historical information help database indexers and searchers in identifying and using appropriate terms.

The following sections will discuss different term relationships presented in database thesauri.

Hierarchy Relationship. It shows a reciprocal relationship between broader terms (superordinate or parent terms) and their narrower terms (subordinate or child term). As previously discussed, all terms should appear in pairs – all broader terms (BT) have their narrower terms (NT) and all narrower terms have their respective broader terms.

Examples:

Mammals NT Dogs *(there are several other NTs for 'Mammals' such as cats, horses, buffaloes, etc.)*

Dogs BT Mammals

Carrots BT Root Vegetables

Root Vegetables NT Carrots *(there are several other NTs for 'Root Vegetables' such as radish, turnips, potatoes, etc.)*

Equivalence Relationship. When two or more terms represent the same or nearly the same theme, one of these terms is selected as the preferred term (also called a 'descriptor'). A cross-reference to this descriptor is made from all the remaining terms (synonyms) which may act as entry points for

thesaurus users. These synonyms tell users to use (USE) the valid descriptor, while the descriptor term informs users that it is used for (UF) its possible synonyms. In many situations, in addition to a descriptor, use of its synonyms can help expand the scope of a search.

Examples:

Aves   **USE**   **Birds**

Birds   **UF**   **Aves**

Mobile phones   **USE**   **Cell phones**

Cell phones   **UF**   **Mobile phones, hand phones, smart phones, i-phones**

Associative Relationship. Certain descriptors are neither equivalent nor hierarchical, yet these terms have some association with each other. Usually there is an element of overlapping meanings among these descriptors. Depending on the context, a searcher can also consider and select certain related terms (RT) with overlapping meanings.

Examples:

Gold   **RT**   **Money**

Money   **RT**   **Gold**

(Although gold is a metal, it can also be used as a substitute of money.)

Mathematics   **RT**   **Mathematician**

Mathematician   **RT**   **Mathematics**

(Although mathematics is a subject area while mathematician is a person, there is an overlapping relationship between these two terms.)

Figure 9 presents a typical thesaurus display, showing information about the scope of the term, broader and narrower terms, related terms, and the term history.

Figure 9: A Typical Database Thesaurus Term Display

Refining Search Results

In spite of a carefully developed search strategy, it is not uncommon that a searcher may not be able to retrieve desired number of relevant records. In many situations, a searcher needs to either broaden or narrow down the scope of his search strategy. The following sections suggest various measures for broadening and narrowing search results. These measures are presented in a random order and a searcher can decide what measures to use in a given situation.

Broadening Search Result

1. Drop less important themes to increase the number of hits. Dropping some themes would result in using less number of Boolean AND operators thus increasing the number of hits.

2. Use more synonyms for the identified themes. This will result in using more Boolean OR operators which will increase the number of retrieved records. For identifying new synonyms, various sources such as database thesaurus or subject headings can be used. Another way to identify good synonyms is to examine the retrieved relevant records and look for additional keywords.

3. Use wildcards and truncations which will allow including additional terms in the search and, as a result, more records will be retrieved.

4. Do not limit your search to a particular data field (e.g. title or abstract). Use of multiple default searchable fields such as title, abstract, keywords, descriptors, etc. will increase the number of hits as several fields will be searched simultaneously.

5. If the selected database provides a thesaurus, try to select broader terms to expand scope of the search.

6. Use multiple databases in the same discipline.

7. Check errors in the search strategy – wrong use of Boolean and proximity operators, spellings, search limiters, etc.

Narrowing Search Result

Here assumption is that we have retrieved more than the desired number of records and we wish to reduce them. Actually some of the measures

suggested above can be used in reserve meanings to cut down the number of retrieved documents.

1. If appropriate, add more themes which will result in using more Boolean AND operators thus reducing the number of hits.

2. Review the synonyms used for each theme and drop less important keywords. This will result in using less number of Boolean OR operators, thus reducing the number of retrieved records.

3. Use appropriate proximity operators which will reduce the number of irrelevant records.

4. If appropriate, instead of using individual terms connected with Boolean AND operator, use phrases which will retrieve less but more relevant documents.

5. Limit the use of truncations and wildcards which will reduce the number of word alternates or synonyms.

6. Search the selected terms in an appropriate data field which will retrieve less but more relevant documents.

7. Consult the database thesaurus and select more specific and narrower descriptors.

8. Limit your search by using appropriate search limiters, such as year of publication, language, document type, full-text, peer reviewed, etc.

9. Avoid searching multiple databases simultaneously. Select a database which is likely to provide the best possible results.

10. If necessary, use Boolean NOT operator. However, caution should be exercised as Boolean NOT is likely to remove some relevant documents.

Selection of Databases

As discussed at the start of this chapter, it is desirable that a searcher should have sufficient knowledge of databases accessible to him. A good search strategy used in an inappropriate database can result in unsatisfactory result. It is, therefore, necessary that a searcher should identify and use an appropriate database for searching. The following factors can be considered while selecting databases for searching. These factors can also be used by library and information professionals while subscribing to their databases.

1. Availability of basic information about a database – reputation of the database producer, total number of records, annual additions, number of serials covered, etc.

2. Subjects coverage (e.g. social sciences, humanities, business, etc.). If a database is in a specific subject area (e.g. agriculture), whether it covers all sub-disciplines of this subject or only a few (e.g. entomology, fishers, food & nutrition, etc.).

3. Time coverage of the records. Some databases only provide access to recent literature while others cover all available literature in a subject area.

4. Geographic coverage of records (e.g. Europe, North America, Asia or all countries).

5. Language of documents covered (e.g. English, German, French or all languages).

7. Type of documents included in the database (e.g. articles, patents, theses, reports, etc.).

8. Database updating frequency (e.g. real-time, hourly, daily, monthly, quarterly, or irregular).

9. Document turnaround time – time lapse between publishing of an item and its inclusion in the database. Some databases immediately include newly published literature while others take considerable time to do so.

10. Target users of the database (e.g. general public, school students, college and university students, academicians, researchers, business people, etc.).

11. Indexing depth of documents (e.g. whether all major and minor themes discussed in a document are indexed or only the major themes are covered).

12. Amount and type of information provided in each record (e.g. bibliographic information, full-text, numeric data, directory information, etc.)

13. Options provided to customise display, printing, and downloading of retrieved records in different formats and styles.

14. Type and quality of database thesaurus used.

15. Overall data quality – (e.g. indexing errors, spelling mistakes, and other issues in the records).

16. Level of assistance available to users (e.g. online help, search tips, FAQs, online tutorials, etc.).

Exercise

This section provides a sample search topic and how to develop its search strategy. It is important to note that there is no single standard approach for conducting a particular search. It will basically depend on the experience and preferences of a searcher.

Search Topic: *The impact of TV on domestic violence.*

Possible Solution: There are three themes (i.e. TV, domestic, violence) and one pseudo-theme (i.e. impact) in this topic. It would be better to treat 'impact' as a pseudo-theme as even without it we can retrieve most of the relevant documents. Its inclusion will result in using an additional Boolean AND operator, thus chances of losing some relevant documents (see the section on Boolean AND operator). Although apparently domestic violence looks like a single theme, it will be difficult to adequately identify and use its possible synonyms. The following search strategy can be used for this topic:

> Theme 1 (TV): (TV **OR** Television)
> > **AND**
>
> Theme 2 (Domestic): (domestic **OR** family **OR** home **OR**
> > spouse **OR** child* **OR** boy* **OR** girl*
> > **OR** wom?n)
> > **AND**
>
> Theme 3 (Violence): (violence **OR** abus* **OR** aggression*
> > **OR** hostilit* **OR** assult*)

> *(Note that we have only used Boolean OR within a theme to connect its synonyms and Boolean AND to connect the three themes.)*

It is also possible to use proximity operator NEAR to combine the sub-themes 'domestic' and 'violence'.

> 1. (TV **OR** Television)
> > **AND**

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2. ((domestic **OR** family **OR** home **OR** spouse **OR** child*
   OR boy* **OR** girl* **OR** wom?n) **W5** (violence **OR**
   abus* **OR** aggression* **OR** hostilit* **OR** assult*))

If we use the 'command search' option of a retrieval system, it is possible to merge the three themes into a single search statement. However, it is comparatively more difficult to review and make changes in a single long search statement.

((TV **OR** Television) **AND** (domestic **OR** family **OR**
home **OR** spouse **OR** child* **OR** boy* **OR** girl* **OR**
wom?n) **AND** (violence **OR** abus* **OR** aggression* **OR**
hostilit* **OR** assult*))

Conclusion

This chapter has discussed some basic search features provided by a majority of the academic databases. As the number of databases is growing rapidly, it is important that library and information professionals should possess adequate searching skills to develop effective search strategies. It is equally important that library patrons should also be able to conduct their own simple searches and approach library and information professionals for more complex topics. It is, therefore, necessary that libraries should offer short training courses to their patrons to teach them basic database searching skills. In addition, libraries should also develop appropriate library-specific user assistance tools for database searching such as online tutorials, FAQs, handouts, and other help materials to facilitate self-learning by library patrons.

Chapter Ten

Abdus Sattar Chaudhry

TAXONOMIES AND METADATA

Metadata and taxonomies have become important for organizing information and knowledge in the digital environment. These play an important role in defining digital asset management systems and web content management systems. It is therefore important that strategies for metadata and taxonomies are deployed for categorizing and relating assets and content to support organizational goals and objectives. However, most of the time metadata can be confused with taxonomies and vice versa. It is therefore important that the nature and role of these important steps in knowledge organization are properly understood. In this chapter, these two terms are described and other relevant concepts are explained so that their role is appropriately understood.

Metadata

Metadata is data about data. It is a description of something: a document, spread sheet, web page, database, etc. In other words, aattributes or elements that help to define or describe a particular information item or knowledge resource would be considered metadata. Metadata is used to display information to users about the resource. Metadata can also be used to help protect an asset's intellectual property rights. In the context of information and knowledge organization, metadata is used to support the following:

- Search
- Context

- Ownership
- Rights management
- Tracking
- Preservation

The following three types of metadata is important in knowledge organization:

Descriptive Metadata

This type of data focuses on the contents of information items and is generally derived from the item itself. Examples of descriptive metadata include cataloging records, finding aids, specialized indexes, hyper link relationships, and annotations by users. Such data help achieve the following objectives:

- ✓ To serve the purpose of discovery (how one finds a resource)

- ✓ To facilitate identification (how a resource can be distinguished from other similar resources)

- ✓ To assist in selection (how to determine that a resource fills a particular need)

- ✓ To assist in evaluation, linkage, and usability

Administrative Metadata

This type of data focuses on the context and is external to the resource. Common examples of administrative data include acquisition information, rights management details, location information, documentation of access, criteria for digitization, version control, etc. The objective of this type of metadata is to facilitate the management of resources with focus on the following:

✓ When and how an object was created?

✓ Who is responsible for controlling access to or archiving the content?

✓ What control or processing activities have been performed in relation to it?

✓ What restrictions on access or use apply?

Structural Metadata

This type of metadata focuses on presentation of an item and is about relationships among different parts of the item. Examples of structural metadata include TEI guidelines, e-book structure, XML coding, page breaks, chapter headings, etc. The following features distinct structural metadata:

✓ Information about structural metadata can be thought of as the glue that holds compound digital objects together.

✓ Structural metadata is required to record the relationships between different components of a knowledge entity to enable its use.

Metadata Schemes

Schemes are sets of metadata elements and rules for their use defined for a particular purpose with specifications for:

- *Semantics* – meanings of the items of metadata (elements) with name and a definition and the conditions of application (required, optional, repeatable).
- *Content Rules* – how to select and represent the elements.
- *Syntax* – how to encode the elements into machine-readable form.

Metadata schemas are also called element sets, and property vocabularies. They generally specify names of elements and their semantics. They may also specify rules for how content must be formulated, representation rules for content, and allowable content values. Schemes have profiles that are formally developed specifications that limit and clarify the use of a metadata scheme for a specific user community.

Metadata standards

The following standards are relevant to knowledge organization functions:

- Standards for data structure, e.g., Dublin Core, VRA, EAD, MODS, etc.
- Standards for data contents, e.g., RDA, CCO. DACS, etc.
- Standards for data exchange, e.g., HTML, XML, RDF, etc.
- Standards for data value, LCSH, AAT, TAG, LCNAF, etc.

Dublin Core (DC) is one of the commonly used metadata format in knowledge organization applications. DC metadata element set datils are available at http://dublincore.org/documents/dces/ and implementation terms can be seen at http://dublincore.org/documents/dcmi-terms/. DCME s*et is a standard for cross-domain information resource description. It is now a U.S. national and international standard. Here is a listing* of metadata standards and schemes used in different environments:

- EAD (Encoded Archival Description) - An SGML DTD that represents a highly structured way to create digital finding aids for a grouping of archival or manuscript materials. The standard is

maintained in the Network Development and MARC Standards Office of the Library of Congress (LC) in partnership with the Society of American Archivists. For more information see http://lcweb.loc.gov/ead/.

- IEEE LOM (Institute of Electrical and Electronics Engineers. Learning Object Metadata) - Standard jointly developed by IMS, IEEE, ARIADNE, and ADL/SCORM for describing, exchanging and managing, locating and evaluating learning objects, that is, instructional content, in a digital or non-digital format. The Draft standard dated 15 July 2002 includes nine categories for the metadata: general, life-cycle, meta-metadata, educational, technical, rights, relation, annotation and classification. Includes a mapping to Dublin Core Simple (Annex B, p. 44)

- IMS (Instructional Management Systems) - A specification developed by EDUCAUSE (formerly EDUCOM), a consortium of U.S. institutions of higher learning and vendors, for the discovery and description of learning objects. The specification covers a wide range of e-learning related activities, e.g. vocabulary markup, learning design, content packaging, learner information. It became the basis for the IEEE Learning Object Meta-Data (LOM). The specification includes the element names, definitions, datatypes, and field lengths and defines a conceptual structure for the metadata.

- MODS (Metadata Object Description Schema) - "Intended to be able to carry selected data from existing MARC 21 records as well as to enable the creation of original resource description records. It includes a subset of MARC fields and uses language-based tags rather than

numeric ones, in some cases regrouping elements from the MARC 21 bibliographic format."

- OWL- Web ontology language http://www.w3.org/TR/owl-features/. OWL is a language for describing ontologies and schema. It can specify concepts and their relationships. OWL/XDD (XML declaration description) allows a means to express complex rules and constraints.

- ONIX (Online Information eXchange) - Developed by book publisher for the exchange of book trade information between publishers and wholesalers, e-tail and retail booksellers, other publishers, and anyone else involved in the supply chain. Standards are also being developed by publishers for serials. Mapping between ONIX and MARC exists to facilitate the exchange of content from publishers to library cataloging agencies. Consists of more than 236 elements.

- SCORM (Sharable Content Object Reference Model) - eLearning metadata standards supported by ADL (Advanced Distributive Learning Initiative).

It is also important that information professionals are clear about how to record metadata in records to be used in knowledge organization systems. Different approaches are used to record metadata. Commonly used approached are summarized as under:

- Embedded directly into a file, such as HTML document (tags can be viewed by a click on browser's *view/source* option).

- Metadata can be stored in a separate file (files include a URL or other location information for the item being described).

- Metadata can be stored as a record in a database (record consists of metadata tags and location information for the actual documents).

- The method used for adding metadata to a resource is unique for each institution.

- Although metadata in HTML format can look very technical, in most institutions, adding metadata is simple and easy.

- Templates and software applications greatly simplify the process of adding metadata.

Once the details for metadata records are worked out, guidelines should be prepared for staff involved in preparing metadata records. The following aids are useful to facilitate metadata creation:

- metadata specifications
- entry template
- editing tools
- harvesting tools
- user guidelines
- mechanism for interoperating with other collections

There are plenty of tools available that can be integrated into information systems to make it easy for staff to enter and edit metadata. Information professionals should make sure that appropriate features are available in automated information systems for metadata entry and editing.

Metadata Implementation Strategies

Organizations interested in taking advantage of metadata for organization of information and knowledge resources are expected to put in place

appropriate strategies. In this regard, decisions need to be made about what kind of information organization needs to describe resources? And how much detail need to go into a metadata record? In addition, strategies need to cover aspects related to metadata scheme and element set, parameters and input standards, exchange syntax, and metadata creation tools. It should also be clear if the emphasis is on browsing and navigation of resources on repositories, websites, and other online sites.

The most common way to associate metadata with web-accessible content is to embed the metadata in the digital object that it describes – if the object is an HTML document, metadata can be embedded by use of *<meta>* elements. Not all web pages are harvestable – a file called 'robots.txt' in the web server directory can stop harvesting. *<META NAME='ROBOTS'' CONTENT='NOINDEX''* can be used to specify that a certain page should not be indexed. Most Internet search engines index only static HTML pages - a huge amount of web-accessible content is not maintained as static HTML.

In theory, authors could provide accurate information about their web pages in <meta> tags and search engines could use the contents of these tags in indexing and ranking. In practice, however, use of <meta> tags vary from engine to engine. Most search engines will index the terms found in the description field. Some will index terms found in the keywords field. The following guidelines will be helpful in leveraging metadata for knowledge discovery:

- Directions on which elements to use
- Mandatory set of elements

- Conditional (mandatory in some circumstances)

- Standards for each element to be included in the record

- A consistent way to complete each free text element

- Appropriate level of detail in each element

- Vocabularies to be used

- Authority lists and thesaurus of terms

- Names of persons and departments

Metadata Creation Practices

There are more than 150 metadata formats currently in use in information institutions. In this chapter, Dublin Core (DC) metadata format is used to describe and explain practices related to metadata creation and management. DC is a set of core elements developed with simple rules that could be applied by non-specialists. DC is used by researchers, museum curators, and music collectors, and several other communities of users. DC does not require knowledge of highly specialized descriptive systems like AACR or tedious encoding scheme like MARC. Basic set of elements include Title, Creator, Contributor, Subject/Keywords, Description, Publisher, Dates, Identifier, Resource type, Format, Relation, Source, Language, Coverage, and Rights. These elements can be used either with short or long descriptions. Here is an example of DC metadata with short description.

```
<HEAD>
<TITLE>Foundations Project summary</TITLE>
<meta name="DC.Title" content="Foundations Project summary">
```

<meta name="DC.Description" content="Summary information about the State of Minnesota's Foundations Project, including focus, purpose, design and intended results.">
<meta name="DC. Creator" content="Quam, Eileen">
<meta name="DC. Publisher" content="Minnesota. Dept. of Natural Resources">
<meta name="DC. Date" content="1999-10-15">
<HEAD>

The description with qualifiers is displayed as under:

<meta name="DC.Title" content="BIO, Biotechnology Industry Organization">
<meta name="DC.Creator.nameCorporate" scheme="MEntry" content="Biotechnology Industry Organization."> <meta name="DC.Publisher.place" content="Washington, D.C. :">
<meta name="DC.Date.issued" scheme="MARC21-Date" content="2002-9999">
<meta name="DC.Description.note" content="Title from opening screen (viewed Nov. 13, 2002)."> <meta name="DC.Description.summary" content="The Biotechnology Industry Organization (BIO) is a biotechnology advocacy group."> <meta name="DC.Identifier" scheme="URI" content="http://www.bio.org/"> <meta name="DC.Language" scheme="ISO639-2" content="eng">

These descriptions appear complex because of syntax but with the use of editing tools can be done without much difficulty. The tools and utility programs can facilitate through assistance in the following:

- Simplify addition of Dublin Core metadata
- Embed tags directly into <head> portion of html doc
- Have XML output capabilities
- Facilitate batch updating
- Some tools come with several vocabularies

Some examples of these tools include: TagGen
http://www.hisoftware.com/fact_sheetcc.htm **;** Reggie-The Metadata Editor
http://metadata.net/dstc/**;** UKOLN DC-Dot
http://www.ukoln.ac.uk/metadata/dcdot/**.**

Policy guidelines should also be prepared for the following: directions on which elements to use mandatory set of elements & conditional (mandatory in some circumstances; standards for each element including a consistent way to complete each free text element & appropriate level of detail in each element, and vocabularies to be used including authority lists and thesaurus of terms and names of persons and departments.

Taxonomies

Taxonomies are different from metadata in that a taxonomy helps you to organize your content and assets into hierarchical relationships. It becomes easier Classifying content and assets in a taxonomy can make it far easier to search for or browse particular resources from digital assets or content management systems once the resources ae categorized using a taxonomy. you aren't sure exactly what you are looking for. Defining and using a taxonomy can also help categorizing content and assets using a controlled vocabulary. What is confusing is that different terms are used for same and similar concepts related to metadata and taxonomies. These include ontologies, controlled vocabularies, thesauri, folksonomies, and tagging. There is considerable overlap in these terms and sometimes these are used interchangeably. There are some distinctions in their role and functions as they are used for organizing information and knowledge. In the next section, description of these terms is provided to distinct these in terms of their use.

Controlled Vocabularies

These refer to terms that are used to describe an item which may be described in multiple ways. A controlled vocabulary provides consistent usage of language to describe an item through synonym control. Depending on refinement of these lists of terms, they may be referred to by different names, e.g., list of subject headings, thesauri, etc. Subject heading lists are generally at a broader level and are mainly lists of names of subjects preferred to be used for specific concepts in labeling information resources. A thesaurus allows for the cross-referencing of terms and concepts with potential relationships between terms. Thesauri are generally prepared in narrowly defined subject areas. The terms are organized by broader term (BT), narrow term (NT), and related term (RT) relationships. Thesauri are used for both indexing (analysis for organization) and searching information resources from collections of knowledge resources such as bibliographic database, repositories, and other online sites. Controlled vocabularies also have tremendous potential for building taxonomy for a particular organization or a selected information system.

Folksonomies

These are ad hoc taxonomies created through a collaborative process by content creators and users of a system. Some other words affiliated with folksonomies include collaborative tagging, social classification, social indexing, and social tagging. More on information on folksonomies can be found at http://en.wikipedia.org/wiki/Folksonomy. Folksonomies have great potential for social tagging and can also be used to refine and enhance existing taxonomies.

Social Tagging

Social tagging emphasizes on user involvement in the tagging and categorization process. These collaborative resource sharing applications enable users to upload resources online, tag them with folksonomic keywords and then share them with website community. Many social websites use different names when referring to social tagging. These include collaborative tagging (Golder & Huberman, 2006), social annotations (Wu, Zhang, & Yu, 2006); and user tagging (Furner, 2007). The common feature is that tags are being used to provide a potent web tool and resource discovery aid (Goh et al., 2008). The core value of social tagging is these thrive on users' contributions as core creators and facilitators, to classify, organize, and share information and knowledge (Lambe, 2007).

Ontology

An ontology refers to a network of relationships between terms or even taxonomies. In the broadest sense of the term, it is a mapping of a conceptual model with specification of entities and relationships. which discusses scenarios in which ontologies make more sense than other forms of structuring information. Best realms in which to deploy ontologies include small collection being described, formal categories, stable entities, restricted entities. Ontology is more relevant from the information system perspective as compared to taxonomies. It deals with complex relationships with items and their description. More information on ontology can be found from http://www.shirky.com/writings/ontology_overrated.html

Taxonomy Building

Irrespective of what it is called, the development of a good taxonomy takes into account the importance of separating elements of a group (taxon) into subgroups (taxa) that are mutually exclusive, unambiguous, and taken together, include all possibilities. A good taxonomy should be simple, easy to remember, and easy to use.

An excellent introduction to what taxonomies are is available at http://www.digital-web.com/articles/better_living_through_taxonomies/. Considering their important role and potential for organizing information and knowledge resources in repositories and online sites, several books have been written on building and using taxonomies.

Several taxonomy building projects have been reported that provide good examples of building taxonomies using controlled vocabularies and classification schemes. For example, a project by Chaudhry and Goh (2005) focused on building taxonomy in business using organizational resources, while another project focused on building taxonomy for organizing organization of information resources in the domain of cultural heritage (Chaudhry and Tan, 2005).

To examine how a general classification scheme and domain thesauri can be used as sources in an organizational taxonomy for navigation, an organizational taxonomy was built for a library and information science school using Dewey Decimal Classification (DDC) and several domain thesauri to support the school's teaching/ learning and research activities (Wang, Chaudhry, & Khoo, 2006). The first part of the study, the taxonomy

development process, findings, and specific steps and guidelines for the construction of the hierarchical structure and categories, were reported by Wang et al (2010). A subsequent study by Wang, Khoo and Chaudhry (2014) focused on the evaluation of the navigation effectiveness of the taxonomy and the effectiveness of the taxonomy construction steps.

Khoo, Wang, and Chaudhry (2012) also described a task-based taxonomy in the domain of information studies. They pointed out some issues in the construction of an organizational taxonomy for navigation using existing general classification schemes and domain thesauri. The derived guidelines and steps will be helpful for other organizations who hope to develop their own taxonomies to support navigation. The Information Studies Taxonomy that was refined based on evaluation results can serve as a template.

Taxonomy building design principle described by Sacco (2000) will be useful for most organizations. These are summarized as under:

- Use of compound subjects should be minimized by organizing the terms as a set of independent primary objects.
- The fanout of concepts in the taxonomy should be kept minimized. A fanout larger than 10-20 makes the taxonomy more difficult to access and to understand. A high number of documents classified under a terminal concept indicate that a further refinement of terminal is needed.
- Concept labels should be clearly understandable and not ambiguous and taxonomic abstractions should be clearly perceivable and consistent.
- Examples for a concept should be provided not only in the form of documents, but also in terms of summaries, which highlight related concepts.

A balance of depth and breadth is desirable for categorization. A four-level categorization scheme of main and sub-categorization is advisable in most applications. The afore-mentioned projects demonstrated that classification schemes and thesauri could provide useful support in building taxonomies. There are plenty of tools that can be used to build taxonomies. But, it is important that a proper tool is chosen keeping in view the needs and the scope of work. Chaudhry (2010) developed criteria of assessment of taxonomy tools.

Wang, Khoo, and Chaudhry conducted a study of effectiveness of a multifaceted organizational taxonomy that was built on the Dewey Decimal Classification and several domain thesauri in the area of library and information science education. The objective of the evaluation was to detect deficiencies in the taxonomy and to infer problems of applied construction steps from users' navigation difficulties. The evaluation approach included scenario-based navigation exercises and post exercise interviews. Navigation exercise errors and underlying reasons were analyzed in relation to specific components of the taxonomy and applied construction steps. Guidelines for the construction of the hierarchical structure and categories of an organizational taxonomy using existing general classification schemes and domain thesauri were derived from the evaluation results.

Pellini and Jones (2011) provided a very useful listing of web resource on taxonomies. This is reproduced below:

- Collaboration and Findability, blog by Lee Romero
  http://blog.leeromero.org/
- Consulting and Training in Taxonomies and Indexing

- www.hedden-information.com/index.htm
- Earley and Associated Blog www.earley.com/blog
- EncycloZine Content Classification
  http://encyclozine.com/Reference/Library/Classification
- Green Chameleon, blog by Patrick Lambe www.greenchamelon.com
- Montague Institute www.montague.com/
- Taxonomies & Controlled Vocabularies Special Interest Group
- www.taxonomies-sig.org/
- Taxonomy Boot Camp www.taxonomybootcamp.com/2010/
- Taxonomy Community of Practice Wikispace
  http://taxocop.wikispaces.com/
- Taxonomy Community of Practice Yahoo Group
  http://finance.groups.yahoo.com/group/TaxoCoP/
- Taxonomy Strategies www.taxonomystrategies.com/html/library
- Taxonomy Warehouse www.taxonomywarehouse.com/
- Taxonomy Watch, by Linda Farmer
  www.taxonomy2watch.blogspot.com
- The Taxonomy Blog, by Marlene Rockmore
  www.thetaxonomyblog.wordpress.com
- Willpower Information Thesaurus principles and practice
  www.willpower.demon.co.uk/thesprin.htm

Books on Metadata and Taxonomies

The following books will be useful for academics interesting and designing curricula and programs for knowledge organization:

1. David, Dimond. (2016). *Metadata for Content Management: Designing taxonomy, metadata, policy and workflow to make digital content systems better for users.*
2. Shivakumar, Shailesh Kumar. (2016). *Content Information Architecture, Taxonomy, and Metadata.*
   DOI: 10.1002/9781119206842.ch6

3. Halava, Marjorie. (2014). *The Taxobook: Principles and Practices of Building Taxonomies: <u>Synthesis Lectures on Information Concepts, Retrieval, and Services.</u>* Albuquerque, New Mexico: Access Innovations, Inc. <u>doi.org/10.2200/S00603ED1V02Y201410ICR036</u>

4. *Hedden, Heather. (2016). The Accidental Taxonomist, 2nd edition.* Information Today Inc. 496 p.

5. Lambe, Patrick. (2007). *Organising Knowledge: Taxonomies, Knowledge and Organisational Effectiveness*. Oxford, England: Chandos Publishing.
Stewart, Darin L. (2006). *Building Enterprise Taxonomies*. Portland, Oregon: Mokita Press.

6. Jagerman, Evert J. (2006). *Creating, Maintaining and Applying Quality Taxonomies*. Zoetermeer, Netherlands:

7. Bailey, Kenneth D. *Typologies and Taxonomies: An Introduction to Classification Techniques* (Quantitative Applications in the Social Sciences series) Thousand Oaks, California: Sage Publications. (1994)

8. Gale Hodge. Understanding Metadata. www.niso.org/standards/resources/UnderstandingMetadata.pdf

9. Marcia Zeng. Metadata Basics. <u>www.loc.gov/catworkshop/readings/metadatabasics/index.html</u>

10. Jane Greenberg (2000). Metadata and Organizing Educational Resources on the Internet. CRS Press.

Suggestions for Teaching Courses

Metadata and taxonomies are relevant to education, digital libraries, computer science, and information studies. In information schools, these courses are offered as part of library and information science (also called information studies and information management), digital libraries, knowledge management, and information architecture. While the orientation of courses might b slightly different, the substance and content remain

predominantly the same. This chapter discusses teaching of metadata from the perspective of information studies and therefore gives preferences to areas that are more relevant to organization of information and knowledge resources. These resources may be part of traditional library collections or repositories of knowledge resources on organizational sites.

Courses on data and taxonomies can be offered either as a part of an advanced knowledge organization module or as a component of a digital assets management module. Sometimes, there is a separate course on taxonomies and a full module on metadata. In either case, emphasis should be on both understanding of key concepts as well as preparation of metadata records for an online site such as a repository or website.

A major shift in teaching approach for knowledge organization is an emphasis on creating knowledge organization tools such as taxonomies, categorization schemes, and metadata profiles, in addition to traditional approach of using existing tools and systems. Courses on metadata and taxonomies should also cover assessment of taxonomy tools and evaluation of different systems in aiding the navigation of resources on organizational sits. Students should also be equipped with knowledge on how effective metadata schemes enhance knowledge discovery. Abdul Halim (2007) describe a project on Learning Objects Application Profile for Granularity and Reusability.

Courses on taxonomies and metadata are offered in most reputable information education programs in North American universities and other parts of the world. In this section, some model programs are referred to as examples so as to give some guidelines for academics interesting teaching in

these areas. The Information Studies Division at McGill University of Canada offers a course GLIS 663 on Knowledge Taxonomies (http://www.mcgill.ca/study/2017-2018/courses/glis-663) as part of the Master's in Information Studies.

Information School at University of Washington offers several courses on metadata under its Information Architecture Program INFX 531 Metadata Design and INFX 536 Metadata for Interactive Media (https://ischool.uw.edu/programs/mlis/careers/information-architecture).

Nanyang Technological University of Singapore teaches taxonomies in a course in its MSc in Knowledge Management. The K6307 course on Knowledge Organization covers topics related to knowledge organisation systems, structures, classification and categorisation systems, thesauri, taxonomies, and ontologies. This course is taught from a perspective of using knowledge organisation tools for content organisation and management on websites, intranets, portals, and document management systems (http://www.wkwsci.ntu.edu.sg/programmes/Pages/Home.aspx).

As is evident from the above discussion, providing an adequate coverage to the complex topics such as taxonomies and metadata can be very challenging. Chaudhry and Khoo (2008) suggested that managing this will become easier through collaboration. They discussed the possibility of sharing teaching materials using metadata and taxonomies. Khoo (2013) pursues need for this collaboration further by describing his experience in regional collaboration activities in LIS education. A taxonomy of

collaboration in LIS education is presented, listing the different types of collaborative activities that LIS schools can engage in, and the benefits that schools can derive from them.

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Chapter Eleven

INFORMATION MANAGEMENT

Shaheen Majid

Introduction

No doubt we are living in an era where information is considered the most important commodity to live a successful and meaningful life. Without information it is now almost impossible to undertake most of the human activities and its absence can result in serious consequences. Due to technological advancements human knowledge is growing at an unprecedented speed and inability to properly manage it could be disastrous. Technology is acting as a catalyst in generating new information, providing easy and speedy access to existing information, and help archive information for future generations. Obviously, if we are living in an information society, it is crucial to properly manage our information assets. Information management could be at different levels – national, organizational, and personal levels. At national level, a government needs to come up with appropriate information communication technology (ICT) infrastructure, national level information-related policies, and necessary legislations for data security and intellectual property protection. It should also take appropriate measures and provide guidelines for managing information by all government funded departments, projects, academic institutions, hospitals, and other public agencies. Similarly, relevant government agencies also need to properly archive national historical information and records for the future generations.

Likewise, it is also vital for business enterprises, non-governmental organizations, and other private institutions to properly manage their information assets to stay competitive and successful. Information is now becoming one of the important elements of competition among organizations.

Many organizations have comparable manpower, financial, and production resources but one factor which can provide them edge over others is their ability to identify, acquire, process, store, and utilize this information for problem solving and timely decision-making. Information is also like a binding force which facilitate smooth functioning of various operations in an organization. For instance, if a business enterprise receives a piece of information that its competitor company has launched a new product with several new features and it may affect marketability of its own product. Now this piece of information is likely to trigger a series of actions in this enterprise and each unit involved in product design, manufacturing, and marketing can analyse the situation and propose appropriate measures to senior management. Sales and marketing department can analyse the impact of competitor's product on its marketing strategies. It may also acquire information about customers' reaction and interest in competitor's new product as well as their additional expectations. This information would be useful to the product design unit to consider new features to be incorporated in the existing product, not only to retain the current customers but also to attract new ones. The production unit can start considering the modified manufacturing process and resources required for producing the new product. The senior management is likely to be involved in supervising and coordinating all the related activities. This way a single piece of information can trigger a series of actions where each department will act on this information according to its area of responsibility so that the organization can come up with an suitable and well-coordinated response. It is, therefore, essential for all organizations to systematically identify, collect, process, share, and utilize information to remain relevant and competitive in a complex business environment.

Proper information management is also desirable at personal level as it will facilitate overall information management in an organization. If individual

employees and their respective departments fail to properly manage their information, many invaluable information sources are likely to either become invisible, under-utilized, or even lost. That is why it is desirable that all employees, their respective departments, and organization as a whole should appreciate the value of information and make concerted efforts to properly manage it.

The following sections will discuss the information management process and various activities involved at each step. The focus of discussion will be on information management in organizations. Although some examples from business enterprises will be used, the discussed concepts are equally applicable on all types of organizations, including government and private agencies.

Information Management Process

The information management process can be divided into five major steps comprising information needs identification, information acquisition, information processing and storage, developing information services, and information distribution and use.

1. Information Needs Identification

This is the first and most important step in effective information management. It is impossible to meet information needs of users without having a thorough understanding of their needs and information seeking behaviour. Information needs can be divided into established and situational information needs. Information regularly required by employees for performing various tasks based on their job responsibilities is called known or established information needs. Such information needs can either be satisfied by internal documents such as sales reports, production reports, financial reports, R&D reports, strategic plans, market research studies, etc. or through acquiring relevant external information. The external information could either be acquired

through standard information sources such as books, journals, magazines, trade reports, newspapers, fact books, directories, and online databases or through environment scanning.

Environment scanning is the process of collecting information about events and changes happening in the external business environment of an organization. In many situations, as compared to standard information sources, environment scanning helps an organization to collect information about the factors that can directly or indirectly affect its business and operations. The most important external factors that may impact an organization could be due to technological innovations, emerging economic trends, political changes, regulatory and legal restrictions, and social and cultural changes. All organizations need to regularly identify and collect information about the factors that are relevant to their businesses and take appropriate measures to adjust in the fast changing environment.

On the other hand, situational information needs arise as a result of a particular situation, event or a new work assignment. Information management department should be able to identify and acquire additional information to satisfy such specialized and occasional information needs. Some of the situational information needs can be satisfied through undertaking on-demand environment scanning.

Depending on the size of an organization and physical location of its employees, different methods can be used to collect data about their information needs and seeking behaviour. Considering IT literacy and the Internet access, an online questionnaire would be more useful for employees stationed at far locations. A paper-based questionnaire can be used if most of the employees are located at a single place or a few nearby locations. In addition, either interviews or focus group discussions can also provide rich qualitative data. With an appropriate survey instrument, data can be collected about employees' information needs and seeking behaviour, their preference for different

information sources (trade reports, magazines, market statistics, etc.), their preferred formats (print, electronic, multimedia), the desired mode of information delivery (face-to-face, telephone, e-mail, etc.), and the frequency at which they would like to receive information.

The date collected about employees' information needs and seeking preferences can be used to categorize them into different homogeneous groups, through a process called market segmentation. The market segmentation can help divide employees, with similar characteristics and information needs, into homogenous groups. For each user segment, we can consider offering appropriate information services. The user segmentation technique can help provide right information to right users, at the right time and location, and in their preferred formats, thus reducing the chances of creating information overload. The user categorization can be based on different attributes such as job function (e.g. planning, design, production, marketing, etc.), physical location of employees, job status (e.g. junior staff, managers, senior executives, etc.), education level, IT literacy, and specialized competencies.

2. Information Acquisition

Once information needs of different departments and their staff are known, the next step is to identify and acquire appropriate information sources to satisfy these information needs. Broadly information sources can be categorized into three categories, i.e. humans as an information source; the Internet and web sources; and textual (print, electronic) information sources. There could be a considerable degree of overlap among these sources as the same information may be available through multiple sources.

Humans as and Information Source

In some situations, people provide more relevant and useful information to an organization than other information sources and channels. Information coming

through people is particularly useful in dealing with ambiguous and unstructured problem situations. In such situations, the level of uncertainty is usually high either due to limited access to relevant information or the available information is too vague and open to multiple interpretations. In such circumstances, detailed knowledge of the issue and an understanding of its context could be useful in getting relevant and more focused information.

For instance, a person is planning visiting a particular country for the first time either for a business or leisure trip. Due to limited knowledge of the visiting country, this person is likely to have many questions in his mind. Some of the needed information may easily be accessible through certain popular information sources, particularly through the web and social media. Understandably, these sources are less likely to provide information fully matching the personal profile and interests of this person as these pieces of information are not specifically written for him. However, if a friend or a relative of this person is familiar with this country or has recently visited it, he can provide more useful information as he knows the personality and background of the requester, his preferences for food, entertainment, transportation, shopping, etc. No other source except humans can provide such a focused, relevant, and customized information.

An advantage of using human information sources is that they usually filter out irrelevant information and communicate only information which is according to the needs and situation of information requester, thus reducing the chances of information overload. Similarly, while communicating information, people usually summarize voluminous information, analyse and highlight key points, and provide their interpretation of an issue or situation. In other words, instead of communicating raw information, human sources usually share value-added and processed information.

Employees in an organization daily come across useful information from multiple sources which can contribute towards organizational learning and progress. However, they are often unaware of the potential value of this information and, as a result, they fail to pass it to those who can make best use of it. Employees usually do not know what information to share, with whom to share, and how to communicate this information. Organizations can come up with awareness programs for their employees to make them realize the advantages of information and knowledge sharing, creates a conducive information sharing culture, provide information sharing systems and tools, and develop appropriate guidelines to facilitate sharing activities.

Internet and Web Information Sources

Access to the Internet has changed the traditional boundaries and practises of information management and, as a result, it is now much easier to undertake various information management-related activities. We have moved from an era of information scarcity to information abundance and from a time of slow information delivery to fast and wider information provision. Previously identification, acquisition, and distribution of information to intended users was a big challenge, particularly if they were located at remote locations. Similarly, only a few databases or other online tools were available to identify the relevant literature; reprints were mostly acquired through slow postal mail; and document duplication was slow and expensive. Usually requesters have to wait several weeks to get hold on the needed information. The Internet has revolutionized the whole process and now the needed documents can be identified, acquired, duplicated, and disseminated in a fraction of time. However, information abundance and easy access to it has created a different set of challenges, such as higher users' expectations, information overload, and the problem of information authenticity due to widespread misinformation and disinformation.

In addition to providing access to huge amount of diversified information, the Internet is also a very powerful tool for person to person communication. Various social media platforms such as institutional blogs, Wikis, Facebook, Twitter, podcast, instant messaging, etc., can be used for internal information sharing as well as to communicate with customers and the general public. Various discussion forums allow experts and other interest groups to easily share their ideas and opinions.

Besides using email for formal and informal messaging, it can also be used for various information management activities, particularly for information collection and distribution. It is now much easier and speedier to approach experts and other individuals for asking questions, seeking clarifications, and requesting documents. Email can also be used for ordering materials from publishers, booksellers, document delivery services, and other agencies. Similarly, it is now possible to quickly distribute information to intended users, irrespective of the fact whether they are located in the same building, in a different city or country, or even stationed at a remote and isolated site.

Previously acquiring grey literature – the literature not published or available through commercial channels (e.g. pre- and post-prints of articles, technical reports, market research reports, theses and dissertations, technical specifications and standards, newsletter and bulletins, etc.) - was very challenging. Now many organizations and individuals are making such materials available through their websites. Even if certain so-called grey documents are not accessible through the web, their owners can easily be contacted for getting copies of the needed items.

Textual Information Sources

It is a broad category which includes materials produced internally within an organization or externally by competitors, partner organizations, government

agencies, academics institutions, professional associations, and other agencies. These materials may be produced in print, electronic, or other formats. It is possible that some of these materials may also be available through the Internet. However, these materials are treated separately here as they usually have more direct relevance to the seeking organizations.

Although human and web information sources have several advantages, some weaknesses are also associated with them. One weakness of information shared by individuals is that it is usually subjective and represents the viewpoint of a particular person. Similarly, although the web provides access to an enormous amount of information, determining its creditability is often difficult and challenging. It is, therefore, desirable to complement information from these sources with information sought from other sources and communication channels, including materials produced by certain organizations.

An organization is expected to produce many documents related to its internal operations and activities. These documents can broadly be grouped into the following three categories:

- **Operational Documents**: These documents are generated as a result of certain operational activities in an organization, such as sales reports, production reports, financial reports, human resource reports, research & developments reports, etc.
- **Planning Documents**: Such documents keep a record of planning activities of an organization. This category includes documents such as organizational strategic plans, minutes of planning meetings, project proposals, feasibility studies, consultants' reports, market research reports, competitor and business intelligence reports, etc.

- **Informational Documents**: An organization may also generate several materials to communicate with its own staff as well as with customers and the general public. One purpose of such materials is to create awareness among the employees about the organizational goals and targets, major activities, standard operating procedures (SOPs), new products and services, forthcoming projects, etc. The internal information documents may include company newsletter, annual reports, speeches of senior management, reports of key activities, etc. For external users, a company may issue press releases, product flyers and brochures, company newsletter for customers, advertisements, etc.

Identification, gathering, and managing internal information has always been a challenge for effective information management. It is because usually information is generated and retained by individual departments and, as a result, internal documents are scattered all over the organization. In some cases, due to internal competition, organizational politics, or other possible reasons, the generating departments may avoid sharing their information with other departments in the organization. Consequently, these documents may remain invisible, thus resulting in information inaccessibility, under-utilization, and duplication of efforts by other departments in acquiring the same information. Even some departments, due to lack of awareness, limited resources, and inadequate information management skills, may not properly manage their documents which may result in losing track of these materials. One possible solution to reduce information invisibility is to conduct an organization-wide information audit to prepare an inventory of all information assets located in

different departments. This way it will be possible for potential users to know what information is available where and how to get access to it.

3. Information Processing and Storage

Information gathered from internal and external sources need to be properly processed and stored for future retrieval and use. It is comparatively easier to process and manage structured information (e.g. inventory records, manpower, documents, etc.) as it is usually consist of predefined or known data elements. For example, an inventory record may contain data elements such as product name, product code, specifications, stock level, etc. Similarly, a human resource record may contain data about name, age, gender, education, job experience, special expertise, contact information, etc., which is uniform among all employees. It is usually easier to identify, collect, process, store, and make accessible the structured information as a variety of automation packages are available to handle such information.

On the contrary, it is quite cumbersome and time consuming to identify, acquire, process and manage unstructured information due to its invisibility and lack of a uniform structure. Some examples of unstructured information are: facsimiles, memoranda, minutes of meetings, emails, drawings, charts, photos, etc. In many organizations unstructured information is either completely ignored or not properly managed due to its high volume, inconsistent structure, and procedural difficulties in locating and acquiring it. Although some systems have been developed to convert unstructured information into structured information, currently they provide limited capabilities and may not be accessible to all organizations.

Even for structured information proper processing is necessary for its fast and accurate retrieval. Similarly, organizations need to use a carefully developed document management and archival policy for managing their

information assets. It is, therefore, desirable that before starting populating a system, a document management policy should be developed and implemented. Such policy guidelines can outline what documents to be included or excluded, how long these documents will be retained in the system, what documents will be discarded after completing their useful life, what documents will be archived and how long, etc. Many organizations continue adding new information into their systems without removing outdated documents. For organizations 'unlearning' is as important as learning because many previous strategies, initiatives, and solutions may not be now relevant in the fast changing environment. It is important that information should be treated like medicines or processed food items which have their fixed shelf-life. After passing the expiry date, instead of curing or providing nutrition, the expired medicines and food items can become injurious to health. Similarly, use of outdated information can result in wrong decision making or arriving at incorrect conclusions. It is, therefore, desirable to estimate the possible useful life of each document and, after reaching at its expiry date, a review may be conducted to determine if this document is still useful or it may be either discarded or achieved.

Some departments in an organization may resist putting all their documents and information in a central repository due to security or other concerns. Hence, it is also necessary to determine the security level of all documents before storing and providing access to them. A document may be highly confidential and should only be accessible to authorized individuals. On the other hand, certain other documents may not be confidential and should be made accessible to all employees in an organization with proper access identification and authorization. Thus it is desirable that organizations should establish an appropriate information management system to provide fast and accurate information access to their employees and, at the same time, effectively protect their confidential information assets through a multi-layer security system.

4. Designing Information Services

Information collected from various sources can be disseminated to end-users in the form of different information services. Data gathered during the information needs identification step would be useful in launching various information services for different staff categories. For this purpose the market segmentation technique, discussed in one of the previous sections, can help design information services according to the information needs and seeking behaviour of different user groups, thus avoiding disseminating irrelevant information. In addition, while designing an information service, information professionals should consider adding value to the gathered information to make it more relevant and useful to their users.

Value-added Features

The following value-added features would help disseminate quality information to users:

a. ***Ease of Use:*** It should be easier for users to quickly scan or browse the provided information to promptly locate the relevant information. A simple measure such as grouping of subject matter under appropriate headings can assist in quick scanning. Information, whether in digital or print format, should be presented in such a way that it is convenient for users to access and use, easy to get answers, and to quickly gain understanding of the topic.

b. ***Noise Reduction:*** This means avoiding disseminating irrelevant information to reduce information overload. Similarly, information should be communicated to users according to their education and intellectual capacity. Sending highly technical information to a person with limited education and low IT skills

would be inappropriate. Search features of modern retrieval systems allow users to retrieve relevant information according to their information needs and personal attributes. Similarly, instead of providing all possible information in a single long transaction, pointers to additional information can be provided through hyperlinks to make a communication short and sharply focused.

c. ***Information Quality:*** Many users do not have adequate skills or time to assess the quality of information received by them. It is the responsibility of information professionals to provide accurate and error-free information to their users. In addition, the disseminated information should be up-to-date and comprehensive, covering all possible aspects of a topic. Repackaging of information from multiple sources in one transaction will save time and effort of the recipients. Due to rampant misinformation and disinformation, it is also desirable that information professionals should not depend only on a single source rather try to validate information from other reliable sources before passing it to their users.

d. ***Information Adaptability:*** This means the disseminated information should be according to a user's specific information needs and circumstances. The communicated information should directly be relevant to a specific problem situation, accessible in a variety of ways, and presented in such a manner that the intendent user can easily understand it.

Types of Information Services

Depending on users' information needs and circumstances, different information services can be designed and offered to them. These services can be categorized based on the type of information communicated, and how it is made available to potential users. For example, an information service can be considered for disseminating current or urgent information that requires immediate attention. The current information is usually more useful for managing daily operations and problem solving. The urgent information is like a breaking news which should be immediately notified to the concerned individuals in the organization, even without any standard information management processing. This information can be later processed and stored in the organizational repository.

Another information service can be designed to satisfy retrospective information needs of users by packaging currently acquired information with relevant information from the institutional repository to provide a complete picture to the concerned staff. For instance, some event or crisis has happened which may impact the business of an organization. Now information about the current event can be packaged with an analyses of earlier similar events such as, how previous crisis was managed, what measures were taken, and what lessons were learnt. This way management will get a complete picture and can decide how to handle the new situation.

Some departments in an organization, in addition to existing information, they may also need future-oriented information such as information about emerging trends, economic predictions, and business analyses to review and plan for future directions. This type of information is crucial for organizational strategic planning.

It is equally important to consider how to provide access to various information services to different groups of users. For this purpose, information professionals can consider disseminating information to users through push, pull, and on-demand information services.

Push Information Services. When information is delivered to users, usually at a regular interval, using different communication channels. Either information is 'pushed' to the intended users or they are notified about its availability. Many organizations use the selective dissemination of information (SDI) service or an alerting service to provide regular information updates on a topic of interest. Many libraries also routinely circulate fresh arrival lists for announcing new materials acquired by them. Proper market segmentation and an understanding of users' information needs could help 'push' only relevant information to them, thus avoiding information overload. A major benefit of a push service is that it reduces the chances of missing useful information by users.

Pull Information Services. When information is retrieved by users at their own convenience from different storage locations such as institutional repository, intranet, shared drive, etc. Here users can retrieve information as and when needed by them without receiving unnecessary information. However, for effective information pull, all employees need to know what information is available where, and how to access it. They also need to possess basic information literacy skills for locating and retrieving the needed information.

On-demand Information Delivery Service. When information is delivered by information management unit in response to a specific information request from a user. Such information needs may emerge as a result of a particular situation, event or work task. Response time is usually crucial in meeting such

information needs. Information management unit can either purchase the needed information or gather it through other means such as environment scanning.

Calculating Cost of an Information Service

Though it is quite challenging to calculate exact cost of an information service, it is desirable to at least have some realistic estimates. This cost estimation will help determine the return on investment (ROI) of an information service. The utility of an information service will be questionable if its estimated cost is much higher than its expected benefits. The cost estimation is also useful in budget preparation and utilization. The cost estimation should include both cost of planning and developing a service and its operational cost.

a. ***Planning and Development Cost:*** It is one time cost comprising manpower time and use of other resources for planning and designing an information service. The following are some of the planning and development activities involved in launching a new information service:
  - Determine scope and coverage of the service
  - Identify target users and perform market segmentation
  - Identify suitable sources for information gathering
  - Determine if any special equipment required
  - Consider the desired information processing (value-adding activities)
  - Consider information delivery channels and the required infrastructure
  - Conduct pilot testing of the service
  - Undertake various promotion activities

b. *Operational and Service Maintenance Cost:* The operational and service maintenance cost can further be divided into direct and indirect costs. The direct cost includes those cost items that can be attributed to a specific information service such as need for specialized equipment, supplies, office space, staff salaries, promotion, etc. On the other hand, indirect cost items cannot be assigned to a specific information service because these are associated with the whole information management operation. For example, office space, office equipment (e.g. photocopiers, scanners, computers, etc.), utilities, furniture and fixture, manpower time, etc., are usually shared by several information services and operations.

Pre-launch Scrutiny

Once an information service is ready for launch, it is necessary to ascertain if it is properly designed and likely to deliver the expected benefits. Below is a pre-launch check list which can determine the usefulness of a new information service.

Pre-launch Check List

1. Compatibility of the service with organisation's goals and objectives
2. Appropriateness to user community size and location
3. Ability to meet users' information needs
4. Estimated cost vs. expected benefits
5. Availability of qualified information professionals and other staff to offer and effectively manage the service
6. Life expectancy of information service
7. Users' acceptability of the information service
8. Availability of required resources – materials, hardware, software, space, etc.
9. Availability of appropriate information distribution channels

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Promotion of Information Services

Adequate promotion of new and existing information services is desirable to create awareness among their potential users. For effective promotion, target user groups need to be identified to prepare appropriate and stimulating messages according to their roles and work responsibilities in an organization. For example, language and presentation style of a promotional message for junior staff could be completely different from senior management due to their different work roles in the organization, education level, and intellectual capacity. The user segmentation concept can also be applied while undertaking promotional activities as different promotional techniques and messages can be used for reaching out to different user groups in an organization. The following are some of the popular promotional techniques and information professionals can decide to use those techniques that are more suitable in their organizational context:

a. *Public Relations:* The main purpose of public relations is to establish an informal interaction between information management unit and its current and potential users. It is a useful promotional technique as it can influence users' perceptions and awareness about the benefits of various information services. Interpersonal contact is a basic ingredient of public relations. Some information professionals invite their users to participate in a "coffee with information professional" session. Such informal sessions are very useful to know about the information needs and preferences of individual users, their key projects and work assignments, and the support they need from information management unit. These sessions can also be used to inform users about the information services available to them. Such interactions also help develop a good personal rapport with

information users who may now feel less intimidated while asking help from information professionals.

b. ***Publicity***: In this technique awareness about information services is created with no or limited cost. Announcements or short write-ups can be placed in organizational newsletter to remind users about new and existing information services, acquisition of new materials, subscriptions to databases, availability of user education programs, and access to other user-oriented information management activities. Similarly, attractive and informative posters, flyers, and displays can also help grab attention of potential information users.

c. ***Souvenirs and Corporate Gifts:*** Such gifts can be given to users during the introduction phase of an information service or other information-related events. Souvenirs such as bookmarks, pens, table gadgets, stick-on stickers, display magnets, etc., can be used with appropriate messages to remind potential users about the availability of different information services.

d. ***Word-of-Mouth (soft-selling):*** In this technique a happy information user informs his colleagues and other potential users about the existence and quality of an information service used by him. In many situations, this technique is more effective than other promotional techniques as usually people trust their colleagues more than publicity materials produced by a service provider. It is, therefore, necessary that information management unit should take each information request seriously and try to provide best possible service to every user.

It could also be useful to identify some prominent, well-respected, and socially active staff in the organization and try to promptly satisfy their information needs (without compromising service to other users). These

individuals are more likely to share their good information service use experience with their co-workers during formal and informal interactions. This way they will indirectly start promoting information services to their potential users.

e. ***Briefings/ demos:*** Certain other promotional activities such as briefings and demonstrations can also create awareness about different information services. For example, information management unit can demonstrate a newly acquired database, salient features of information sharing platforms implemented in the organization, and use of a citation management software such as Endnotes. Briefings can also be organized for newly recruited staff and other interested individuals.

f. **Organize an 'Information Day':** An information management unit can also consider arranging an information day or an open-house where all employees are invited to visit their library or information centre. Although it is better to keep such an event very informal, information professionals can still consider organizing different innovative activities to use this opportunity to promote their information services through interactive information-related games, quizzes, colourful and informative posters, exhibitions, one-to-one interactions, etc. No doubt refreshments and door gifts will attract more visitors.

Evaluation of Information Services

Periodic evaluation of information services is necessary to determine if these services are still relevant and effective in meeting users' information needs. The following are some of the questions which can help assess the effective of an information service.

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│          Evaluation of an Information Service     │
│                                                   │
│  1. Have users accepted the information service?  │
│  2. Is it convenient for users to use the service?│
│  3. Is service still relevant to the changing     │
│     information needs and                         │
│     seeking behaviour of users?                   │
│  4. Is maintenance cost of the service reasonable?│
│  5. Is service still relevant to the organisational│
│     goals and                                     │
│     objectives?                                   │
│  6. To what extent information needs of users have│
│     been met                                      │
│     through a specific information service?       │
│  7. What changes are desirable in format, content,│
│     and place of                                  │
│     delivery of the service?                      │
│                                                   │
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5. Information Distribution and Use

The final step in information management process is distribution and use of information by intended users. Due to powerful information communication tools, fast and widespread information delivery is now easily possible. Physical distance of users from information management unit is no more a concern as they can easily be reached. As previously discussed, patrons can either use the information pushed to them by information management unit or they can pull it from a storage according to their need, situation, and convenience. For effective information distribution and to reduce the impact of information overload, it is necessary that only relevant information should be disseminated to the right person at the right time, and in a preferred format.

Information in an organization can be used for multiple purposes including for managing daily operations, decision making and problem solving, business analyses and interpretations, understanding complex situations, starting new projects, and undertaking strategic planning exercise. Most of these are

information-rich activities and lack of quality information can result in serious consequences. As strategic planning is considered crucial to all organizations, the following sections will discuss the role of information management in organizational strategic planning.

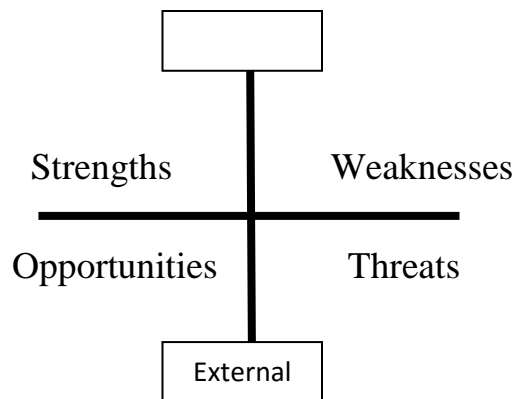## Role of Information Management in Strategic Planning

The basic purpose of strategic planning is to develop long-term plans of an organization, considering business environment opportunities and threats in the light of organizational strengths and weaknesses. In other words, it is a process of collecting information about an organization's operations and activities, assessing its capabilities, and understanding their relationship with external business environment. The strategic planning exercise also reviews if existing organizational strategies and goals are still relevant in the fast changing, complex, and uncertain business environment. The planning exercise may result in generating future projections, the revised goals and strategies, and a new direction for an organization.

Strategic planning is an information-rich activity and availability of up-to-date, accurate, and high quality information can help planners to come up with a strong and viable strategic plan. Many organizations conduct SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to determine organizational strengths and weaknesses as well as opportunities and threats emerging from the external business environment. The concept of SWOT analysis has many similarities with the thoughts presented in the book *Art of War,* written by a Chinese general Sun Tzu in 5th century BC. According to him:

- *If you are ignorant of both your enemy and yourself, you are certain to be defeated in every battle*;
- *If you know yourself but not your enemy, for every battle won you will suffer losses; and*

- *If you know your enemy and yourself, you will win every battle.*

It clearly indicates that in order to remain successful in an extremely competitive environment, organizations need to know their strengths and weaknesses as well as gather information about their competitors and other external factors which may either create business opportunities or pose certain challenges. This means all organizations need to properly manage their internal information, and at the same time, remain connected with external business environment to collect information about their competitors, economic and business trends, emerging technologies, political changes, demographic indicators, social and cultural changes, and local and internal trade laws and regulations. Lack of quality information may result in developing a weak strategic plan which is not in line with fast changing business realities.

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                         │
       Strengths         │        Weaknesses
    ─────────────────────┼─────────────────────
      Opportunities      │        Threats
                         │
                    ┌────┴─────┐
                    │ External │
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Scope of SWOT Analysis

Proper information management can provide reliable internal and external information to planners for conducting SWOT analysis. Though originally the SWOT analysis was designed for business enterprises, it is now used by all types of organizations including academic institutions, government departments, non-governmental organizations, and even by charity organizations. The following sections will briefly discuss how systematic

information management can help in providing necessary information for conducting a SWOT analysis.

Strengths and Weaknesses

These are internal factors which may either become a strength or weakness for an organization. Some examples of internal factors are human resources (e.g. number of employees, their qualifications and skills, relevant work experience, motivation level, leadership skills, continuing professional development opportunities, rewards and incentives system, staff satisfaction, etc.); physical resources (e.g. location, production infrastructure, equipment, buildings, etc.); financial resources; work culture and processes; management of organization information and knowledge assets, etc. If an organization has a culture of documenting all its operations and activities and this information is well-managed, planners can use it to have a clear understanding of organizational strengths and weaknesses. For this purpose, organizations need to make well-coordinated efforts to identify, acquire, process, store, and make internal information accessible to all concerned employees.

Opportunities and Threats

These are external factors that may directly or indirectly affect operations of an organization. For strategic planning, organizations need to consider various measures to take advantage of certain emerging trends which may create new business opportunities for them. On the other hand, certain trends, technologies, competitors, and changing business environment can create serious threats for an organization. Many organizations use PESTLE or a similar analysis to identify external factors which can help develop their future strategic plans.

The following session explains the type of information required for conducting an effective PESTLE analysis:

a. **P**olitical Factors: Certain political factors which can directly or indirectly affect a business are: elections and manifestos of political parties, political instability and associated risks, trade sanctions, new government business legislations, government incentives for a particular industry, changes in personal and corporate income tax, changes in international laws, etc. These factors can either create favourable business opportunities for an organization or result in certain threats or challenges.

b. **E**conomic Factors: Organizations also need information to keep track of economic changes happening in their business domain. Some economic factors which may affect an organization are: overall economic growth of a country, budget for a financial year which may provide some incentives or impose new taxes, new economic free zones, changes in inflation and interest rates, global economic growth, recessions, mergers and alliances, stock markets, changes in oil prices, currency exchange rates, changes in labor cost and availability, etc.

c. **S**ocial Factors: Some examples of social and cultural changes which may create new business opportunities or threats are: changes in a country's demographics, birth rate, emergence of new social classes, lifestyle changes, changes in purchasing power and living standards, changes in consumers' preferences (e.g. branded merchandise, online shopping, etc.), work culture and ethics, etc.

d. **T**echnological Factors: These days technology is a major consideration while developing organizational strategic plans, particularly for industries heavily dependent on technology. As a result of innovation and technological advancements, new products and services are emerging which may either create opportunities for

an organization or threaten its business and market share. For strategic planning, organizations need to collect information about emerging technologies, new inventions and their possible applications, technology-related legislations, intellectual property protection laws, etc.

e. **Legal Factors:** For strategic planning, organizations also need to collect information about current business laws and legislations, consumer protection laws, anti-trust laws, anti-monopoly laws, anti-dumping laws, health and safety laws, employees' benefit laws, etc.

f. **Environmental Factors:** In recent years, the factors pertaining to weather and environment protection have gained tremendous importance. Several international environment protection laws are either already implemented or in their advance stages of negotiations and these laws may affect business of an organization. Some ecological and environment protection factors which may affect a business include carbon emission standards, regulations for greenhouse gases, pollution index, climate changes and natural disasters, etc. For example, heavy floods in a country can destroy human lives, property and infrastructure as well as create serious challenges for agriculture, healthcare, transportation, tourism, and certain other sectors. However, for some companies there might be several new opportunities in environmental crises. For example, companies producing construction materials or belonging to construction sector can benefit from the reconstruction efforts after a flood, tornedo, hurricane, earthquake, or other natural disasters.

It is obvious from the above discussion that proper information management can provide invaluable support to different departments in an organization to effectively and confidently undertake various activities. Lack of information or

use of low quality information is likely to result in poor decision-making which may jeopardize the future of an organization.

Conclusion

Information is now a vital resource for all types of organizations as it can contribute significantly towards their progress and effectiveness. However, information will only become a beneficial resource if it is properly identified, acquired, processed, stored, and disseminated to the relevant individuals. Library and information professionals, in addition to providing conventional information services, they also need to satisfy certain non-traditional context-based information needs of their users. For this purpose, an understanding of information management concepts and their applications in unique and diverse situations is desirable. Many organizations, particularly business enterprises, instead of establishing a traditional library, usually prefer focusing on information management activities which can provide contextualized information. It is, therefore, necessary for library and information professionals to develop basic information management knowledge and skills.

In recent years, the scope of libraries and information centres has expanded and some of them have assumed the responsibility of managing organizational information assets as well as providing more specialized information services such as gathering and processing business environment intelligence. It is also desirable for information professionals to acquire a new set of skills for managing unstructured information, conducting information and data analytics, undertaking information audit, developing organizational repositories, and implementing new concept in information marketing. For more credibility and effectiveness, an inter-disciplinary approach would be more useful where certain established concepts from other disciplines can be borrowed, customized, and implemented in information management activities. For example, certain established and tested marketing and promotion concepts from

business management field can easily be used for the marketing of information services.

Another area where library and information professionals need to focus is improving information literacy and personal information management skills of their organizational staff to make them competent information users. Efforts made by information professionals in managing organizational information assets will only be successful if all employees are able to appreciate, possess and apply basic information skills in their job activities. If all employees in a particular department know how to manage their information, the whole department will be able to collectively manage its information assets. Consequently, if all departments and units properly manage their information, the organization as a whole will be successful in managing its information assets. For this purpose, a carefully designed training program can help provide basic information literacy and information management skills to all employees. Such a collective effort, with a leading role played by information management staff, is likely to result in an information-rich organization which will have better chances to survive in a complex, competitive, and unpredictable business environment.