



# UNIVERSITY OF EDUCATION, LAHORE

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Dated: April 26, 2018

- 1) All Directors/ Principals  
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- 2) Controller of Examinations
- 3) Director, Quality Enhancement Cell
- 4) Director Research

Subject: **Thesis Manual**

Please find enclosed **Manual / "Patterns & Guidelines"** for writing Ph.D. /MS/M.Phil. /BS / B.Ed (Hons) thesis.

I have been directed to request you to strictly implement/ follow the enclosed thesis manual.

  
Dr. Manzoor Akhtar  
Registrar

**Copy for Information:**

- 1) PS to Vice Chancellor
- 2) PA to Registrar
- 3) Deputy Director (Mgt/ Reg)
- 4) All Assistant Director (Admin)
- 5) Office File

**The thesis should include the following chapters:**

**1. INTRODUCTION**

Chapter 1 should be at least comprised of the followings:

- Background and importance of the Study
- Statement of the Problem
- Objectives of the Study
- Research Design( for Social Science only)
- Scope/Limitation/Delimitation of the Study
- Significance of the Study
- Outline of the Study

**2. THE LITERATURE REVIEW**

**3. RESEARCH METHODOLOGY**

**The next chapters (i.e. Chapter 4, 5, etc...) comprise of:**

- Analyses/Findings/ Results/Discussions

**6. CONCLUSION**

**7. RECOMMENDATIONS/IMPLICATIONS/SUGGESTIONS**

**8. REFERENCES**

**9. APPENDICES**

*Note: Students can use Times New Roman or Arial Font style. Follow the line spacing as given in the manual or 1.5. Students have to type their names, title of the thesis, Programme, Division/Campus and degree where applicable.*

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A thesis submitted in partial fulfillment of the  
requirements for the award of the degree of  
Doctor of Philosophy (Physics)

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**UNIVERSITY OF EDUCATION**

**LAHORE**

**September 2016**



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"I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of the degree of Ph.D. /MS/M.Phil./M.Sc./BS/B.Ed.(Hons) <<Type your degree abbreviation>>"

Signature: \_\_\_\_\_

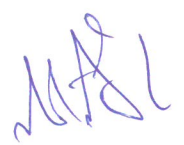
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Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Name of Co-Supervisor: \_\_\_\_\_

Date: \_\_\_\_\_



## DECLARATION

I declare that this thesis entitled "*First Principles Method of Transition Metal Doped Beta Indium Sulfide for Intermediate Band Solar Cells*" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature for any other degree. At any time if my statement is found to be incorrect even after award of MS/PhD (Type your degree here), the university has the right to withdraw my MS/PhD degree.

Signature:

Name:

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AZHAR KHAN

---

Date:

---

October 9, 2016

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## PLAGIARISM UNDERTAKING

I solemnly declare that research work presented in the thesis entitled “*First Principles Method of Transition Metal Doped Beta Indium Sulfide for Intermediate Band Solar Cells*” is solely my research work with no significant contribution from any other person. Small contribution/help wherever taken has been duly acknowledged and that complete thesis has been written by me.

I understand the zero tolerance policy of the HEC and University of Education, Lahore towards plagiarism. Therefore I as an Author of the above titled thesis declare that no portion of my thesis has been plagiarized and any material used as reference is properly referred / cited.

I undertake that if I am found guilty of any formal plagiarism in the above titled thesis even after award of MS/PhD degree, the University reserves the rights to withdraw/revoke my MS/PhD degree and that HEC and the University has the right to publish my name on the HEC/University Website on which names of students are placed who submitted plagiarized thesis.

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Name: \_\_\_\_\_

AZHAR KHAN

Date: \_\_\_\_\_

October 9, 2016





## CERTIFICATE OF APPROVAL

This is to certify that the research work presented in this thesis, entitled "*First Principles Method of Transition Metal Doped Beta Indium Sulfide for Intermediate Band Solar Cells*" was conducted by Mr. AZHAR KHAN under the supervision of Prof. Dr. ABC. No part of this thesis has been submitted anywhere else for any other degree. This thesis is submitted to the Division of Science and Technology, University of Education, Lahore in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Field of Physics.

Student Name: \_\_\_\_\_

Signature: \_\_\_\_\_

### Examination Committee:

#### 1. External Examiner 1

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

(Designation & Office Address)

\_\_\_\_\_  
\_\_\_\_\_

#### 2. External Examiner 2

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

(Designation & Office Address)

\_\_\_\_\_  
\_\_\_\_\_

#### 3. Internal Examiner

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

(Designation & Office Address)

\_\_\_\_\_  
\_\_\_\_\_

Supervisor Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Dean/HOD Name: \_\_\_\_\_

Signature: \_\_\_\_\_



## OFFICE OF THE CONTROLLER OF EXAMINATIONS

### NOTIFICATION

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Date: \_\_\_\_\_

It is notified for the information of all concerned that Mr./Ms. (Name of Student) PhD Scholar of (Name of Department) of (Name of University) has completed all the requirements for the award of PhD degree in the discipline of (Name of the Subject)/Program as per detail given hereunder:

<b>PhD in <u>(Subject name)</u></b>			<b>Cumulative Result</b>			
Registration No.	Scholar's Name	Father's Name	Credit Hours			Cumulative Grade Point Average CGPA
			Course Work	Research Work	Total	

Research Topic: \_\_\_\_\_

Supervisor-I Name: \_\_\_\_\_

Supervisor-II Name: \_\_\_\_\_

Foreign/External Examiners:

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University: \_\_\_\_\_

Address: \_\_\_\_\_

b) Name: \_\_\_\_\_

University: \_\_\_\_\_

Address: \_\_\_\_\_

Detail of Research Articles Published on the basis of thesis research work: \_\_\_\_\_

**Note:** This result is declaration as notice only. Errors and omissions, if any, are subject to subsequent rectification.

**Signed by**  
**Controller of Examinations**

CC:

1. abcdefg
2. hijklmno



## ACKNOWLEDGEMENT

It should not exceed one page.

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## ABSTRACT

A good abstract explains in a few lines what was actually done and why the work was important. The maximum number of words should not be more than 1000 words. The abstract page may include the following:

- Background
- Objectives/Aim of study
- Research Methodology
- Findings
- Conclusion
- Implications
- Limitations



## TABLE OF CONTENTS

CHAPTER	TITLE	PAGE No
	DECLARATION	
	DEDICATION	
	ACKNOWLEDGEMENT	
	ABSTRACT	
	TABLE OF CONTENTS	
	LIST OF TABLES	
	LIST OF FIGURES	
	LIST OF ABBREVIATIONS	
	LIST OF SYMBOLS	
	LIST OF APPENDICES	

**Example:**

<b>1</b>	<b>INTRODUCTION</b>	
1.1	Background of the Research	
1.2	Solar Cells	
	1.2.1 Intermediate Band Solar Cells	
	1.2.2 Concepts and Definitions	
1.3	Background of the Study on $\beta$ -phase $\text{In}_2\text{S}_3$	
1.4	Statement of the Problem	
	1.4.1 Need for Highly Accurate Method	
	1.4.2 Insufficient Study on Transition Metal Substitution in $\beta$ - $\text{In}_2\text{S}_3$	
	1.4.3 Lack of Intermediate Band Thin Film Study on the $\beta$ -phase $\text{In}_2\text{S}_3$	
1.5	Objectives of the Study	
1.6	Scope of the Study	
1.7	Significance of the Study	
1.8	Organization of the Thesis	

**2. LITERATURE REVIEW**

Summary

Example: The last sub-section comprises of summary of the literature review.

**3. METHODOLOGY**

**4. ANALYSES/ FINDINGS/RESULTS AND DISCUSSION**

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

**CONCLUSION**

**REFERENCES**

**APPENDIX**

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**LIST OF TABLES**

<b>TABLE No.</b>	<b>TITLE</b>	<b>PAGE No.</b>
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**LIST OF FIGURES**

<b>FIGURE No.</b>	<b>CAPTION</b>	<b>PAGE No.</b>
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**LIST OF ABBREVIATIONS**

**LIST OF APPENDICES**

<b>APPENDIX No.</b>	<b>TITLE</b>	<b>PAGE No.</b>
---------------------	--------------	-----------------



## SUBMISSION OF THESIS

### Final Submission of Bound Manuscripts

The submission of thesis shall include one soft and five hard copies (6 copies in case of co-supervisor) of the thesis and 6 copies of abstract, not exceeding 1000 words, to his/her supervisor who forward it to HOI (Head of Institute i.e. concerned Director/Principal of the respective Campus/Division) for further processing.

The formatting and the referencing style for the thesis should be according to the APA (American Psychological Association) 6<sup>th</sup> edition.

### Electronic Copy of Thesis

The electronic copy should include a scanned copy of the approval page. The electronic copy should be saved on CD/DVD (W/R) in PDF format and should be saved with the full name of the candidate, year, degree and the subject.

#### Example: Azhar Khan-2016-Ph.D. Physics

**Chapter Heading:** 14 pt., Bold, Capital Letters, Align Centre

**Title:** 14 pt., Bold, Capitalize each word, Align Centre

### Colour of Thesis Binding

Name of the degree program	Text Colour	Colour of the Binding
B.Ed. (Hons)/ BS (Hons)	Black with silver script	ABC
MA /M.Sc. (2 Years Program)	Navy Blue with gold script	ABC
MS / MPhil.	Dark Green with gold script	ABC
Ph.D.	Dark Maroon with gold script	ABC

The spine of the thesis should show **Name of the candidate along with degree name** on top across the width of the spine with **Year** of submission (see the sample given on page no 3 of this manual). Letters/words on spine should be in 16 pt. and may be in bold face.

## MANUSCRIPT FORMAT

The content, format and style of all elements of your thesis must conform to the APA (American Psychological Association) 6th edition. APA style should be followed as per the following example.

### Margins (A4 size paper)

- Left margin – 1.5 inches to allow for binding.
- Top margin – 1.0 inch above the first line of type.

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- Right margin - should be at least 1.0 inch.
- Bottom margin- 1.0 inch below the last line of type.
- Page No. 0.5 inch at the right upper corner.

#### **Page Limit for Ph.D. Thesis**

<b>For Arts &amp; Social Sciences</b>		<b>For Science &amp; Technology</b>	
Minimum Limit	175 pages	Minimum Limit	120 pages
Maximum Limit	300 pages	Maximum Limit	300 pages

#### **Page Limit for M.Phil./MS Thesis**

<b>For Arts &amp; Social Sciences</b>		<b>For Science &amp; Technology</b>	
Minimum Limit	125 pages	Minimum Limit	75 pages
Maximum Limit	200 pages	Maximum Limit	125 pages

#### **Page Limit for M.Sc. (2-Years)/BS/B.Ed. (Hons) Thesis**

<b>For Arts &amp; Social Sciences</b>		<b>For Science &amp; Technology</b>	
Minimum Limit	75 pages	Minimum Limit	50 pages
Maximum Limit	100 pages	Maximum Limit	75 pages

## **REFERENCES**

The references should appear in APA (American Psychological Association) 6th edition format; attached herewith.

The information/examples quoted herewith are taken from different sources (Reference needed)

## APPENDIX

### USING APA STYLE MANUAL

#### What is the APA Style?

- APA is a Publication Manual of the American Psychological Association

#### 1) General Guidelines

One should type or print on one side only and the size of the paper should be 8½ X 11 inches. The pages number should be consecutive and be at the top right corner. The page number should begin from the title page **but there shouldn't be page number on title page.**

The font size of the text should be 12-point and *Times Roman* or *Courier* typefaces. Use only black toner. There should be indent paragraphs 5-7 spaces. The maximum number of line per page should not be more than 27.

#### 2) Headings

**There are five levels of heading as given below.**

#### CENTERED UPPERCASE HEADING

#### Centered Uppercase and Lowercase Heading

#### *Centered, Italicized, Uppercase and Lowercase Heading*

*Flush Left, Italicized, Uppercase and Lowercase Heading*

*Indented, italicized, lowercase paragraph heading, ending with a period, with the following text starting on the same line.*

#### 3) Numbers

From one to nine, write all numbers in words e.g. one, two, three, ...nine. From 10 and over use numerals for all numbers and never starts a sentence with a number.

#### 4) Seriation

For Seriation, always use the lowercase letter in parentheses.

*Seriation within paragraph or sentence:* For instance, the response of participants was different (a) passive response, (b) confused response, and (c) the active one.

*Separate paragraphs:* Each paragraph should be numbered with an Arabic numeral (1, 2, 3..), and add a period. Example

1. Start with paragraph indent and type second and succeeding lines flush left.

2. The new item starts a new paragraph.

**5) Tables**

Tables should be plotted as shown below;

Table 1

*Percentage Contribution from RU and non RU universities*

	Authors	Publication	Citation
Research universities	80	1898(83.3%)	11519 (%81.4)
Non-research universities	20	381 (16.7%)	2628 (18.6%)
Total	100	2279	14147

**Numbers.** Number all tables with Arabic numerals sequentially. Do not use suffix letters (e.g. Table 3a, 3b, 3c); instead, combine the related tables. If the manuscript includes an appendix with tables, identify them with capital letters and Arabic numerals (e.g. Table A1, Table B2).

**Titles.** Like the title of the paper itself, each table must have a clear and concise title. When appropriate, you may use the title to explain an abbreviation parenthetically.

Example: *Comparison of Median Income of Adopted Children (AC) v. Foster Children (FC)*

**Headings.** Keep headings clear and brief. The heading should not be much wider than the widest entry in the column. Use of standard abbreviations can aid in achieving that goal. All columns must have headings, even the stub column (see example structure), which customarily lists the major independent variables.

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6) **Figures**

Draw figures as shown below;

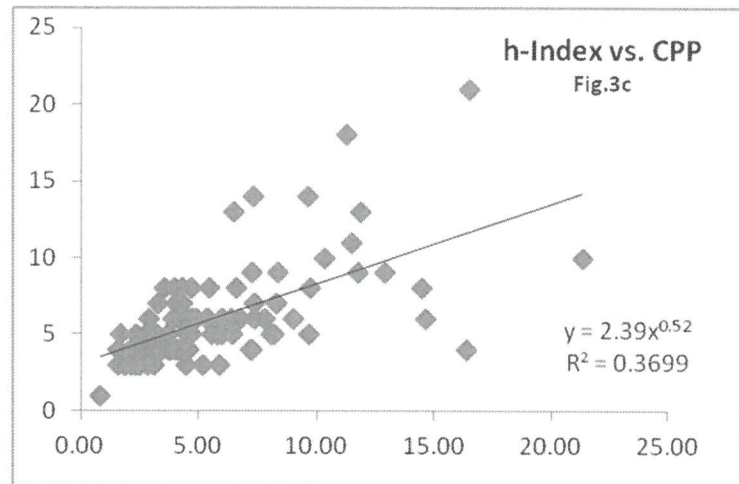


Figure 5. Box plot illustration of AI and OII

7) **Citations**

**The following information is required for citation**

- i) Author or Authoring Body
- ii) Publication's date
- iii) Title of the research work
- iv) Publisher of the work & place of publication
- v) Source's title (journal, book, talk, encyclopaedia, website etc.
- vi) Source's volume number, issue number, page or paragraph numbers etc.
- vii) In the case of electronic source (website, DOI,) date of retrieval date should be mentioned. For examples, see the relevant part given below.

*In-text citation:* It is also known as parenthetical citation e.g. author-date reference. Details are given below. The in-text citation should be listed in the *Reference list*

**Author's Name in Sentence**

Bornmen *et al.* (2008) used greater than 0.6 cut-off threshold for the categorization of the indices between the factors (p. 743).

**Author's Name in Parentheses**

Scientometric data are usually not symmetrically distributed and skewed (Egghe, 2006a; Bornmann *et al.*, 2008; Moed, 2005). Therefore, we applied Egghe (2005a; 2005b) assumption that the relationship between any two indices is nonlinear and can be described as a power function.

*Handwritten signature*

**8) Verbatim copying/Short Quotations**

Always put the double quotation in the running text for verbatim copying of text or short quotations of less than 40 words. Make sure to add the author's last name, publication year, and page number(s) of quoted text e.g. h-index is defined as "a scientist has index h if h of his /her Np papers has at least h citations each and the other (Np – h) papers have no more than h citations each" (Hirsch, 2005a, p. 16569)

The traumatic response commonly involves "delayed, the uncontrolled repetitive appearance of hallucinations and other intrusive phenomena" (Caruth, 1996, p. 11).

**9) Long Quotations**

For 40 or more than 40 words, write the text in a *block form*. Text should be indented 5-7 spaces and no need to put the quotation marks. If the quotation has internal paragraphs, indent the internal paragraphs further 5-7 spaces. Use single space to write the block quote and cite the source after the end punctuation of the quoted text. Here is an example of **Long Quotations**

Haider (1969) stated that:

The report, submitted by Key in 1956, suggested the need for strengthening scientific libraries to the chain of laboratories of Pakistan Council of Scientific and Industrial Research (PCSIR). The report emphasized the need for maintenance of up to date libraries through a regular flow of scientific literature in a country like Pakistan, where personal contacts with international scientists are rather limited. Realizing the poor condition of science & technology libraries, PANSDOC sponsored a symposium on the "Development of scientific and technical libraries" held from 14<sup>th</sup> to 16<sup>th</sup> March in 1963 at Karachi. It provided a platform to the scientists, educationists, librarians & publishers for presenting their problems, complaints and appreciations based on their experiences. The PCSIR was established in 1957 with the technical & financial assistance of UNESCO. Its purpose is to help Pakistani scientists keep abreast of current scientific literature through its document procurement, translation, bibliography & compilation services (pp.38-41).

**How to cite Secondary Reference**

World Health Organization proposed in 1947 the following definition of health. "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity" (World Health Organization, as cited in Potter & Perry, 2001, p. 3).

**10) Multiple Authors (Parenthetical Citations)**

In case of two authors, cite both names and separated then by symbol & for instance: (Saeed & Maryam, 1969, p. 137)

In case of 3 to 5 authors, first time cite all the authors and then use et al. For example: (William et al., 2003)

For six or more authors, one has to cite first author's name and then et al. e.g: (Pervaiz et al., 1998)

**11) Single author (Multiple Citations)**

In case of multiple sources from a single author, citation should be put in chronological order, separated by comma, for instance: (Burken, 1996, 1998, in press)

When all publication are in the same year the same year: (Ali, 1997a, 1997b, 1997c, in press)

**12) Multiple authors (Parenthetical Citations –Multiple Citations)**

For multiple sources, authors should be separated by a semicolon, and should be put in alphabetical order. For example: (Buker, 1968; Pervaiz, 1995; White, 2011)

**13) Personal communication (not included in references)**

Personal communication should also cite in the text. Example: (T.K. Aamer, personal communication, October 14, 2011)

**14) Handling Parenthetical Citations**

- Sometimes additional information is necessary . . . for instance; When there is more than one author with the same last name (H. James, 1878); (W. James, 1880)
- Two or more works in the same parentheses (Caruth, 1996; Fussell, 1975; Showalter, 1997)
- Specific part of a source; (Jones, 1995, chap. 2)
- If the source has no known author, then use an abbreviated version of the title: Full Title: "California Cigarette Tax Deters Smokers" Citation: ("California," 1999)

**Example of parenthetical citations**

Afza (1975) investigated the information needs of scientists working in the Oil, Fats and Waxes Division of the PCSIR laborites at Lahore using interview method.

Recently, in a reviewing article, Anwar concluded that "land has barren since 1983" (2007, p. 28).

However, it is no more barren. Lately the research on information needs of various communities has been explored by Muneera (2007) in her PHD study, Khurum (2007) and Nazli (2001) in their master studies.

**Another example** when text is taken from the same source but not continue text (in parts). Add ... for the missing text e.g. According to Evans (2000) "people seek information from formal and informal system. Informal system provides the bulk of individual's every day, or common, information". He pointed out that "two important factors 'accessibility' and 'effort' is governed by law of least

effort...It means people required information which needed least effort both in terms of time and money (e.g. material at hand; a person accessible; colleague etc.)”(p. 33).

## 15) Reference List

- The reference list of all cited sources should be placed at the end. References should start on a new page and starts each entry flush with the left margin, indent subsequent lines five to seven spaces (hanging indent).
- Use double space both within and between entries and *Italicize* the title of books, magazines, etc.
- Capitalize only the first word of the title, the first word after a colon or dash, and proper nouns in titles of books, articles, etc.
- Capitalize all major words and all words of four letters or more in periodical titles.

### *Order of the Reference List*

- Sources should be arranged alphabetically starting with author's last name
- If author has more than one source, arrange entries by year, earliest first
- When an author appears both as a sole author and, in another citation as the first author of a group, list the one author entries first
- If no author is given, begin entry with the title and alphabetize without counting a, an, or the
- Do not underline, italicize or use quote marks for titles used instead of an author name

### Examples – the Oder of the Reference List

- ✓ Babar, J. R. (2000a). Organize ...
- ✓ Babar, J. R. (2000b). Classify the ...
- ✓ Kamran, K. L. (1999). Issue ...
- ✓ Kamran, K. L. (2003). Preservation of ...
- ✓ Kamran, K. L., Ali, R., Smooth, P., ...
- ✓ Yasir, H. (1994). Preclusion ...

### Group Author

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5<sup>th</sup> ed.). Washington, DC: Author.

### Book with one author

Abels, E. (2004). Information seekers' perspectives of libraries and librarians In D.A. Nitecki (Ed.). *Advances in Librarianship*, (pp.151-167).Amsterdam: Elsevier.

### Book with two authors

Case, D. O. & White, E. B (2007). *Looking for information: A survey of research on information seeking needs and behaviour* (2nd ed.). Amsterdam: Elsevier.

**Book with six or more authors**

Wolchik, S. A., West, S. G., Sandler, I. N., Tein, J., Coatsworth, D., Lengua, L., et al. (2000). An experimental evaluation of...

**Book with no author**

*Merriam-Webster's collegiate dictionary* (10<sup>th</sup> ed.). (1993). Springfield, MA: Merriam-Webster.

**Book with editors**

Allison, M. T., & Schneider, I. E. (Eds.). (2000). *Diversity and the recreation profession: Organizational perspectives*. State College, PA: Venture.

**Chapter in Book**

Stern, J. A., & Dunham, D. N. (1990). The ocular system. In J. T. Cacioppo & L. G. Tassinary (Eds.), *Principles of psychophysiology: Physical, social, and inferential elements* (pp. 513-553). Berkeley, CA: University of California Press.

**Multivolume book**

Koch, S. (Ed.). (1959-1963). *Psychology: A study of science* (Vols. 1-6). New York: McGraw-Hill.

**Journals with Continuous Pagination**

Chan, L. (1999). Electronic journal and academic libraries. *Library Hi Tec*, 17(1), 10-16.

**Journals with Pagination by Issue**

Chatman, E. A. (1996). The impoverished life-world of outsiders. *Journal of the American Society for Information Science*, 47 (3), 193-206.

**Article in press**

Adcs, R. (in press). The new trends in fashion. *Journal of fashion*.

**Abstract**

Misumi, J., & Fumita, M. (1982). Effects of PM organizational development in supermarket organization. *Japanese Journal of Experimental Social Psychology*, 21, 93-111. [Abstract] Psychological Abstracts, 1982, 68, Abstract No. 11474

**Magazine**

Posner, M. I. (1993, October 29). Seeing the mind. *Science*, 262, 673-674.

**Newspaper**

Schwartz, J. (1993, September 30). Obesity affects economic, social status. *The Washington Post*, pp. A1, A4.

**Encyclopedia**

Blaser, L. (1996). Relativity. In *Gale encyclopedia of science* (Vol. 15, pp. 82-86). New York, Gale Encyclopedia Co.

**Videotape**

National Institute on Mental Health. (1980). *Drug abuse* [videotape]. Bethesda:



Author.

### Thesis

Bokhari, S. A. (1976). *Information needs of the engineers of the Heavy Mechanical Complex, Texila*. Unpublished Master's thesis, University of the Punjab, Lahore.

### Electronic sources

Fidel, R. & Petersen, A. M. (2004). From information behavior research to the design of information systems: the cognitive work analysis framework. *Information Research*, 10(1). Retrieved April 3, 2008 from <http://informationr.net/ir/10-1/paper210.html>.

### Web page

Choo, C. W., Detlor, B., & Turnbull, D. (2000). Information seeking on the Web: An integrated model of browsing and searching. Retrieved on April 3, 2008 from [http://www.firstmonday.org/issues/issue5\\_2/choo/](http://www.firstmonday.org/issues/issue5_2/choo/).

### Professional paper from the Internet

Jacob, B. & Shoemaker, N. (n.d.). *The Myers-Briggs Type Indicator: An interpersonal tool for system administrators*. Retrieved October 19, 2003 from <http://www.mindspring.com/~nancyschoemaker/nes/mbti/mbtipaper.pdf>

### Stand-Alone Web Document with no author or date

GVU's 8<sup>th</sup> WWW user survey. (n.d.). Retrieved January 17, 2003, from <http://www.ccgatech.edu/gvu>

## Sample Reference List

### References

- Abels, E. (2004). Information seekers' perspectives of libraries and librarians in D.A. Nitecki (Ed.). *Advances in Librarianship*, (pp.151-167). Amsterdam: Elsevier.
- Afza, N. (1975). *Information needs of scientists working in the Oils, Fats and Waxes Division of the PCSIR Laboratories*. Unpublished master's thesis, University of Punjab, Lahore.
- Allen, B. L. (1996). *Information tasks: Towards a user-entered approach to information systems*. USA: Academic Press.
- Belkin, N. J. (1980). "Autonomous states of Knowledge as a basis for information retrieval" *The Canadian Journal of Information Science*.5, 133-143.
- Blake, C. & Pratt, W. (2006). Collaborative information synthesis: A model of information behaviour of scientists in medicine and public health. *Journal of the American Society for Information Science and Technology*, 57(13), 740-1749.
- Brown, C. M. (1999). Information seeking behaviour of scientists in the electronic information age: Astronomers, chemists, mathematicians, and physicists. *Journal of the American Society for Information Science*, 50(10), 929-943.

- Case, D. O. (2007). *Looking for information: A survey of research on information seeking needs and behaviour* (2nd ed.). Amsterdam: Elsevier.
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