

**School of Media, Culture and Creative Arts  
Department of Information Studies**

**An Investigation of the Role of Digital Libraries in Bridging the  
Digital Divide in Developing Arab Countries: The Case of Yarmouk  
University, Jordan**

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**This thesis is presented for the degree of  
Doctor of Philosophy  
of  
Curtin University of Technology**

**January 2010**

## **Declaration**

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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## **Abstract**

Developing countries are often said to suffer the disadvantages created by a ‘digital divide’ – the gap between the digitally advantaged and the digitally disadvantaged. This study examines the phenomenon of the digital divide in the context of Jordan as an example of a developing Arab country. The research question for the study is: How can digital libraries assist universities in Jordan to bridge the digital divide?

This research question is addressed by using the established method of a document availability test to measure the availability of randomly selected documents at Yarmouk University, Jordan; and conducting a comparison with Curtin University as an example of an established university in a developed country. This test serves as the basis for a survey and interviews undertaken with academic and library staff from Yarmouk University, and senior government policy makers in Jordan.

A focus of the study is on assessing the particular challenges and frustrations facing Arabic-speaking researchers in their use of digital information services. That is, while the term digital divide is often used as a means of expressing the technology gap between developed and developing countries, it may well be that a further divide is created because of the domination of the languages and content of the developed world in the digital environment.

The findings of the research make recommendations regarding the digital scholarly environment in Jordan. These include the need to:

1. develop a more mature research culture,
2. enhance professionalism and skill development in academic library staff,
3. increase collaboration in the creation and delivery of digital scholarly content,
4. develop open access publishing and archives,
5. improve advocacy and training roles of academic librarians.

**Key Words:** Digital library, digital divide, linguistics divide, Arabic language, Internet, document availability, Developing Countries, Arab Countries, Jordan.

## **Acknowledgement**

In the name of Allah, the most Beneficent, the most merciful. All praises and thanks are to Allah, the lord of the universe and all that exist.

Every move of my works towards the completion of this thesis at Curtin University of Technology has been supported and inspired by many individuals. I thank the Government of the Hashemite Kingdom of Jordan, symbolized by Al-Balqa' Applied University, Yarmouk University, and the many librarians and senior government policy makers, for giving me the opportunity and the necessary support to pursue my higher education without which this work would never have come alive.

I am blessed to have been influenced by many talented and creative faculty members at the Faculty of Media, Society and Culture, Curtin University of Technology. To these people I owe a tremendous debt of gratitude. I could hardly find the words to express my appreciation for everything my supervisor, Dr. Paul Genoni has done. His advice and guidance have been thoughtful and extensive. He has been truly dedicated to my supervision and taught me the rigors of both research and supervision and truly made a difference in my academic life. Special thanks also go to my associate supervisor Dr. Michele Willson for her valuable assistance, her timely comments, and guidance which have enriched and strengthened this research.

I am so grateful to the editor, a very special thanks goes to Mrs. Lisa Bell. Without her encouragement, suggestions and editing assistance, I would not have finished this thesis. I would also like to say many thanks to Mr. David Packer from the Student Learning Support at Curtin University for his assistance in my research.

Thanks are also due to other members of the Faculty staff, including Dr. Margaret Exon, Dr. Kerry Smith, and Mrs. Christine Richardson for their valuable comments and advice during the period of my study.

Lastly, but most importantly, I would like to thank my beloved wife, Abeer, and daughter, Rayam and sons, Yaman and Bashar, who have struggled this journey with me. Without their constant love, patience, and support the journey would have been far greater. My father and mother, and mother in law, have been my constant source of inspiration through keeping me in their prayers, and my brothers with special thanks to Motasim for his valuable assistance in my progress. I also thank my sisters, and relatives who have provided their encouragement and prayers. They all have made sacrifices for me over the years and without their cooperation and enthusiasm this study would not have been possible.

## Table of Contents

Declaration .....	i
Abstract .....	ii
Acknowledgement .....	iii
Table of Contents .....	v
List of Figures .....	xi
List of Tables .....	xiii

### ***Chapter 1 Introduction ..... 5***

1.1 The field of research.....	5
1.2 Research question and objectives.....	6
1.3 Research significance.....	7
1.4 Presentation of the study .....	8

### ***Chapter 2 Research Context: Jordan and Australia ..... 11***

2.1 Introduction .....	11
2.2 Jordan: general background .....	12
2.2.1 The Jordanian economy .....	13
2.2.2 Information and communication technology in Jordan .....	14
2.2.3 Internet services in Jordan.....	17
2.2.4 Higher education in Jordan .....	21
2.2.5 Irbid.....	25
2.2.6 Yarmouk University.....	25
2.2.7 Yarmouk University library and information services .....	26
2.3 Australia: general background .....	28
2.3.1 The Australian economy .....	29
2.3.2 Information and communication technologies in Australia .....	31
2.3.3 Internet services in Australia.....	33
2.3.4 Higher education in Australia .....	35

2.3.5 Western Australia.....	37
2.3.6 Curtin University.....	37
2.3.7 Curtin University library and information services .....	39
2.4 Summary .....	41
<b><i>Chapter 3 Background and Review of the Literature.....</i></b>	<b>43</b>
3.1 Introduction.....	43
3.2 Defining the digital divide .....	44
3.2.1 The digital divide in developing countries.....	48
3.2.2 The digital divide in Arab countries .....	56
3.2.3 Bridging the digital divide .....	60
3.3 Language on the Internet.....	63
3.3.1 Arabic language on the Internet.....	65
3.4 Digital libraries and the digital divide.....	69
3.4.1 Defining the digital library.....	69
3.4.2 Digital libraries and scholarly communities in developed countries .....	71
3.4.3 Digital libraries and scholarly communities in developing countries.....	74
3.4.4 Digital libraries and scholarly communities in Arab countries.....	77
3.4.5 The role of the Internet and digital libraries in bridging the digital divide.	83
3.5 Summary .....	86
<b><i>Chapter 4 Research Methodology .....</i></b>	<b>88</b>
4.1 Introduction.....	88
4.2 User studies .....	89
4.3 Methodological triangulation .....	90
4.4 Reviewing the literature .....	91
4.5 Qualitative and quantitative methodologies.....	92
4.6 Document availability test .....	93
4.6.1 Sample.....	96
4.6.2 Sampling technique.....	97
4.6.2.1 Selection of international journals .....	98

4.6.2.2 Selection of national journals.....	100
4.6.2.3 Systematic sampling .....	100
4.6.3 DAT Instrument .....	101
4.6.4 Procedure .....	102
4.7 Questionnaire .....	104
4.7.1 Advantages and disadvantages of questionnaires .....	105
4.7.2 Questionnaire design.....	107
4.7.2.1 Section A.....	108
4.7.2.2 Section B .....	108
4.7.2.3 Section C .....	109
4.7.2.4 Section D.....	110
4.7.3 Pilot questionnaire.....	111
4.7.4 Population and sampling.....	113
4.7.5 Major questionnaire .....	115
4.8 Interviews.....	118
4.8.1 Interview design.....	118
4.8.2 Population and sampling.....	120
4.8.3 Data collection .....	121
4.9 Data analysis .....	123
4.9.1 Questionnaire analysis .....	123
4.9.2 Interview analysis .....	124
4.10 Ethical considerations and data storage .....	124
4.11 Summary .....	125

***Chapter 5 Document Availability Test Results ..... 127***

5.1 Introduction.....	127
5.2 Document availability test (International sample - group 1) .....	127
5.2.1 Sample items from Group 1 (International sample) available in print .....	132
5.2.2 Sample items from Group 1 (international sample) available digitally .....	134
5.2.3 Sample items from Group 1 (international sample) available free from the Internet .....	136
5.3 Document availability tests, groups 2 (Jordanian sample, n=250) and group 3 (Australian sample, n=250).....	140

5.3.1 Sample items in Group 2 at Yarmouk University Library .....	143
5.3.2 Sample items in Group 3 at Curtin University Library.....	145
5.3.3 Comparison of results at Yarmouk University Library (Group 2) and Curtin University Library (Group 3).....	147
5.4 Summary .....	150

## ***Chapter 6 Questionnaire Results..... 152***

6.1 Introduction.....	152
6.1.1 Descriptive analysis .....	153
6.1.2 Demographic information (Part A).....	153
6.2 Use of the Internet (Part B).....	157
6.2.1 Location of Internet access .....	157
6.2.2 Length of time using the Internet.....	159
6.2.3 Reason for accessing Internet services?.....	161
6.2.4 Attitudes towards using the Internet .....	164
6.2.5 Barriers to use of the Internet.....	168
6.2.6 Use of the Internet in Jordan compared to western countries.....	171
6.2.7 Benefits of using the Internet in academic work.....	174
6.2.8 Barriers to the effective use of the Internet.....	176
6.3 Use of Library information (Part C).....	178
6.3.1 Frequency of visits to the university library .....	179
6.3.2 Library visits after access was made available through the Internet.....	180
6.3.3 Awareness of electronic resources subscribed to by the university library.....	181
6.3.4 Access to library services via the Internet. ....	183
6.3.5 Role of libraries and librarians in bridging of the digital divide.....	185
6.3.6 Perception of access to full text databases in western countries compared with Arab countries .....	188
6.3.7 Impact of the digital library on academic research and other activities....	190
6.4 Language and scholarly communications (Part D) .....	191
6.4.1 Arabic and English in the Arab academic environment .....	196
6.4.2 Role or (status) of English language in Arab countries .....	198
6.4.3 Advantages of the Internet for research communities .....	200
6.4.4 Barriers to the use of Arabic on the Internet.....	201

6.4.5 Role of universities in promoting the use of Arabic language on the Internet for the purpose of scholarly communications.....	203
6.4.6 Promoting the use of Arabic on the Internet in the academic environment	204
6.5 Summary .....	205

***Chapter 7 Interview Results..... 206***

7.1 Introduction.....	206
7.2 Demographic information .....	207
7.2.1. Interviews with academic staff .....	208
7.3. Semi-structured interview results.....	209
7.3.1 Interviews with academic participants .....	209
7.3.2 Interviews with policy maker participants .....	238
7.4 Results of librarian participant interviews .....	258
7.5 Summary .....	275

***Chapter 8 Discussion ..... 276***

8.1 Introduction.....	276
8.2 Objective 1: measure the extent of a digital divide in Jordan .....	277
8.3 Objective 2: Identify the components of any digital divide (i.e. technological, linguistic and cultural).....	283
8.3.1 Technological.....	284
8.3.2 Linguistic .....	288
8.3.3 Cultural.....	295
8.4 Objective 3: Assess the potential role of digital libraries in Jordanian universities in overcoming the digital divide. ....	300

***Chapter 9 Conclusion ..... 306***

9.1 Five conclusions.....	308
9.1.1 Research culture .....	308
9.1.2 Professionalism and skills development for academic librarians .....	309

9.1.3 Collaboration in the creation and delivery of digital scholarly content.....	309
9.1.4 Open Access publishing and archives to be developed .....	310
9.1.5 Advocacy and training .....	311
9.2 To what extent is the experience of the digital divide in Jordan relevant to other developing Arab countries?.....	312
9.3 Limitations of the current research .....	314
9.4 Future research.....	314
9.5 Summary .....	315
Cited Bibliography .....	318
Appendix A. Major Questionnaire (English Version) .....	339
Appendix B. Major Questionnaire (Arabic version).....	348
Appendix C. Questionnaire Reminder Letter One.....	355
Appendix D. Questionnaire Reminder Letter Two .....	356
Appendix E. Interview Schedule .....	357
Appendix F. Consent Form Attached to the Interview .....	359
Appendix G. Samples of data sheet .....	361

## List of Figures

<b>Figure 2.1:</b> Map of Jordan.....	<b>13</b>
<b>Figure 2.2:</b> Map of Australia.....	<b>29</b>
<b>Figure 4.1:</b> Flow chart of sample item search.....	<b>103</b>
<b>Figure 5.1:</b> A schematic view of the major findings of the study (Group 1 – International Sample Items, n=500).....	<b>129</b>
<b>Figure 5.2:</b> International Sample: availability at Curtin University, n=500 .....	<b>130</b>
<b>Figure 5.3:</b> International Sample: availability at Yarmouk University, n=500 .....	<b>131</b>
<b>Figure 5.4:</b> Sample items in Group 1 (international sample, n=500) available in print form.....	<b>133</b>
<b>Figure 5.5:</b> Sample items in Group 1 (international sample) available in digital form .....	<b>134</b>
<b>Figure 5.6:</b> Sample items in Group 1 (international sample) available in print or digital form.....	<b>135</b>
<b>Figure 5.7:</b> Sample items in Group 1 (international sample) available from the Internet.....	<b>136</b>
<b>Figure 5.8:</b> Sample items in Group 1 (International sample, n=500) accessed in print, digital, and Internet forms, with duplicates removed.....	<b>139</b>
<b>Figure 5.9:</b> A schematic view of the results of the test for Group 2 (Jordanian sample, n=250).....	<b>141</b>
<b>Figure 5.10:</b> A schematic view of the results of the test for group 3 (Australian sample, n=250).....	<b>142</b>
<b>Figure 5.11:</b> Group 2 (Jordanian Sample, n=250): availability at Yarmouk University Library.....	<b>144</b>
<b>Figure 5.12:</b> Group 3 (Australian sample, n=250): availability at Curtin University Library.....	<b>146</b>
<b>Figure 5.13:</b> Sample items from Group 2 and Group 3 available in all forms, availability at Curtin University Library and Yarmouk University Library.....	<b>148</b>
<b>Figure 6.B1:</b> Location of Internet access (comparison of Masters Graduates, n=222 and PhD. Graduates, n= 142).....	<b>158</b>
<b>Figure 6.B2:</b> Hours per day spent using the Internet (comparison of Masters Graduates, n=222 and PhDs. Graduates, n= 142).....	<b>161</b>

<b>Figure 6.C3:</b> Frequency of physical visits the Yarmouk Library (comparison of Masters, n=222 and PhD, n= 142) .....	<b>179</b>
<b>Figure 6.C4:</b> How has your actual visit to the library become after being able to access it via the Internet? (Masters, n=222; PhD, n= 142) .....	<b>181</b>
<b>Figure 6.C5:</b> Are you aware of the content of electronic resources that the university library subscribes to? (Comparison of Masters, n=222; PhD, n= 142).....	<b>183</b>
<b>Figure 6.D6:</b> What language do you express yourself in more effectively?.....	<b>192</b>
<b>Figure 6.D7:</b> What is the teaching or learning language in your department? .....	<b>193</b>
<b>Figure 6.D8:</b> What language do you prefer to use for the purpose of information retrieval?.....	<b>194</b>
<b>Figure 6.D9:</b> What language do you prefer to use for scholarly publishing? .....	<b>195</b>
<b>Figure 6.D10:</b> What translation software do you use?.....	<b>196</b>

## List of Tables

<b>Table 2.1:</b> Student enrolments by nationality (Jordanians/non-Jordanian) in the public universities. ....	22
<b>Table 4.1:</b> The Distinction between qualitative and quantitative research methods..	93
<b>Table 4.2:</b> A summary of selected journal titles (international sample) .....	99
<b>Table 4.3:</b> A summary of selected journal titles (Australian Sample) .....	100
<b>Table 4.4:</b> A summary of selected journal titles (Jordanian Sample) .....	100
<b>Table 4.5:</b> Distribution of academic staff at Yarmouk University 2006/2007 .....	114
<b>Table 4.6:</b> Actual and sample distribution of academic staff.....	115
<b>Table 4.7:</b> Actual and sample distribution of academic staff.....	116
<b>Table 5.1:</b> Type of websites providing access to sample items in Group 1 (international sample) free from the Internet .....	138
<b>Table 5.2:</b> Type of websites where sample items (Groups 2 and 3) are available from the Internet .....	149
<b>Table 6.A1:</b> Gender of respondents .....	153
<b>Table 6.A2:</b> Age of respondents.....	154
<b>Table 6.A3:</b> Faculty.....	154
<b>Table 6.A4:</b> Highest completed level of education .....	155
<b>Table 6.A5:</b> Academic rank .....	156
<b>Table 6.B6:</b> Location of respondent's access to the Internet for work purposes ....	157
<b>Table 6.B7:</b> Length of time using the Internet .....	159
<b>Table 6.B8:</b> How many hours do you use the Internet for work purposes?.....	160
<b>Table 6.B9:</b> What purpose best describes why you use the Internet?.....	162
<b>Table 6.B10:</b> Attitudes towards using the Internet.....	165
<b>Table 6.B11:</b> The Internet contains information relevant to my research.....	167
<b>Table 6.B12:</b> The Internet has become the most important information source for my study and research.....	168
<b>Table 6.B13:</b> Barriers to using the Internet (n= 364) .....	169
<b>Table 6.B14:</b> Advantages and disadvantages of using the Internet in Jordan and western countries (n=364).....	172
<b>Table 6.B15:</b> Faculty of Social Sciences and Humanities (Arabic, n= 155).....	173
<b>Table 6.B16:</b> Faculty of Information Technology (English, n= 20) .....	173
<b>Table 6.C17:</b> Frequency of library visits .....	179

<b>Table 6.C18:</b> How have your visits to the library changed after being able to access it via the Internet?.....	<b>180</b>
<b>Table 6.C19:</b> Are you aware of the content of electronic resources that the university library subscribes to? .....	<b>182</b>
<b>Table 6.C20:</b> Use of library services accessed via the Internet .....	<b>183</b>
<b>Table 6.C21:</b> Role of the Library and Librarians in bridging the digital divide (n=364).....	<b>186</b>
<b>Table 6.C22:</b> The Library provides adequate access to electronic resources? (Masters, n= 222; PhD. n=142).....	<b>187</b>
<b>Table 6.C23:</b> Western countries provide more full text electronic databases than Arab countries .....	<b>189</b>
<b>Table 6.C24:</b> Western countries provide more full text electronic databases than Arab countries .....	<b>189</b>
<b>Table 6.D25:</b> Importance of Arabic and English for research in Arab academic environment (n= 364).....	<b>197</b>
<b>Table 6.D26:</b> Use of English language for research in Arab academic environment (n= 364).....	<b>199</b>
<b>Table 6.D27:</b> Building scholarly communities (n= 364) .....	<b>200</b>
<b>Table 6.D28:</b> Barriers to the use of Arabic language on the Internet (n= 364).....	<b>201</b>
<b>Table 7.1:</b> Academic interview participants.....	<b>208</b>
<b>Table 7.2:</b> Policy maker interview participants.....	<b>238</b>
<b>Table 7.3:</b> Librarian interview participants .....	<b>258</b>

# Chapter 1 Introduction

‘It is impossible to have a complete education system without an appropriate and strong higher education system . . . You have to have centers of excellence and learning and training and services of libraries if you are going to advance the issue of poverty and development in developing countries . . . The key . . . is higher education, not just on the technological side, but to create content and people with enough knowledge to be able to use it.’ (Lauritz B. Holm-Nielsen 2001)

## 1.1 The field of research

Developing countries are often said to suffer from the disadvantage of a ‘digital divide’—the gap between the digitally advantaged (developed) countries and the digitally disadvantaged (developing) countries. In broad terms this digital divide mirrors the technology gap that separates the developed countries from the developing. This is a gap that opened significantly during the course of the industrial revolution and has yet to be closed.

The examination of the digital divide and its impact has become urgent as it has been apparent that the divide has the potential to delay global development and exacerbate differences in living standards. On World Telecommunications Day, May 17, 2004, then United Nations Secretary General, Kofi Annan, made a plea for the elimination of the digital divide between rich and poor nations. In doing so he highlighted the role of digital information as a crucial component of economic and social development.

Much of the attention given to the digital divide to date has focused on the most severely disadvantaged countries, particularly in Africa and parts of Asia. This study, however, will examine the digital divide in the context of developing Arab countries, with a particular focus on the phenomenon as it is experienced in Jordan. The Arab

countries of the Middle East region provide an interesting case with regard to digital divide issues as they have an ambivalent status in terms of their ‘development’. On one hand they have comparatively productive and wealthy economies by the standards usually applied to developing countries, but on the other hand they are still in a transitional stage of development in terms of providing widespread access to many important human services, including education and communication. A number of governments in the region, including the Jordanian Government, have therefore seized upon the implementation of ICT services as one of several essential instruments of development. Other important related policy initiatives include an emphasis on education, and the increased use of English as the preferred language for education and some civic uses. In these ways developing Arab countries are striving to modernize their economies and public life and encouraging increased engagement with the developed ‘west’.

One sector in which the impact of these various ‘instruments of development’ is being keenly felt is higher education. The universities in Jordan and other developing countries of the Arab Middle East are a focal point for the social, economic and educational transitions that are central to the development of the region. The universities are increasingly seen as crucial hubs of advanced education and research, both of which are prized by regional governments as being integral to future economic and social development. The various expectations that are held for Arab universities place them at the centre of regional attempts to build modern economies based on high-end digital information and knowledge systems.

At the heart of any university’s development and implementation of digital information services is their library. This is true of both developed and developing countries, but the university libraries in developed countries have been more successful in establishing their role in the effective delivery and use of digital information.

In recent years, libraries serving universities in developed countries have undergone a profound transformation as they have embraced developments in ICT and shifted their collections from print to digital formats. As scholarly communication—both formal and informal—has shifted rapidly to the digital environment, academic libraries have

placed themselves at the centre of the process by which digital scholarly content is discovered, collected, stored and delivered. In doing so, they have assumed a new identity as ‘digital libraries’, and have continued to play their role as crucial partners in teaching, learning and research, and thereby the means by which new knowledge is developed and transmitted.

At the centre of the collections and services offered by the transformed libraries has been the Internet. The Internet has come to serve as both an increasingly important source of free information, and as the platform on which libraries deliver databases of digital content. Some of this database content is acquired on subscription from commercial providers, and some is created by libraries as they digitize items from within their existing collections.

University-based libraries in developing countries have more recently begun to play a similar role in delivering digital content. They can do this both by facilitating access to internationally-sourced digital content, and/or by creating digital repositories of locally-sourced information. The quantity and quality of the digital content these libraries provide, and the value adding they deliver through associated services, will be critical factors in determining how rapidly and effectively information access in developing countries matches that experienced in developed countries. In the process, academic libraries in developing countries are emerging as key ‘players’ in attempts to bridge the digital divide (Lim 2005; Aqili & Moghaddam 2008).

The broad intention of this research is to assess the role that digital libraries serving Jordanian universities can play in reducing the digital divide, and thereby assisting the country’s universities to optimize their effectiveness with regard to both learning and research. An underlying assumption is that optimization in both these regards will be important contributions to future development in Jordan.

A particular focus of this study will be on assessing the challenges and frustrations facing Arabic-speaking scholars in their use of ICTs and related services. That is, while the term ‘digital divide’ is frequently used as a means of expressing the technology gap between developed and developing countries (Wilhelm 1999; NTIA 2000; 2002; Norris 2001; Warschauer 2001; Hall 2002; Harrgittai 2003; Salinas 2003;

Munster 2005), it may well be that in part the divide is the result of the domination of the languages and cultural content of the developed world in the digital information environment.

Increasingly it is being realized that the digital divide may be about more than just access to the Internet and its associated technologies. Four of the other important issues that have been suggested are:

- Language barriers,
- Literacy barriers,
- Lack of 'local' information in digital content,
- Lack of cultural variety. (Ishaq, 2001; Harrgittai, 2003; Salinas, 2003; Warschauer, 2003; Munster, 2005)

If this is the case, in order for developing countries to bridge the divide they must also address these related issues that limit the acceptance and usability of the Internet.

While it is easy for governments in the Arab region to ride a wave of enthusiasm for ICTs, they may run the risk, however, of neglecting these other factors that influence diffusion of technology at the micro level (Loch, K., Straub, & Kamel, S., 2003). Previous research has identified how local culture can either inhibit or encourage technological innovation. In particular, several studies have supported the contention that cultural and social norms in Arab countries can significantly affect the transference of ICTs (Hill, Straub, Loch, Cotterman, & El-Sheshai; 1998; 2001).

For some time international scholarly communication, a disproportionate amount of which is generated in the USA and European countries, has been dominated by English (Global Reach, 2004; Munster, 2005). In the past decade this domination has been transferred from the print to the digital environment.

As a result some developing Middle Eastern countries, including Jordan, have taken a decision that it is easier to adapt their systems of education and technology use to English, rather than try to create, or acquire access to, a parallel range of content in their own language. As a matter of policy the Jordanian government has promoted the

use of English as the primary language for educational purposes. Students learn English at school from an early age, and most universities teach in English. There is also considerable pressure on native Arabic-speaking Jordanian academics to publish in English language journals. By adopting such strategies, however, Arab nations may run the risk of suppressing vital aspects of their own cultural memory, development and identity.

The future of Arabic as a scholarly language in the digital age was questioned in the seminal Arab Human Development Report 2003: Building a Knowledge Society, prepared by the United Nations Development Programme (UNDP). The Report concluded that Arabic is a ‘language in crisis’, and identified a number of aspects to this crisis. These included the ‘challenges raised by information technology, which relate to the computerised automation of the language’ (UNDP, 2003, 7), and emphasised the central role of language in the maintenance and well-being of any cultural system. In addition the Report called for the ‘arabisation’ of university education in relevant countries, noting that the ‘failure to arabicise science creates obstacles to communication between scientific disciplines and slows knowledge exchange’ (7). In other words the current policy of the Jordanian government is held to be potentially detrimental to not only the productivity and significance of Arab research, but also to long-term development and wellbeing of Arab societies. As identified by the Arab Human Development Report 2003, the challenge for regional governments is to develop the policy and infrastructure capable of producing adequate digital content in Arabic, with a view to;

- Preserving and making available the best of existing Arabic scholarship,
- Supporting the research of current and future Arab-speaking scholars.

With these issues in mind it was therefore determined that in investigating the role of Jordanian academic libraries in addressing the digital divide, that the scope of the research needed to extend beyond a narrow focus on the technology issues, and attempt to reach a broader understanding of the complex array of issues which might potentially impact on the collecting and service options available to these libraries.

## **1.2 Research question and objectives**

The design of the study was driven by the search for an answer to a single research question:

How can digital libraries assist universities in Jordan to bridge the digital divide?

In order to help devise research methods capable of providing data relevant to answering this research question, three objectives were set.

1. Measure the extent to which a digital divide exists in Jordan.

It could not simply be assumed that a digital divide exists between developed countries and Jordan. This information gap between a developed country and Jordan needs to be assessed in order to determine the extent of any digital divide and the characteristics of that divide that may be relevant to devising means by which it can be addressed.

2. Identify the components of any digital divide (i.e. technological, linguistic and cultural).

On the basis of existing evidence it was considered unlikely that any digital divide is the result of differences in technology availability only. Rather, it is likely that differences in technology availability reflect a complex array of local cultural factors that require investigation. By understanding these factors any development in library collections and services aimed at addressing the digital divide can be grounded in a sound understanding of the various components of that divide.

3. Assess the potential role of digital libraries in Jordanian universities in overcoming the digital divide.

University libraries are but one of the government funded instrumentalities that might possibly contribute towards addressing the digital divide. It was therefore felt necessary to create an objective that would focus research on the emergence of digital libraries and the particular role they can play in meeting this challenge.

This research question and the three associated objectives were critical in the selection and design of the three core methods selected for this research. These methods consist of:

- A document availability test.
- A questionnaire.
- Interviews.

These research methods and the design of the associated instruments will be discussed in Chapter 4.

### **1.3 Research significance**

Although the capacity of digital libraries to optimize the accessibility of information has been frequently examined and discussed, there are few published studies that deal with the capacity of digital library collections and services to bridge the digital divide. This study, measuring the extent of the digital divide as experienced in a developing Arab country and assessing the capacity of digital libraries to overcome that divide, is the first of its type. As will be examined, a detailed review of both English and Arabic literature reveals no evidence that similar studies have been conducted to investigate the role of digital libraries in bridging the digital divide as it is experienced in the Arab Middle East. The Arabic literature presents only a handful of studies on the use of the Internet by academics for general purposes, and none specifically targeting issues related to the digital divide. Moreover, an examination of previous research reveals no evidence of studies investigating the dominant challenges and limitations facing Arabic-speaking researchers in their use of Internet information services (see for example, Warschauer 2003; Taha, 2004a, 2004b)

The results of the research will therefore generate important baseline information regarding the digital divide as experienced in the Arab World, and will assist the collaboration between librarians, academics and government policy makers as they seek to develop Jordanian library and research infrastructure. It is very important to understand how libraries need to modify their collecting practices and service

delivery to accommodate the new modes of research and scholarly communication. In particular the research outcomes have the potential to assist the development of strategically focused digital library collections and services aimed at reducing the digital divide.

This research should also prove important in generating action aimed at improving the status and effectiveness of digital libraries more generally in Jordan and the wider Arab World. Arab scholars have a particular set of needs if they are to maximize their research output in a digital environment, and this will require optimal policy settings from governments to deliver carefully planned library and research infrastructure.

It should be noted that the particular focus of the research is on issues related to the use of the digital content and digital library services to address the research needs of Jordanian academic libraries. These libraries also play an important role in meeting the teaching and learning needs of staff and students, but the issue of the digital divide is most clearly focused on matters relating to the research capacity of developing countries.

It is sincerely hoped that this research will make a contribution to the eventual implementation in Jordan of academic library services that reach the standard of ‘world’s best practice’.

## **1.4 Presentation of the study**

The report on this research project has been organized into nine chapters.

Chapter 1 is an introduction, providing an overview of this study. It describes the problem and issues that have generated the research, and frames the study with a research question and associated objectives. Chapter One also explains the significance of the study and describes how the study outcomes are being presented.

Chapter 2 contains the necessary background about Australia and Jordan, the two countries that serve as the sites of data collection. The chapter includes comparisons of the current state of information technology and related infrastructure, and higher education in the two countries. The chapter also contains background information about Western Australia and the city of Irbid in Jordan, and provides a brief overview of the universities in these two locations that are used in this research. They are Curtin University (Australia) and Yarmouk University (Jordan)

Chapter 3 reviews the literature relevant to the purpose and scope of this study. It highlights in particular the concept of the digital divide. This includes the relationship between the digital divide and Internet use in developing Arab Countries as compared with studies conducted in developed countries. The other major issue addressed in the literature review is the digital library and the potential role of such libraries in addressing the digital divide and thereby assisting economic and social development in developing countries and regions. The literature relating to some of the various ‘barriers’ to ICT implementation and use experienced in developing countries is also reviewed.

Chapter 4 describes the research methodology that was used in the course of this research project, including the three data gathering procedures. The chapter discusses user studies as an appropriate methodology for research in library and information science, and establishes document availability testing as a valid means of examining the digital divide. Chapter 4 also describes the instruments used, the research populations, and sampling procedures. It also includes information about data management and storage, and ethical considerations.

Chapter 5 contains the results and preliminary analysis of the document availability testing conducted at Curtin University and Yarmouk University. It incorporates a direct comparison between the availability testing of the same sample of ‘international’ items based on the collections of the libraries of Curtin University and Yarmouk University, and an indirect comparison between two separate samples of ‘local’ items conducted at the two universities.

Chapter 6 describes the results and preliminary analysis of a questionnaire survey. It presents frequencies and percentages illustrating the variables distribution and graphically illustrates the results of the questionnaire with figures and tables. The chapter presents the results in four sections. The first section provides the demographic data relevant to the respondents; the second examines respondents' use of the Internet and digital scholarly communication; the third describes responses relevant to the role of libraries and librarians; and the fourth presents results reporting attitudes related to the use of Arabic as a scholarly language.

Chapter 7 contains the reporting and analysis of the qualitative data derived from a series of interviews. It includes the outcomes of interviews conducted with three groups of interviewees; academics from Yarmouk University; decision or policy makers selected from different higher education institutions and government instrumentalities in Jordan; and librarians selected from different universities in Jordan. The interview questions focus on the impact of the Internet and other ICTs on academic activities; the barriers to Internet and ICT use in Jordan; and the role of the Internet and digital libraries in bridging of the digital divide.

Chapter 8 presents a synthesis and discussion of the results of the three research instruments that have been reported in the preceding chapters. Major findings are highlighted and considered in light of the research question and objectives determined at the outset of this project.

Chapter 9 completes the thesis. It includes five conclusions derived from the research which indicate areas for priority in future development of digital library and research services in Jordan. It also includes a consideration of the extent to which the results from this research can be extrapolated to other developing Arab countries, and makes suggestions for further research.

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## **Chapter 2 Research Context: Jordan and Australia**

### **2.1 Introduction**

The current research uses a case study method to investigate the role of digital libraries in bridging the digital divide at Yarmouk University in Jordan. As this study focuses specifically upon the circumstances in a Jordanian university, it is necessary to provide a general background about the country and the problems it experiences in the use of information technology in higher education. Associated issues regarding the ICT infrastructure and Internet services in the country will also be discussed. This chapter also presents relevant information about Yarmouk University, from where the main population for the study was drawn, and its library system.

The chapter also provides background on Australia, as the research involves a comparison between a country considered to be advantaged (Australia) and one that is considered to be disadvantaged (Jordan) with regard to the 'digital divide'. In the Australian context, Curtin University is used as the site for comparison. Curtin University serves as an example of a mid-ranking university in a developed country, offering modern and integrated digital library services to a student population slightly larger than that of Yarmouk University.

This chapter also presents the relevant geographical, economical, and ICT development indicators in Jordan and Australia that account for the many of the circumstances that prevail at Yarmouk University, the focus of the principal study, and Curtin University, where the control study was conducted. An examination of a number of these development indicators suggests that Jordan and Australia are differently placed with regard to the digital divide and experience substantial differences in terms of the development of their digital library services.

## **2.2 Jordan: general background**

Jordan is officially called the Hashemite Kingdom of Jordan and is an Arabic country located in the heart of the Middle East and the Arab World. Jordan is bounded in the north by Syria, the south by Saudi Arabia and the Gulf of Aqaba, the east by Iraq and the west by the occupied West Bank (Hejleh, 2009). Jordan is a small country with a total area of approximately 92,300 square kilometers and has an estimated population of 6 million people (Department of Statistics, 2009), of which about one third live in the capital Amman and its suburbs (Department of Statistics, 2009). Islam is the state religion of Jordan (96% of the population are Sunni Muslims, 4% are Christian). The official language of Jordan is Arabic, but English is widely spoken. Jordan Television and Radio Jordan both have an Arabic and English service. The *Jordan Times* is a daily English newspaper, and a weekly, the *Star*, which also has a French section. The countries of Jordan, Lebanon, Syria and Palestine together form a rich historic region referred to as the 'Fertile Crescent' (Central Intelligence Agency, 2009).

Figure 2.1: Map of Jordan



\*Source: (Maps.com, 2008)

### 2.2.1 The Jordanian economy

Although Jordan has limited economic capacity due to lack of water and other natural resources, it has significant political, cultural, and economic influence due to its strategic location. Jordan has long been at the crossroad between east and west and its centrality has given it strategic and economic importance as a vital trading and communications centre in the Middle East (National Information Technology Center, 2008).

Due to its limited economic and natural resources, it is the industries that utilise resources that make up about \$30 billion of Jordan's annual GDP, ranking it 104th in comparison with the rest of the world (Central Intelligence Agency World Factbook, 2008). These industries produce a range of commodities and services including clothing, phosphate, fertilisers, pharmaceuticals, petroleum, cement, potash, inorganic chemicals, light manufacturing and tourism (Central

Intelligence Agency World Factbook, 2009). Jordan's exports in 2008 totalled approximately \$6.521 billion with its major markets being the United States, Iraq, India, Saudi Arabia, United Arab Emirates, Syria, Israel and Kuwait. Imports totalled \$15.65 billion in 2008 and included crude petroleum, motor vehicles, machinery and equipment, cereals, fabrics and textiles (Central Intelligence Agency World Factbook, 2008)

The supply of water, oil and other key natural resources are limited in Jordan and as a result of poverty, unemployment (12.9%), and inflation (14.9%) are intransigent problems. King Abdullah II, since coming to the throne in 1999, has undertaken broad economic reforms in a long-term effort to improve living standards and counter such problems. In 2008, Jordan recorded an annual economic growth of 5.8% (Central Intelligence Agency World Factbook, 2008).

### **2.2.2 Information and communication technology in Jordan**

‘We have followed a path that will allow the technological revolution to harness our available talent into productive sectors that can fuel and sustain economic growth’. (Al-khatib, 2006)

His Majesty King Abdullah II.

The use of information technologies including computers in both the public and private sectors in Jordan is relatively established. Since its implementation (which can be traced back as far as 1921), the telecommunications sector in Jordan has improved and grown significantly, so much so that it has become a major factor in the country's economy. The first computer system was introduced at the end of 1960s, and by the end of 1987 approximately 17% of public sector employees were using computers (Al-Jaghoub and Westrup, 2003, Ahmad and Zink, 1998). Ahmad and Zink (1998) indicated that public institutions internationally have adopted information technologies early, indicating that while the 1960s signalled the emergence of modern information

technologies in Jordan, 1977 marks the start of significant computer adoption in the country.

Between the 1980s and 1990s, public institutions implemented more widespread use of computer systems. The privatisation of the public Telecommunications Corporation in 2004 enabled the telecommunications sector to keep up with new trends in technology and by doing so, establish an advanced and trustworthy telecommunications system. By changing the local, national and international switching systems, developing ground stations for a satellite communication network and introducing fibre optics technology, Jordan Telecom—the new name of the public Telecommunications Corporation—has been able to overcome financial and technical problems previously endemic within the sector. More recently, Jordan Telecom worked with other countries in the region to expand its domestic market in the belief that ‘addressing the digital divide through the policy of the government is to encourage the widest possible access to communications services at affordable prices’ (Global Investment House, 2006).

In Arab countries, the implementation of the infrastructure necessary to support ICTs has been influenced by a number of factors including socioeconomic, geographic and linguistic barriers which limit access and deny these countries the range of social and economic benefits possible from the adoption of new technologies. Despite this, a number of developing Arab countries, including Jordan, have endeavored to encourage the use of information technologies in all levels and fields. More recently, the Jordanian Government’s ‘Vision 2020’ showcased efforts to integrate the information technology in public and private institutions with a special focus on primary and higher education. It has been argued that Jordan is better placed in this regard than other developing Arab nations, as ‘illiteracy in Jordan is lower than in the rest of the Arab World, which gives Jordan the chance to reduce the digital gap with other more advanced countries’ (Economic and Social Commission for Western Asia (ESCWA), 2007). The country’s relatively youthful leadership is investing in technological solutions in a bid to overcome problems in economic and social development.

Both public and private institutions have acknowledged the role of information technology in improving services. Jordanian universities were at the forefront of this uptake, integrating information technology into their services and, as a result of efforts by the academic library consortium, connected the ten public universities through a broadband network (El-Gabaly and Majidi, 2003). The emphasis placed on ICT development in Jordan by His Majesty King Abdullah II has been seen to have had a significant impact on the State. Also, the higher education sector established several companies inside the universities in Jordan and started to work more closely with industry in order to produce more employable graduates and provide every university student with a laptop computer (Information Technology Association- Jordan, 2007).

In March 2007, Jordan launched a strategy framework for ICT Research and Development with a vision of developing a dynamic ICT sector through innovative local research and capabilities targeting economic growth, competitiveness, and providing challenging employment opportunities in the Jordanian job market (Higher Council for Youth, 2004). It is envisaged that as a result of such developments, Jordan will be positioned as a major ICT hub and leader in ICT-enabled development within its region. The Ministry of Information and Communications Technology has identified four broad areas central to its research and development strategies which aim to:

- Accelerate the diffusion [of] and improve the effective use of ICTs by all key sectors of the economy;
- Accelerate the growth and secure the sustained competitiveness of the ICTs sector;
- Build a repository of existing infrastructure and laboratories and set criteria for better utilisation of these facilities;
- Ensure effective and affordable infrastructure for research and development in the ICTs sector (Ministry of Information and Communications Technology, 2007a).

According to (Government of Jordan, 2009), another main objective expressed in the current two-year plan (2007-2009) is the implementation of e-governance

which has been identified as a priority for the country. As part of this objective, an e-government service portal now operates, providing access to all government institutions and services from one unified portal. A focus on the issues of security and back up services has also been addressed to further enhance the efficiency of e-government services provided through this portal.

In terms of bridging the ‘digital divide’, services in Jordan have also improved recently with the increased use of digital information established in 100 ‘Knowledge Stations’ throughout the country. This has enabled all parts of Jordanian society, irrespective of their location or economic status, to acquire the necessary ICT skills which may help them to become more productive members of society, improving both their social and economic situation (National Information Technology Center, 2007). As noted previously, another initiative under the banner ‘Laptop for every University Student’ aims to bridge the country’s digital gap and support the usage of ICT tools in the educational process. This involves providing a laptop for each university student in Jordan’s public and private universities at an affordable cost along with Internet access and wireless technologies (Ministry of Information and Communications Technology, 2008).

Overall, the implementation of information technology in Jordan is well underway despite issues with limited resources and other concerns. There are still many areas where much remains to be done and the country’s policy makers are aware of the need to apply the advantages of the ICTs in different fields and for services provided for both the public and private sectors.

### **2.2.3 Internet services in Jordan**

Internet services were first made available in Jordan in the mid 1990s. During the last 10 years, the market has undergone significant development. In 1997, the Public Institution for Wireless Communications, a state owned company, was operating on a commercial basis under the name of the Jordan Communication Company. Until 2004, it was the only company offering national and local

phone services. In 2004, the government sold its shares to France Telecom which then became the dominant player in the communication sector in Jordan, controlling 51% of the domestic market (Menassat, 2007).

Government and private institutions are becoming increasingly aware of the advantages of having access to the Internet, and as a result the number of users is growing. In Jordan, there are currently eight ISPs. The National Information Centre (NIC) is the main service provider to government, supplying workshops and training using fibre optics technology. NIC also provide leased lines and ADSL to other public institutions. There are also seven private service ISP providers and because of the increased competition, access to digital technologies has become more affordable for most people.

In Jordan, the emergence of the Internet café has become a popular way for citizens to access computers and the Internet. This is especially evident with young people and students who do not have laptops or cannot afford to pay an Internet subscription. There are approximately 500 Internet cafes in Jordan whose main clients are drawn from the 18 to 22 age bracket. In Jordan, the number of Internet users has increased significantly from 2.4% in 2000 to 18.2% in 2008, a major rise in comparison to other Arab countries, but well below the level of developed western countries. For example, despite the considerable improvements in the availability of ICTs in Jordan the gap in Internet access between Jordanians and Australians is still considerable. This is made clear by comparing recent data prepared by the International Telecommunication Union (ITU) indicating that 38.17% of Australians subscribe personally to the Internet as compared to only 3.74% of Jordanians (International Telecommunication Union, 2008).

Despite this comparatively low level of Internet use, Al-Khalidi (2002) indicated that the Internet in Jordan was becoming a part of the culture and everyday life. It is commonly thought that Jordan currently holds the ‘world record’ of the highest number of Internet cafés in one street – ‘Shafeik Irshidat Street’ in the city of Irbid which is no more than one kilometre long has entered the *Guinness Book of Record* for its large number of Internet cafés. This is likely to be due to its close proximity to the student population of Yarmouk University. The *Wall Street Journal* also confirmed that Internet cafés with names like Apollo, Speed, Star Gate, and Sukrat are as common in Jordan as payphones (Gomes, 2002). Yarmouk University alone has more than 130 Internet cafés on its campus. These cafés are provided with a fire wall system that restricts access to some websites. The first Internet/Bookshop Cafe, Books@Cafe, opened in the capital Amman. This cafe offers a selection of books that could be read by customers inside the store as well as Internet connection where customers can go online for around \$3 JD per hour (approximately \$5 US).

Prices for Internet connectivity are high in Jordan when compared to similar countries in the immediate region such as United Arab Emirates or Bahrain. In Jordan, Internet subscribers in Amman alone are able to connect to the Internet at the cost of a local call. The cost of setting up a connection (around \$100 JD) is still considered high for everyday Jordanians and subscribers located in other cities like Irbid are also required pay the price of national calls in addition to their subscription

bill (around \$60 JD) per month. The high associated costs of connecting to the Internet combined with an average of income per capita in Jordan of less than \$3000 JD per year are key factors contributing to a low participation rate. This cost to the consumer is also high due to the price of the bandwidth that suppliers must pay in order to offer customers a reasonable Internet connection. As discussed earlier, there have been a number of specific planning and policy initiatives undertaken in Jordan to try and combat such barriers (Human Development Reports, 2008).

### **2.2.4 Higher education in Jordan**

Higher education in Jordan began as late as 1951, when colleges were established throughout the country. Since that time, higher education in Jordan has grown quickly and developed in quality to become one of the most advanced educational systems in the Arab Middle East Region (Al-Jabery and Zumberg, 2008). The body currently responsible for the administration of higher education, the Jordanian Ministry of Higher Education and Scientific Research, was established in 1985 (Ministry of Higher Education and Scientific Research, 2009b). Higher education is accessible to holders of the General Secondary Education Certificate (GSEC) who can then choose between private community colleges, public community colleges, or universities (public or private).

The limitation of natural resources in Jordan as a means of economic development prompted the government to emphasise development of the higher education sector. The development of human resources has been consistently viewed as a high priority from successive Jordanian governments including, the King himself. In recent years the Government has focused on the improvement of the educational system and policies aimed at addressing the needs of the country and advancement through the use of information technologies. Jordanians are now considered amongst the best educated, trained, and academically qualified of the Arab people with a literacy rate (91.3%), amongst the best in the Arab World (Ministry of Higher Education and Scientific Research, 2009a).

The systems of education at Jordanian universities are modeled on English-American education systems. Bachelor's degrees normally take four years, depending on the field of study. Master degrees are awarded after a further one to two years' study involving both course work and a thesis, or by course work only and a comprehensive examination. A Doctorate Degree may be awarded after three to five years of further study and the submission of an original dissertation (Ministry of Higher Education and Scientific Research, 2009a). Since the attack on the United States on September 11 2001, Jordanian universities have received a large number of foreign Arab and Moslem students who no longer feel comfortable studying in North

America and who wish to pursue their studies in an advanced and hospitable environment. Jordan exports highly qualified academic staff to other Arab Gulf States.

Currently, there are 25 universities in Jordan, ten of which are public and 15 private. According to the Higher Education Forum in Jordan (2007), there were more than 140,911 students enrolled in both public and private universities with 55% of the students being female ([www.mohe.gov.jo](http://www.mohe.gov.jo)). As shown in Table 2.1, (Aladwan and Qutaishat, 2007) reported that there were 151,617 students numbers enrolled in public universities during the 2005/2006 academic year. Of these students, 140,911 were Jordanians and 10,706 were non-Jordanians. In addition, 62,000 students were enrolled in private universities.

**Table 2.1: Student enrolments by nationality (Jordanians/non-Jordanian) in the public universities.**

University	Undergraduate		Graduate Studies		Total		Total Grand
	A	B	A	B	A	B	
Uni. of Jordan	31023	2388	3736	680	34759	3068	37827
Yarmouk Uni.	17711	1018	3272	353	20983	1371	22354
JUST	13809	3458	1246	193	15055	3651	18706
The Hashemite	15855	720	514	16	16369	736	17105
Al Balqa'a	17561	465	763	41	18324	506	18830
Mu'tah	14628	754	1409	153	16037	907	16944
Al Hussein	6044	74	67	-	6111	74	6185
Aal Al Bayet	12355	323	918	70	13273	393	13666
Total	128986	9200	11925	1506	140911	10706	15167

(Aladwan and Qutaishat, 2007)

\* A-Jordanians

\* B- Non-Jordanians

The main problems facing higher education in Jordan currently are an acute shortage of funds, non-relevance of some programs, and issues of accreditation, governance and quality control as each university functions independently. In response to the need for educational reform, in 2007 his majesty King Abdullah II recommended to

government a reorientation of education policy and systems with a focus on research and development to better meet the needs and ambitions of the country. This change is perceived as being necessary in order for the country to take advantage of the many benefits offered by emerging ICTs.

(DelCastillo, 2002) reported that Jordan is one of the few developing countries that has commenced the integration of information technologies into the education system. This has occurred firstly in primary and secondary schools and through the implementation of distance education as a method for the delivery of higher education courses. The government has supported the establishment of distance-learning programs throughout the country's public and private universities as part of a broad strategy to continue developing Jordan's educational infrastructure through the integration of ICTs.

In terms of Internet connections, all Jordanian universities have a broadband wireless service which provides Internet access to all staff and students. At the primary and secondary level, most private schools already have Internet connectivity; in the public schools, universal connectivity was implemented over 1999 and 2000 (Ein-Dor et al., 1999).

According to (Cartwright, 2007), higher education in Jordan provides a model of Internet connectivity which should be reviewed by both neighboring states and distant states with similar interests in developing the use of ICTs in higher education. Subsequently, the Ministry of Higher Education and Scientific Research (MoHESR) has established three steering committees including the Management Information System (MIS) National Committee, the Committee for E-learning, and the Committee for Data Centres, to supervise and plan the implementation of the major areas related to ICTs in Jordan, namely:

- Building and implementing MIS at universities, MoHESR and the related councils,
- E-learning including all the relevant details of accreditation, legislation, plans and requirements to ensure a proper utilization and usage in the educational processes.

- Building a Higher Education Data Center (HE-DC) and to convert the current Computer Centers into Data centers (Ministry of Information and Communications Technology, 2007).

More recently the Human Development Report (2008), the Strategic Plan 2007-2009, and *Vision 2020*, have all discussed the role of higher education and the impact of national ICTs policy on the sector. All include policy directives addressing issues relative to ICT development and implementation including ICT infrastructure; e-learning; e-Library services; Management Information Systems (MIS); higher education strategies; ICT resource management, and the role of government. In particular, these various government documents advocate that academic programs are to be consistent with international standards and encourage collaboration between grass roots organisations and universities through joint research and development with the aim of improving local research and reducing associated costs.

In addition, a plan by the Ministry of Communication and Technology focuses on initiatives that aim to help Jordan to reduce the digital, language, and cultural divides on all levels by:

- Promoting research and developing skills in the educational system – secondary, high school, and university levels (pilot initiatives under the e-HR innovation fund).
- Reforming higher education promotional policy to establish career paths for researchers and use applied research and development work as a criteria for promotion.
- Increasing cooperation with foreign universities in research and development in ICTs.
- Utilising Jordanian expatriates to assist in developing Jordan as a regional research hub.
- Attracting researchers from the region, expanding and complementing Jordanian resources with regional (and, potentially, international) resources.
- Consolidating efforts in universities and research centres in focusing research and directing activities.

- Promoting a culture of innovation and research and development partnership models (using e-HR, and/or e-incubation fund).
- Encouraging academia, research institutions and private sector involvement in ICTs innovation activities, venture capital funds and the commercialisation of innovation through technology licensing and incubation (e-incubation).
- Improving awareness of universities and private sector of grassroots needs (of NGOs, civil society organizations, and rural communities) and of barriers to ICTs diffusion and the digital divide (create the e-society innovation fund) (Ministry of Information and Communications Technology, 2007).

### **2.2.5 Irbid**

Irbid, where the study was conducted is the second largest of the 12 Governorates of Jordan. Irbid has a population of approximately one million people, and is 90 kilometers (about 60 miles) northwest of Amman. Important historical and archaeological sites such as Amman, Jarash, Um Qais, the Dead Sea, the Jordan Valley, Petra and Aqaba are easily accessible from Irbid. Yarmouk University is the largest university in Irbid. The map presented in Figure 2 shows the location of Irbid. Other universities located in Irbid include the Jordan University of Science and Technology, Irbid National University, Jadarah University for Graduate Studies, and the New York Institute of Technology.

### **2.2.6 Yarmouk University**

Yarmouk University was founded by Royal Decree in 1976 and has grown in size and stature to become one of the most prestigious universities not only in the country but the region as a whole. Its name has both Arabic and Islamic associations. It is a foremost institution of higher learning, known for its innovative approach to academic management, human resource development, and the pursuit of excellence in research and teaching in varied areas of the arts, humanities and social sciences to meet the ambitions of Jordanians and Arabic society. Over 1986 and 1987, the

faculties of Engineering, Pharmacy, Medicine, Public Health, Medical Science, Dentistry and Nursing were transferred to the Jordan University of Science and Technology with its campus located within Yarmouk University. The faculties of Agriculture and Veterinary Medicine were added soon after (Yarmouk University, 2009a).

Yarmouk University currently contains 12 colleges, offering 55 majors in Bachelor programs, 63 Master and 18 PhD programs. In 2008/2009, there were 30,400 undergraduate students enrolled at Yarmouk University and around 750 academic staff. Yarmouk University is a government funded institution, but enjoys a considerable degree of autonomy. Faculty members are expert in their fields, and students are drawn not only from Jordan but from a number of Arab countries and other parts of the world, providing Yarmouk University with a diverse community. Yarmouk University has a subsidiary private secondary school on its campus, called Yarmouk University Model School (YUMS) which primarily services the children of university staff (Yarmouk University, 2009a).

Yarmouk University endeavours to provide quality education to students in many fields of specialisation and at every level. It encourages research programs that are relevant to the economic growth and development of the country but also to human welfare and prosperity in general. It aims to foster cultural enrichment and provide education and training opportunities on a local, national and international level (Yarmouk University, 2009b).

In terms of bridging the ‘language divide’ between developed western countries and a developing Arab country, Yarmouk University has implemented a program in conjunction with the University of Virginia in the United States to completely immerse participants in the Arabic language (University of Virginia, 2009).

### **2.2.7 Yarmouk University library and information services**

Yarmouk University Library was established in 1976 and has 110 staff. In addition to the staff and students of the University it also provides services to a local community

of more than one million inhabitants. The Library contains 300,000 book titles, 20,000 audio-visual materials, 880 periodicals and two databases of foreign language materials, *ProQuest* and *EBSCO*. A home-designed library management system based on Oracle is used to provide automated library functions including ordering, acquisitions, cataloging, indexing and abstracting, circulation, and an online catalog. Since 2007, the Horizon System provided through the Centre of Excellence for the Libraries of Jordan Public Universities has been utilised (Yarmouk University, 2009c).

In April 2004, Jordan universities established a consortium for managing the network of public Jordanian university libraries called the Jordanian Centre of Excellence for Public University Library Services. This Centre is based at Yarmouk University. Managed under a memorandum of understanding signed by all Jordanian public universities. (Yarmouk University, 2009c). The Centre provides services and organises functions that foster cooperation among member university libraries, and as a result of its activities has enabled more effective expenditure in terms of hardware infrastructure, software and networks, as well as reducing the cost of periodical maintenance by maximising the volume of information resources available to the Jordanian academic community by facilitating group subscriptions. A range of information resources are now accessible to academic staff through the Jordanian Public University Network and through the Internet. Library users at Yarmouk University, for example, are able to search the library catalogues and databases of all public Jordanian universities (Centre of Excellence, 2009).

The Centre is managed by a Board of Trustees consisting of Jordanian public university library directors, headed by a Vice-President of a member university for a term of one year. As agreed upon by the Board of Trustees, Yarmouk University was selected as the location of the Centre because of its ability to provide administrative support and suitable office space (Centre of Excellence, 2009).

### **2.3 Australia: general background**

Australia (officially the Commonwealth of Australia) is one of the largest countries in the world. It has an area of 7.7 million square kilometers, with an estimated population of 21 million people (Australian Bureau of Statistics, 2008b). The climate is diverse, ranging from temperate climates in the south to tropical in the far north and tracts of desert in the inner areas. English is the national language with the next most common languages spoken at home being Chinese, Italian, and Greek. Australia has no state religion. A map of Australia is shown in figure 2.2.

Australia's government and political system is based on a federal model which was adopted in 1901. This model entrusts a central or national government with exclusive power over defence, external affairs, foreign trade, immigration, customs and excise, and communications including the postal services. Some powers are shared with the six States and the two territories, but any area that is not stipulated in the Australian Constitution are referred to as residual powers and are left to the States (Australian Bureau of Statistics, 2008b).

**Figure 2.2: Map of Australia**



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

### **2.3.1 The Australian economy**

Australia is considered typical of a Western-style mixed economy, with an average annual growth per capita Gross Domestic Product (GDP) of approximately 3.5%, slightly higher than those of the United Kingdom, Germany, France and Jordan (Australian Bureau of Statistics, 2008a). Australia was ranked third in the United Nations Human Development Index and ranked sixth in the Economist worldwide quality-of-life index of 2005 (Organisation for Economic Co-operation and Development, 2009). Over the past 17 years, Australia has experienced a consistent rate of growth and economic prosperity. The Australian Department of Foreign Affairs and Trade indicates in its briefing that;

It has been one of the most stable and productive periods of Australia's modern history, and places Australia in the top echelon of developed countries in terms of sustained rates of growth....Australia ranks first in the Asia-Pacific region for labour, agricultural and industrial productivity per person employed, according to the IMD World Competitiveness Yearbook.

The 2006 OECD Economic Survey noted that living standards in Australia surpass those of all Groups of Eight countries except the United States. (Australian Department of Foreign Affairs and Trade, n.d-b)

While in the past, Australia's economic success rested primarily on its agricultural, mineral and fuel resources, more recently, Australia has come to typify a knowledge-based economy.

The emergence of a 'knowledge based' economy in Australia—marked by an increase in the use of ICT related products and services—has had a significant impact on Australian businesses. Much of the demand for ICT products and services has been driven by a strong interest in the uptake of new technologies which is seen to enhance business productivity and efficiency (Year Book Australia, 2008b). Through the strategic application of ICTs, Australian businesses have played a critical role in the development of what has also been termed the 'information economy' (Wagner, 2004).

The Australian economy still relies heavily on mineral resources, including bauxite and iron ore, which are among the world's largest reserves. Apart from Australia's mineral wealth, its energy resources also include large reserves of coal, petroleum, natural gas and uranium. Despite this, ICT products and services are considered a crucial component of economic growth in Australia, and the future will see further expansion of ICT infrastructure in order to keep pace with world standards. It is estimated that Australia's ICT market has an approximate worth of \$89 billion with

25,000 companies employing 236,000 IT specialists (Australian Department of Foreign Affairs and Trade, n.d-b).

While Australia has not been spared the impact of the recessionary effects of the ‘global financial crisis’ of 2008-09, economists predict that the impact will be less severe than that of the OECD average. It is predicted that economic growth will fall to 1.25 % in 2010 with increases in the unemployment rate and a decline in inflation (Organisation for Economic Co-operation and Development, n.d).

### **2.3.2 Information and communication technologies in Australia**

Information and Communication Technologies and related products and services have played an important role on the way of life in Australia particularly in terms of social and economic development. Australia is ranked among the top developed countries in the world according to standard business and policy indicators that consider such aspects as network digitisation, personal computers and Internet density (Year Book Australia, 2008b) .

Australia, like many western economies focuses on the use of ICTs to enhance productivity and this focus is rapidly becoming entrenched into all aspects of western society including both the private and government sector, with positive impacts on human services including health, entertainment and education (Year Book Australia, 2008b). According to the Australian Department of Foreign Affairs and Trade, ICT related products and services are ‘a key driver of Australia’s strong economic growth and innovation’, and ‘Australia’s ICTs market is the fourth largest in the Asia–Pacific region and the 11<sup>th</sup> largest in the world’ (Australian Department of Foreign Affairs and Trade, n.d-a)

Over 387,000 Australians are employed in ICT-related positions and ICTs account for approximately 4.6 per cent of Australia’s total gross domestic product. In terms of imports, ICT related products and services were valued at \$26 billion in 2006 and exports over the same period valued at \$5.7 billion (Australian ICTs Trade Update 2007). It is evident that ICTs, coupled with the emergence of the Internet and the

transformation of the telecommunications sector in Australia in the past decade embody much of what is considered the ‘new economy’.

Australia has an extensive and advanced telecommunications infrastructure in place. In 1997, the Australian Government introduced open competition in the market and currently Australia has one of the highest rates of mobile phone ownership in the world with network coverage available to over 98 per cent of the population (Australian Department of Foreign Affairs and Trade, n.d-a). Privatisation of the telecommunications industry has encouraged competition, extensive investment in new technology and infrastructure, and improved services. More than 160 licensed carriers operate in Australia, providing a wide range of services and competitive prices for long distance and international calls, mobile services and broadband Internet access. According to the Department of Foreign Affairs and Trade:

‘Australia is today well connected, both domestically and internationally, with a modern fibre-optic backbone, satellite coverage and an extensive mobile network. Since 2000, the number of connections for mobile telephones has exceeded fixed-line connections. At June 2006, there were more than 19.86 million mobile phone subscribers in Australia (in a total population of around 21 million) and many people had multiple subscriptions’. (Australian Department of Foreign Affairs and Trade, n.d-a)

The proportion of Australian businesses using a computer rose from 76% to 89% over a five-year period to 2004-2005 with business access to the Internet also increasing from 56% to 77% and those with a web presence (a website) grew from 16% to 27% over the same period (Year Book Australia, 2008b).

‘In 2004-05 all businesses with 100 or more people employed used computers, 99% used the Internet, while 91% had a web presence. A much lower proportion of businesses with 0-4 people employed used IT; 85% used computers, 71% used the Internet and 17% had a web presence’. (Year Book Australia, 2008b)

The uptake of ICTs has assisted further expansion into overseas markets whereby Australian businesses are becoming increasingly competitive through the Internet and e-commerce (Australian Department of Foreign Affairs and Trade, n.d-a).

While the emergence of the ‘information economy’ in Australia is largely the result of a convergence between technology and industry; the policies introduced by national governments have also promoted growth and development in this area. The introduction of regulatory frameworks coupled with infrastructure has facilitated the uptake of new technologies across the nation. Government incentives and assistance have also provided the necessary impetus to encourage businesses and government agencies to deliver products and services online (Wagner, 2004).

According to (Cartwright, 2007) the Australian government has developed and launched a range of policies that encourage the integration of ICTs across business, government, and household sectors. More recently, government initiatives have included a publication called *2006 e-Government Strategy, Responsive Government: A New Service Agenda*, which examines how the government will meet the challenge of harnessing ICTs to improve service delivery while at the same time improving efficiency and reducing costs. The report also considers an authentication framework that aims to enable e-government by providing confidence in online transactions with government (Australian Department of Foreign Affairs and Trade, n.d-a).

Australia’s ICTs infrastructure is considered to be world class standard and as such is in an ideal position to embrace and take advantage of developments taking place internationally to benefit its domestic market both economically and socially.

### **2.3.3 Internet services in Australia**

According to a report by the Australian Communications and Media Authority (ACMA) titled *Australia and the Digital Economy*,

The internet has become increasingly prevalent in Australian homes and businesses and its effect has been far-reaching; transforming economic and social interactions, traditional

services such as voice telephony, the distribution of content as well as underpinning the development of the digital economy. (Australian Communications and Media Authority, 2009)

Depending upon their geographic location, Australians have access to a range of technologies to facilitate their Internet usage, including analog, Digital Subscriber Lines (DSL), hybrid fibre coaxial, wireless, satellite and optical fibre services.

Internet services were first introduced to Australian in 1984 but it was not until the 1990s with the establishment of the World Wide Web that Internet services became popular in the domestic market. Prior to broader international satellite access, Australia's own fledgling Internet system, including the Australian Academic and Research Network (AARNet) and connect.com.au, were the first Internet providers in Australia, opening for business in 1992 with Internet addresses becoming available to the public in 1993.

According to the (Australian Bureau of Statistics, 2008c), many of the service providers in Australia offer wireless broadband and optical fibre networks throughout the metropolitan areas and to some larger regional centres. Australians have access to over 571 Internet Service Providers (ISPs), meaning that there is approximately one ISP per 37,000 people. This is significant when comparing Internet access in Jordan, which has 8 ISP's, equivalent to one ISP per 750,000 people.

In 2006, there were an estimated 6.7 million active Internet subscribers in Australia with 3.9 million using a broadband access connection and 2.7 million using dial-up services. Currently, an estimated 5.1 million Australian household have a broadband Internet connection (2007-2008) representing over half (56.80 %) of all households in Australia and 78% of households with Internet access (Australian Bureau of Statistics, 2008c; International Telecommunication Union, 2008). In 2007-08, 75% of Australian households had access to a computer and 67% of households had access to the Internet compared to Jordan where the number of Internet users is still under a third of the total population (24.52%). The use of the Internet in Australia is

increasing with an estimated 84 per cent of users accessing it on a weekly basis. According to the Australian Communications and Media Authority;

The take-up and use of on-line services, however, is impacted by a number of socio-economic and demographic factors, with age having a significant impact. Australians aged 65 and over are less likely to be connected to the internet than all other age groups. Other factors such as personal income, work status, gender, household family structure, location and profession also affect participation levels to varying degrees. (Australian Communications and Media Authority, 2009)

### **2.3.4 Higher education in Australia**

A great deal of importance is placed on education in Australia which has a literacy rate of 99%. In terms of higher education, approximately 58% of Australians between the age of 25 and 64 have vocational or tertiary qualifications and with a 49% graduation rate, Australia is ranked highest of all OECD member countries (Department of Foreign Affairs and Trade, 2008). An indicator of the strength of Australia's higher education system is evident in the area of Research and Development (within higher education environments) with Australia ranked seventh in the group of OECD member countries with a total GDP ratio of 0.45% (OECD, Research and Development Statistics, November 2005).

The higher education system in Australia is seen to make a fundamental contribution to the future of Australia and plays a vital role in Australia's intellectual, economic, cultural and social growth and development (Australian Government, n.d.). The higher education system aims;

. . . to educate the future professional workforce creates future leaders, provides jobs for Australians, drives much of their economic and regional success, and facilitates cultural and trade links with other countries. (Wagner, 2004)

The higher education system also plays a key role in the emergence of the 'knowledge economy' in Australia and is said to contribute positively to the attainment of individual freedom, the advancement of knowledge and social progress (Australian Government, n.d.).

There are a total of 39 universities in Australia, of these, 37 are publicly supported and two privately funded and operated. They are located throughout the nation in both metropolitan and rural areas. The universities provide a wide variety of courses, services and facilities, making them attractive for full fee paying international students. Most higher education institutions offer flexible delivery providing both full-time and part-time courses as well as external or distance education courses. In addition, some institutions offer courses which enable students to undertake full-time study linked with periods of employment (Year Book of Australia, 2007). A basic undergraduate degree in Australia involves three or four years of full-time study or equivalent with some programmes offering diploma qualifications (as with a teaching degree) with additional time required for an Honours qualification (Australian Qualifications Framework, 2007). While the system of teaching and learning may vary from school to school within the university sector, generally students attend lectures that present background information and viewpoints related to particular issues or debate under discussion. The pedagogy is highly constructivist in nature with students encouraged to develop their own viewpoints for discussion during tutorials and seminars (Australian Qualifications Framework, 2007).

Most institutions also offer postgraduate study programmes. This may involve one to two years of full-time or equivalent study for a Master's degree and three to five years or equivalent for a Doctoral degree. In 2008, 73% (n= 720,003) of students enrolled in Australian universities were engaged in undergraduate bachelor degree courses and 27% (n= 278,257) were enrolled in higher degree or postgraduate courses. In addition, out of the total 1,029,846 students about 26.50% (n=273,099) were international students (Year Book Australia, 2008a).

According the website of (Australian Qualifications Framework, 2007) the Australian Government works with the States and Territories, through the Ministerial Council for Vocational and Technical Education, and with industry, to ensure that

higher education institutions promote high quality outcomes for students, national consistency and a system that is responsive to industry needs (Australian Qualifications Framework, 2007)

In 2003, the government introduced a range of reforms which provided an additional \$11 billion in funding over 10 years to enable higher education providers to deliver world-class higher education. The Commonwealth Grant Scheme and Higher Education Loan Program (HELP) arose from these reforms (Australian Government, n.d.).

More recently, the Australian government in its 2007 - 2008 budget announced a further investment of \$3.5 billion over four years for Australia's higher education sector with \$5 billion set aside to create a Higher Education Endowment Fund (<http://www.budget.gov.au/2003-04/bp1/download/bst1.pdf>).

### **2.3.5 Western Australia**

Western Australia, where the control study was conducted, is the largest in area of the six states that make up the Commonwealth of Australia, making up close to one third of the total geographical area of Australia. Although more than 2.2 million people reside in Western Australia, most of its population (73.8%) is concentrated in its capital city, Perth (Australian Bureau of Statistics, 2009).

Curtin University (CU) is the largest university in Perth. Other Perth universities are the University of Western Australia (UWA), Edith Cowan University (ECU), Murdoch University, and the University of Notre Dame.

### **2.3.6 Curtin University**

Curtin University was named after Sir John Curtin who was the Prime Minister of Australia from 1941 to 1945. The institution was known as the Western Australian Institute of Technology from its opening in 1965, until 1987, when the name was

changed to Curtin University of Technology. In 2009 the University announced that it would henceforth be known simply as Curtin University.

The missions, values and goals of Curtin University make it a very suitable institution to use as an example of a university in a developed country because it promotes the search for innovative applications of technology in all fields. According to the 2008 Annual Report, Curtin University promotes innovation and excellence in teaching and research for the benefit of their students and the wider community and aims to become an international leader, shaping the future through their graduates and research (Curtin University of Technology, 2008c). The University aims to be positioned among the top 20 universities in Asia by 2020 through a focus on the:

- Development of a culture of excellence and innovation by improving the quality of the university environment,
- Provision of high-quality courses in areas of strength with a focus on improving learning, and teaching quality,
- Strengthening research capabilities and performance to achieve high quality research,
- Achieving international excellence by building partnerships that enhance their international reputation, and
- Enhancing overall capacity and financial sustainability in order to improve efficiency and productivity (Curtin University of Technology, 2008a).

Curtin University has nine campuses and seven education centres within the main campus located in Perth. Other campuses are located regional areas including Kalgoorlie, Northam, and Geraldton as well as a campus located in Sydney (NSW). Two offshore campuses are located in Malaysia and Singapore.

The University caters to more than 43,000 students of which 17,000 are international students located both offshore and onshore. Higher degrees by research students make up approximately 4.6% of the total number of Curtin University students. There is a high staff to student ratio with 1,608 academic staff and 1,565 general staff currently employed (Curtin University of Technology, 2008b).

Curtin University offers over 850 undergraduate and postgraduate courses in business, engineering, health sciences, humanities, science, mining and agriculture. Curtin also has an extensive Research and Development program (Curtin University of Technology, 2008a).

Curtin offers a range of ICT facilities and services that are consistent with the teaching, learning, research and administrative objectives of the University. The provision of these services and facilities is facilitated through policies and procedures that demand high levels of compliance from users, both students or staff (Curtin University of Technology, 2008b). Staff and students of the University are provided with email as well as online access to course enrolment, grades and/or work information. A large range of services available through the University are also accessible online as well as teaching and learning resources related to particular courses.

### **2.3.7 Curtin University library and information services**

As will be discussed in following chapters, the results of both quantitative and qualitative research in the current study suggests that a substantial divide exists between developed and developing countries regarding use of digital information within higher education systems. It is evident that academic libraries in developed countries have been able to take full advantage of the information technology and Internet revolution compared to developing countries. As a result, universities in more developed countries already have the facilities and capabilities to make digital content and library services accessible through the Internet for 24 hours a day.

Curtin University's Library and Information Service supports the University's key objectives and this is reflected in their mission statement:

Working as an essential partner in learning, teaching and research, we apply our unique expertise in scholarly information and enabling technologies to provide innovative, excellent resources, services and spaces, for the benefit of the

University and the wider community. (Curtin University of Technology Library, 2009d)

With an annual expenditure of around \$15 million, the library collection consists of more than 628,000 books and audio-visual items. The Library also provides access to more than 250 electronic databases compared to the two databases provided by the Yarmouk University Library. The Curtin University Library also has a total subscription to 57,257 serials titles (Curtin University of Technology Library, 2009a).

While the computer network at Curtin University is able to access the main catalogue and databases, access is also available through the Internet. In Yarmouk University, the catalogue and databases are accessible only by academic staff. At Curtin University, both staff and students are able to use computers on campus to access the Internet and full text electronic resources to which the library subscribes. Off campus, the same facilities are available if students or staffs have access to a computer with a web browser.

All Curtin students can choose to receive library notices via the Official Communications Channel through their web based account or in person, email, by post, as a reading list, telephone, SMS or online through the Library's web portal (Curtin University of Technology Library, 2009d).

For the purpose of this research, The Curtin University Library provides a good representation of a library within an academic institution in a developed country. The Library's mission statement and associated strategies seek to emphasise access to resources, support for research, flexible delivery of courses and communication. More specifically, the library aims to:

- Acquire and facilitate access to scholarly resources, and provide technical infrastructure and systems expertise to ensure a dynamic client-focused service.
- Proactively support research, and teaching and learning activities for members of the University and wider community.

- Link clients to the information resources they need regardless of location.
  - Ensure a coordinated quality programme, a sound corporate resource base and a coordinated approach to corporate communications.
- (Curtin University of Technology Library, 2009b)

More recently, through collaboration with academic and research staff, the Library has implemented and manages an institutional repository ([espace@curtin](mailto:espace@curtin)) for Curtin University and as a result the Library has improved the method of scholarly communication through the Australian Digital Theses Project. By providing access to these resources internationally, the Library hopes to complement current patterns of scholarly communication both within and outside the University. Such activities contribute to Curtin University's overall research goal; to 'achieve excellence in research and development, particularly as a partner with government, commerce, industry, professional organisations, other institutions of learning and the community' (Curtin University of Technology Library, 2009c).

## **2.4 Summary**

It is apparent that Jordan and Australia are quite different in terms of their existing levels of their social, economic, educational and research development, and of their current levels of integration of ICT services and the Internet into each of these respective areas of national life. In other ways, however, they share some similarities that make them very suitable for the purpose of this study. In particular they have governments which are equally ambitious to pursue development agendas, and which view ICT as a critical component and driver of that development. At this point in time they may have different levels of capacity to meet their goals and objectives in this regard, but both countries see digital information services as integral to their attempts to build sustainable knowledge-based economies.

Curtin University and Yarmouk University and their respective library services also meet the purposes of this research. They are similarly sized institutions which typify ambitious universities in their regions, and they are both attempting to use the

potential of ICT and the resources at their disposal in order to optimise their teaching and research outcomes. The measurable differences between their capacity to deliver digital information to their users will therefore provide an indicator of the current extent of the digital divide as it is experienced by a university in a developing Arab country.

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## Chapter 3 Background and Review of the Literature

### 3.1 Introduction

In order to understand the existing state of knowledge regarding the digital divide and the capacity of digital libraries to assist in addressing issues related to this divide in developing countries, it is necessary to undertake a broad review of the relevant research literature. In the context of the present study this requires a focus on research associated with the use of ICTs by scholars, researchers, and academic libraries in various localities, particularly developing countries. As noted in Chapter 1, however, the bulk of this research has occurred in developed countries, although there is a smaller body of literature investigating the issue in developing countries.

Since the present study is based in the Jordanian academic environment, the literature was searched in particular for research that investigates the impact of digital information on the academic, research and library sectors in Jordan or similar Arab countries. It is apparent that there is a shortage of relevant research regarding the Arab World, including Jordan. It should be noted that studies that address the use of ICTs or the Internet for teaching and instructional purposes, as opposed to research purposes, are excluded from this review.

The chapter commences by describing the key literature on the subject of the digital divide, in particular the issues relevant to the current research focus on bridging the global digital divide. The chapter also includes assessments and summaries of research regarding academics' use of digital libraries, with a focus on the Internet and digital information services provided by these libraries. In accordance with the objectives set for this research the Chapter also reviews the existing literature on the place of the Arabic language as a vehicle for scholarly communication.

The reading of the literature demonstrates that the library profession has long been concerned with the gulf between the information 'haves' and 'have nots', and how with the advent of ICTs this has been manifested as concern about the digital divide. There is ample evidence that this divide is detrimental to the research productivity

and knowledge generation in developing countries that lack the level of ICT infrastructure enjoyed in the developed west. Despite this, the literature also suggests that digital library services are potentially important in providing equal access to digital content that is critical in bridging the digital divide.

It should be noted that some of the research literature considered in this chapter is now several years old. Given the rate of development and implementation of ICTs in both developed and developing countries this means the data emerging from these studies is unlikely to be accurate for current circumstances. These studies remain important, however, in backgrounding and contextualising the current research.

### **3.2 Defining the digital divide**

The number of users of digital information has grown dramatically in recent years as advances in the Internet and related technologies have been eagerly utilized by individuals as a means of pursuing their educational and social goals. In recent times much research has been devoted to exploring the benefits of access to Internet content as experienced by users from varying cultural, economic and language backgrounds. This research has given rise to concerns about the consequences that will follow for those who are hindered by disparities in access to the Internet and its rich content. Such a concern is expressed by Wright, who notes, ‘every technological repercussion and economic transformation threatens stratification by status and pushes the class situation into the foreground’ (2003, p. 6). Wright highlights how the Internet can be seen not only as a tool that propels users towards the fulfillment of personal goals, but also as a vehicle that may further widen the gulf of social and other forms of inequality by being less accessible to certain groups and peoples.

Since the 1990s, the extent of Information and Communication Technology (ICT) infrastructure and use have been used as indices for measuring the difference between the developed and developing countries. This gap between the developed countries, which are said to be ‘information rich’, and the developing countries, which are described as ‘information poor’, has come to be referred to as the ‘digital divide’. According to Heuertz (2003), the concept of the digital divide has evolved to

be understood as part of a broader discourse on development issues and social inclusion. In this light, it becomes clear that defining the ‘digital divide’ is not merely a matter of disparity in access to technology. This point has been emphasised by Warschauer (2003) who noted that;

. . . continued use of the term [digital divide] today obscures rather than clarifies the interrelationship of technology and social inequality. By implying that a gap can be filled with the provision of equipment, the digital divide concept draws attention away from more complex long-term processes that underlie social development and inclusion. . . . An overemphasis on the mere presence of computers or Internet connections, without a corresponding emphasis on social mobilization and transformation, can squander resources while leaving inequity intact. (p. 303)

Nonetheless, since the concept of the digital divide was established in the early 1990s, much of the debate, including in the library and information policy literature, has focused on access to technology—in other words, which groups of people have Internet access in the home and which do not; or which groups can rely on public facilities to gain access, and which can or do not. Some have noted that the term ‘digital divide’ was originally coined to suggest the gap in access to telecommunications infrastructure reported in surveys conducted by the National Telecommunication and Information Administration (NTIA) (e.g., National Training Information Administration, 1999, 2000, 2002; Wilhelm, 1999, 2001; Norris 2001; Warschauer 2001; Hall 2002; Hargittai 2003; Salinas 2003; Munster 2005). It has been suggested that these gaps have had significant repercussions in an age marked by rapid advancements in ICT, and that the current striking international differences in ICT diffusion (often referred to as the ‘global digital divide’) creates a serious challenge to policymakers (Chinn & Fairlie, 2004, p. 17). According to Adulis (2001), the absence of access to ICT is inherently linked to the lack of information technology skills in populations where this gap exists. In this light, it becomes clear that the gap in ICT access that contributes to the digital divide cannot be fixed by merely increasing ICT availability and ignoring the associated skills shortage.

The current international emphasis placed by government leaders and policymakers on keeping abreast of ICT and avoiding the negative consequences of the lack of access to the Internet reflects the significance of the digital divide as a genuine concern. This focus on the importance of accessing the Internet in the ‘information age’ is clearly articulated by the NTIA who noted that, ‘No one should be left behind as our nation advances into the 21st Century, where having access to computers and the Internet may be key to becoming a successful member of society’ (NTIA, 1999, p. 80).

The ‘digital divide’ in this context has therefore been broadly defined in terms of the deficiency of ownership of, or access to, the hardware, software, and technology infrastructure required to enable efficient use of the Internet. This divide (or gap), is primarily a technology imbalance between those who can access information and communication tools such as telephones, television, or the Internet, and those who do not have the economic resources to acquire them (Birdsal, 2000; Munster, 2005). Upon examining the scholarly commentary on the digital divide, the prediction that the divide is likely to increase appears to be a common and recurring assertion.

A parallel enquiry into the impact of access to Internet content, rather than Internet access as an end in itself, has also developed. Scholars interested in the effect of Internet content have noted that librarians are concerned not only in access to the Internet; but they are also concerned in finding out whether that access is enabling users to benefit from the content they thereby acquire. This focus acknowledges that providing individuals with Internet access itself does not necessarily provide them with access to the potential benefits of Internet content, and that it is this discrepancy in the availability of relevant content that may be the real ‘digital divide’. According to this reasoning, it is possible that the real barriers to developing a supportive environment for Arabic-based scholarship may prove to be due to factors other than the lack of technology, and that the ‘divide’ for some may be related to the lack of adequate digital access to primary research material in Arabic.

Heuertz (2003) is one of those who suggest that the concept of the digital divide should not be defined merely by access to technology, and suggests that it is the skills and knowledge to access and evaluate information that are of foremost

importance. The mission of libraries within an information access paradigm therefore is to use ICTs to enable users to have access to content. The argument is that if the potential of ICTs is fully realised by libraries, it could enable users on both sides of the current digital divide to have equal access to content (Amadi, 1981; Heuertz, 2003).

As noted earlier, much of the literature concerning digital divides refers to this difference between the information ‘haves’ and ‘have-nots’. Jurich focuses on this distinction when he suggests, ‘Instead of fostering a new equilibrium among countries, the ICT revolution may be widening the gap between the ‘haves’ and the ‘have nots’, and creating a divide that may prove extremely difficult to close’ (2000, p 42). The definition of the digital divide has also been expressed as ‘the gap between those who have access to and can effectively use information technologies and those who cannot’ (Wilhelm, 2001). It has also been noted that this observable technology gap is not static, and is in danger of widening even further (Ishaq, 2001).

Salinas (2003) argues that ‘digital divide’ is an evolving term, and any definition should therefore reflect this evolution. For Salinas, the core element of the digital divide is the disparity between individuals and/or communities who can use electronic information and communication tools such as the Internet to improve the quality of their lives, and those who cannot. The factors that contribute to that disparity include whether they have the computer hardware or software; whether they are able to deploy these tools effectively; whether in their use they are able to access relevant information or not; and finally, whether the users are fluent in their management of information after it has been retrieved (Salinas, 2003).

When searching for clear and concise definitions of the ‘digital divide’ it becomes apparent that the concept has grown more complex as the phrase becomes shorthand for every conceivable disparity relating to technology access. The multi-dimensionality of the concept has been framed by Norris (2001) into three distinct aspects. The first aspect is the ‘Global divide’, which notes the divergence of Internet access between industrialized and developing countries. The second aspect is the ‘social divide’ which describes the gap between the information rich and information poor in each nation, and describes various forms of localised disadvantage including

poverty, lack of language proficiency, and old-age. The third aspect is the ‘democratic divide’, which refers to the difference between those who do and those who do not use the new technologies to further political participation (Norris, 2001, p.1). Furthermore, while access to ICT continues to be the most common measure of the presence of the digital divide, it has been argued that the discrepancy is more plainly understood within the context of historical development. According to this logic, whether within a country, or between countries, the digital divide may be viewed as a multidimensional reality closely entwined with histories of social and economic development and inclusion (Heuertz, 2003; Ahmed, 2007).

As highlighted above, the ‘digital divide’ primarily refers to the difference between individuals and /or communities who can access and use ICTs, including computers, software and telecommunications infrastructure, to better their lives, and those who cannot. In its most fundamental form it has become an issue of Internet access. In a world where Internet access has become synonymous with information access, it has become a significant difference between nations that have efficient, affordable and widespread access to the Internet, and those that do not (Carvin, 2000; Ishaq, 2001; Warschauer, 2001, 2003; Williams, 2001; Huggins & Izushi, 2002; Hunter, 2002; Lynch, 2002; Munster, 2005).

With the above discussions and definitions in mind, for the purpose of this thesis the digital divide is defined as the information gap between developed and developing countries resulting from disparities in access to, and use of, digital information content including the Internet. The gap may be indicated by a difference in access to required hardware and software, but it may also be indicated by a difference in access to relevant, local and linguistically accessible data and information.

### **3.2.1 The digital divide in developing countries**

Examination of the literature on the digital divide in developing countries indicates that relevant research has been slow to emerge. While debate about localised forms of digital divides commenced in developed countries in the early 1990s, similar studies conducted in developing countries only started appearing from the turn of the

century, following United Nations' summits in Geneva in 2003, and Tunis in 2005, where the global divide was fore-grounded as a critical issue in international development.

It can be speculated that the slowness to address the issue of the digital divide as it is experienced by developing countries is due to the late introduction of ICTs in general life in these countries, as well as the delayed adoption of ICTs in education due to comparatively low rates of digital literacy, lack of training, lack of financial support, and insufficient infrastructure (Al-Aufi 2007). Although studies based in developing countries are relatively new, they generally indicate that there remains confusion about where to start in addressing the issue, what infrastructure is needed, and what skills, training, equipment and funds are required if schools, homes and the community at large are to benefit from the many opportunities provided by Internet access and digital literacy.

The approach that is common in the literature is the description of the extent and significance of the problem (Ishaq, 2001; Willinsky, 2003; Omekwu, 2006). Smith (2003) cites the World Health Organization's conclusion that global inequity in access to the Internet was greater than any other inequity. The statistics that frequently reported regarding the disparities in access to ICTs are alarming. Foster (2006) reported that developing countries have computer and Internet penetration rates that are 1/100th of the rates found in North America and Europe, and that there are less than six personal computers per 1000 people in India, whereas more than six out of ten people in the United States own a computer. In a study undertaken between 1999 and 2001 in 161 countries, Chinn & Fairlie (2007) examined rates of Internet according to a set of criteria which are widely used. These included:

- Economic variables: including income per capita; years of schooling; illiteracy; trade openness,
- Demographic variables: including youth and aged dependency ratios, rates of urbanization,
- Infrastructure indicators: including telephone density and electricity consumption, and
- Telecommunications pricing measures.

Chinn & Fairlie found, unsurprisingly, that a massive digital divide existed between the United States and Sub-Saharan Africa. Furthermore they claimed that the contributing causes of this divide could be quantified, with results of their research indicating that some 53.4% of the gap is accounted for by income differentials; and 40.7% of the gap is attributable to telecommunications infrastructure disparity. They concluded ‘that nearly one-third of the Internet penetration rate gap might be closed if countries in the Middle East and North Africa had similar regulatory quality as the United States’ (p. 22). The researchers also noted that the degree of educational attainment does have a positive association with the degree of PC and Internet use.

Most studies of the global digital divide inevitably point to the various unfavourable conditions in developing countries that contribute to the digital divide (Ishaq, 2001; Kenny, 2001). For those with a low income and/or low education, gaining access to the Internet is highly problematic (Ishaq, 2001; Kenny, 2001). Jurich (2000) indicates that access to the Internet in developing countries is severely limited by the expense. Jurich points out that if forms of the digital divide exist in developed countries such as the United States, then developing countries, many of which are struggling to meet the survival needs of their populations, have little immediate prospect of implementing widespread Internet access. Adulis’ (2001) found that in Brazil, where the average annual income is approximately US\$4,645, it can cost US\$1,200 to buy a personal computer with Internet connection. In addition, associated phone bills costs may exceed US\$200 per year. Therefore, it seems unreasonable for people to spend a quarter of their salaries on connecting to the Internet. Adulis reports that in developing countries a solution to the access problem has been the adoption of community-based telecommunications centres. Ishaq (2001) in addressing the life challenges faced by people in developing countries found that Internet access would greatly improve disadvantaged individuals' quality of life. It was also concluded that more than any other change, there was a chance for developing countries to take a leap forward, develop their own productive and creative capacities, and become integrated into the world of global e-commerce.

Other commentators have noted that because of their impoverished circumstances, developing countries face unique challenges. Appiah (1998) noted that there is a

need for the formulation and implementation of effective and practical strategies enhancing the capabilities of developing country populations to make the best possible use of information technology. He also concluded that overcoming IT illiteracy should involve providing courses for school teachers and school managers to facilitate student access to the internet. Cullen (2002) concluded that the current academic environment was a considerable obstacle, and that access to scholarly information for universities and schools in developing countries must include ‘valuable sources, indexes, full-text databases, and e-journals’ (p. 234).

A number of researchers have undertaken studies of individual countries. In Africa, the need for ICT access is recognized (Appiah, 1998; Omekwu, 2006), and it is understood that ICTs offer a significant window of opportunity for developing countries to accelerate their development in all spheres of economic and social activity and to narrow these gaps with developed countries. However, as Appiah concluded, ‘the changes engendered by the Internet have been to the exclusion of the very poor people in developing countries that Internet could particularly benefit’ (Appiah, 1998, Par. 6). South Africa has been studied extensively in terms of the digital divide, in part because the country is devoted to overcoming and mitigating the disadvantages experienced in large parts of its society as a result of past policies. It has been argued that access to information and telecommunications, as well as education, freed from the crippling and discriminating concept of Bantu education, are crucial elements and form the building blocks of the concept of ‘empowerment’ (Akinsola, Herselman & Jacobs, 2005).

Another example of a developing country that is attempting to improve Internet access is Indonesia. Sulisty-Basuki (2004) has described how ICTs were first introduced in Indonesian libraries in the early 1980s, but that the enthusiasm for ICT has not been well supported due to the prevailing social and economic conditions. Of the population of 210 million people in Indonesia, there are only eight million telephone connections and 12 million cellular telephones. Internet users number about six million, or less than 4 per cent of the population. Sulisty-Basuki concludes there is a wide digital divide within Indonesia between those who have access to computer technology and the Internet and those who do not. Another area of interest noted by Sulisty-Basuki (2004) is the nations which have comparatively high

incomes per population, and yet remain with low percentage of internet access. This offers a potentially useful area for investigation in order to better understand factors contributing to the digital divide other than commonly cited economic or infrastructural problems (Chinn & Fairlie, 2007).

When the extent of the digital divide is measured in academic environments—often the most privileged in developing countries in terms of access to new information technologies—the difference in information access nonetheless remains stark. A study conducted in Brunei (Seyal, Abd-Rahman, & Mahbubur-Rahim, 2002) investigated the attitudes of academics toward the use of the Internet. The target population was academics at four technical colleges in Brunei Darussalam. A total of 340 questionnaires were sent to of which 166 were returned. Although the main objective of this study was to test the Technology Acceptance Model through a variety of hypotheses defined by the authors, the findings also identified the level of the Internet use by academics at the technical colleges. Findings indicated that 79% of the respondents use the Internet. Of the total respondents, 48% use it at home, while only 12% use it at work. A slim majority of the respondents (51%) considered the Internet ‘very important’ for their professional activities. The most frequent reasons given for Internet activity was for keeping abreast of new developments and for gathering research materials.

In Nigeria, Ehikhamenor (2003) investigated the use and non-use of the Internet by Nigerian science academics. The researcher distributed a questionnaire to academics working in selected disciplines in 10 universities. Findings generally reported low use of the Internet among the respondents. While almost 64% were equipped with computers, use and non-use of the Internet was almost divided evenly among respondents. The majority of users had commercial or private access to the Internet. Most of the respondents reported that they learnt to use the Internet by attending courses given at their universities, and the majority (82%) had used the Internet for more than a year. Almost 40% spent at least one hour a week using the Internet. Most claimed that connectivity was poor and expensive. The most frequently used Internet enabled service was e-mail, 38% using it on a daily basis. Results also reveal that almost 76% of the respondents never used discussion lists and more than 65% of the respondents never accessed texts or images from the world-wide-web. While

almost 42% of the respondents indicated that they use e-journals on a monthly basis, more than 37% indicated that they never used e-journals. Ehikhamenor concluded that such low use of the Internet would negatively affect the effectiveness of scholarly communication in Nigeria.

Further research undertaken in Nigeria by Ani, Uchendu & Asteye (2007) investigated the motivation for Internet use on a university campus. Internet users (n=324) at four cyber cafes at the University of Calabar were surveyed. Results indicated 60% of the Internet users at the University are male, and the majority (65%) were students at the University or nearby schools. The findings regarding the reasons for using the Internet indicated that 39% were using it for academic and research information; 19% for recreational purposes such as music, games, and news; and 14% for other educational services.

Adika (2003) investigated the impact of the Internet and its use in three major universities in Ghana by distributing a questionnaire to 106 academics. Findings indicate a relatively low awareness and usage among the survey respondents. Almost 60% of the respondents indicated that they have no connection to the Internet in their academic departments, although the Internet connection was established as early as 1998. Almost 25% indicated that they have never used the Internet, and only 13% reported using the Internet 'always'. The majority of non-users reported that their colleagues have never encouraged them and that their universities had not provided training. Most of the Internet users (87%) indicated that connectivity was slow and prone to problems. Among users, the most frequently used Internet service was e-mail (44%, 'always'), followed by the world-wide-web (30%, 'often'). The majority of respondents, however, reported non-use of mailing lists. The majority of the respondents use the Internet for personal communication, and only modest use was reported for research projects and downloading of scholarly materials. These results indicate an unenthusiastic response to the use of the Internet by academics in Ghana, and Adika recommended that greater priority needed to be given to improving this situation.

A more recent study, also conducted in Ghana (Badu & Markwei, 2005), suggests that usage of the Internet remained low subsequent to the study conducted by Adika

(2003). Academics at the University of Ghana, which forms the basis for the later study, again reported low use of the Internet-enabled services for research and communication, with the exception of e-mail. This low use was reported to be related to the lack of training and the absence of encouragement from the University.

Mamtora (2004) carried out a study to investigate the use of the Internet by the academic staff of the University of South Pacific which serves eleven countries in the region. Although the study results were communicated somewhat later, the data were collected by 1999. Only 146 out of 271 academics in the University responded to the questionnaire. Results indicated that while e-mail was used widely by the academics to communicate inside one campus, it was used less frequently to communicate outside that campus. Results also showed quite high use of mailing lists (51%), and reliance on the use of the Internet as a source of information (75%). Web-based library catalogs were more likely to be used on a weekly basis rather than daily, and 44% of respondents reported no use at all of web-based catalogs. Little difference was indicated in the use of the Internet across disciplines. The clear majority of respondents (95%) indicated that the slow speed of Internet access was the major barrier to use. On a more positive note, most of the respondents reported that the Internet helps overcome their geographic isolation.

One aspect of the digital transformation of scholarly communication that has attracted interest because of its potential to deliver benefits to scholarly communities in developing countries is the open access movement (Arunachalam, 2004; Chan, Kirsop & Arunachalam, 2005; Anbu, 2006; Papin-Ramcharan & Dawe, 2006; Ghosh & Kumar, 2007; Lor, 2007b, Al-Shawabeka, 2009). Open access promotes the free availability of scholarly content on the Internet. This can be achieved either by the publishing of freely available journals, or by authors archiving copies of more traditionally published articles in digital repositories (archives). As one commentator has concluded;

. . . archiving already published research in interoperable institutional archives greatly benefits global science at almost no cost. . . Governments in developing countries will do well to mandate that all publically funded research is made available

through interoperable institutional OA archives. (Arunachalam, 2004, p. 291)

The potential of open access publishing was highlighted in a study conducted by Willinsky (2003) that investigated the technological, social, and philosophical issues involved in improving the quality and availability of social science research. Willinsky noted that while organisations such as UNESCO and the World Bank have focused on the vital role played by research-based knowledge in economic development, less attention has been given to the global implications of new publishing and knowledge technologies for improving research capacities. The primary objective of the study was to test the impact of technological changes on access to knowledge and to investigate the potential of the ‘open access’ and ‘open source’ publishing for improving global research capacity. The research population consisted of researchers, students, librarians and education policymakers, and incorporated interviews and seminars in six universities in developing countries. Willinsky concluded that whereas universal access to the Internet and associated academic services has made information gathering and research easier and faster for university faculty in advanced countries, it is potentially exacerbating the knowledge gap between the developed and developing worlds. The findings identified the importance of open access and open e-journal systems, which link articles to the text of associated studies, policy, practice, and media resources, so that users can consult and weigh different orders of knowledge (Willinsky, 2003).

Ahmed (2007) discussed the role of the open access movement in bridging the digital divide in developing countries, suggesting it would bypass controls on access to scholarly information and make it available for users free of charge. In addition, Ahmed argued that using open access to remove barriers to knowledge would provide substantial benefits for communities and positively impact on the creation of fresh ideas and knowledge, as research become becomes cheaper, easier, and more rapid. In this way some of the financial pressures on the academic and research sectors in developing countries could be released. Ahmed also considered the role of librarians in developing countries, in particular their struggle to purchase access to the required scholarly publications, and noted the danger of an increasing information divide between developed and developing countries. He noted in

particular the circumstances in Africa, facing as it does a severe lack of infrastructure and the largely ineffective uptake of ICTs. Ahmed also notes the digital divide that exists within Africa, and records some of the successful initiatives—particularly in South Africa—that have resulted from the adoption of open access principles. It is argued that the provision of open access to scholarly content is important both to provide African content to local scholars, and to ensure that the results of African research are available to the world.

### **3.2.2 The digital divide in Arab countries**

Much of the recent research regarding the digital divide has focused on the least developed nations, particularly in Africa and parts of Asia. Many Arab countries, including Jordan, have a more ambivalent status in terms of their ‘development’. They have productive and wealthy economies compared with these less development countries, but they are still at a developmental stage with regard to providing high quality, widely available services in areas such as education, health and communication.

The wider regional setting for Jordan is particularly dynamic. Internet use and the general demand for information technology hardware and services in the Middle East are growing rapidly. Egypt, Saudi Arabia, and the United Arab Emirates (UAE) accounted for 59% of regional demand in 2001, and as much as 64% of the forecast future demand (Loch, Straub, & Kamel, 2003). In 2001, the launching of Egypt’s first free Internet service provider, Noor, demonstrated wide commitment to market opportunities. The Internet and the burgeoning world of e-commerce are viewed as engines of economic growth for the region in the 21st century, and Arab countries such as Egypt are often referred to as exemplars for how to ‘leapfrog’ into the IT era.

Despite these developments, according to the *Arab Human Development Report*, one of the important challenges facing the Arab World is its capacity to produce knowledge (UNDP, 2003). The Report discussed the deficiencies of the Arab World in producing the forms of knowledge production that are crucial to human development. As described by the *Arab Human Development Report* there is a range

of socio-cultural and political disincentives to knowledge production in Arab Countries. One such disincentive is the reluctance to merge modern scientific method and knowledge to traditional forms of local knowledge. In addition, scientific research in Arab countries is often held back by weak basic research and the almost total absence of advanced research in several fields including information technology (UNDP, 2003, p.70).

Jordan is one of several Arab countries that has started to actively utilize ICTs in its education system over the course of the last decade. Distance education is one of the many methods used to deliver higher education in Jordan, and Castillo (2004), records how Jordan established distance- learning programmes throughout the country's public and private universities. This implementation of distance education formed part of a broad strategy to develop Jordan's educational standards and infrastructure through the effective of use of ICTs (Tawalbeh, 2001).

Al-Mashagbeh & Gannon (2001) state that the Internet has emerged as one of the most powerful economic, social, technical, and business phenomena in human history. It has been adopted more rapidly than any previous information technology and has widely altered business and government practices. It has also fundamentally changed the way people communicate, organize and perform their work tasks. Moreover, it has provided people with access to a large quantity of easily accessible information for education, entertainment and socialization. Consequently, governments around the world are focusing on the productivity advantages of the Internet and are enthusiastically promoting the Internet in their societies. Jordan has been one of the first Arab countries to integrate Internet based e-commerce and e-governance services into the daily life of its citizens.

There was a gap between the time of the introduction of the Internet in developed western countries and in Arab countries of approximately six to eight years. Jordan was one of the first Arab countries to take the initiative and connect to the Internet as early as 1995 (NIS). By 1997, ten Arab countries had established connections to the Internet (Hallouda & Ghonaimy, 2000).

The incentive for Jordan's early uptake of the Internet in the region came from the head of government. His Majesty King Abdullah II recognised the potential of ICT early in his reign and led the country's development by challenging government to engage with the private sector in developing the nation's ICT capacity. As a result the Government progressed with the Connecting Jordanians initiative and related projects that became key instruments in the implementation of policies promoting economic, social and educational development. The Ministry of Information, Communication and Technology has an obligation to 'encourage the preparation of advanced programs of education and training in telecommunications and information technology, including the use of the Internet, electronic commerce, and electronic transactions'. Although as noted in Chapter 2 Internet usage remains low by international standards, the country now has a rapidly developing education system coupled with a high rate of computer access in schools. The educational program Reach (completed in 2007) connected some 3,200 schools to a fibre network, in addition to 8 public universities, 23 community colleges and 70 Community Access Centres, representing approximately 1.5 million learners.

As noted in Chapter 2 Internet cafes have proliferated in all of Jordan's major cities, and have played an important role in spreading the use of the Internet among Jordanians of different ages with different backgrounds. As early as 2002 Al-Khalidi affirmed that the Internet in Jordan was becoming an integral part of everyday life. While it is easy for the Jordanian and other governments in the region to aggressively adopt ICTs, they may well neglect other factors that influence the diffusion of technology into the wider community (Loch, Straub & Kamel, 2003). Previous research has identified the influence of local culture on the transfer of ICTs, and Arab cultures in particular have been singled out (Hill, Loch, Straub, & El-Sheshai, 1998).

It is noticeable that to date many of the major digital initiatives aimed at supporting Arabic research and culture have originated either *outside* of Arab countries, or outside of the university sector. These include:

- Research centres based mainly on foreign research centres (e.g. American or French archaeological schools). These institutions collaborate with state agencies and undertake a decisive role in

promoting regional cultural information (e.g. the American Centre for Oriental Research that has designed the Jordanian Antiquities Database and Information System (JADIS)).

- Regional networks such as MEVIC (Middle East Virtual Community) which is an attempt by academic nationals resident in the Middle East to open, promote and sustain intra-regional channels of communication and cooperation.
- ‘Religious’ based networks such as Arab Net which provides online resources for the Arab World.
- National networks such as AlgeriaLinks.com which aims at the organization of information about Algeria, making it universally accessible and useful.
- ‘Independent’ networks which are not based—exclusively—in their countries of origin such as Algeria Interface which is based in Paris. (Veltman 2003; Bhattacharya 2004).

As identified by the *Arab Human Development Report 2003*, the challenge for Middle-Eastern Arab governments is to develop the policy and infrastructure capable of producing adequate digital content in Arabic, with a view to;

- Preserving and making available the best of existing Arabic scholarship,
- Supporting the ongoing research of current and future Arab-speaking scholars.

Fundamental to the hopes of achieving these goals is the recognition of the concept of the higher education and research sector, working alongside business and government to deal with the huge problems of inequity in information access that ICTs are in danger of delivering across the world. There are indications that a committed management structure and appropriate government policies, supported by suitable infrastructure, could produce benefits that would make the implementation and use of ICTs sustainable in economically and socially disadvantaged environments.

### **3.2.3 Bridging the digital divide**

On World Telecommunications Day, May 17, 2004, the United Nations Secretary General, Kofi Annan, made a plea for the elimination of the digital divide between rich and poor nations, highlighting the divide as a crucial component of economic and social development.

It is widely felt that efforts to combat the digital divide must emerge from an understanding of larger social issues in order to effectively address various long-term inequities. These social problems and issues have contributed to the growing divide that exists in the adoption levels of Internet technologies between low-income, poorly educated users and high-income, well-educated users (Shneiderman, 2001, p.11-15). As described previously, a number of commentators have noted that the digital divide is more than just a case of access to the Internet and its associated technologies. In order for developing countries to bridge the divide they must also address related issues that limit the usability of the Internet, including such issues and language and literacy barriers, and the lack of local content.

Nevertheless, while these global social disparities remain, the ICT revolution continues to unfold, with an increasing focus on the provision of information resources through digital networks. It is this trend, which has been integral to the emergence of the concept of the digital library, which is now being considered as a potential solution to the digital divide as far as scholarly communication is concerned.

It becomes clear that the issue of the disparity, between those with access to digital networks and those whose access is limited, is inextricably linked with the disparity in wealth which makes accessing new ICTs possible. There are therefore serious risks that the use of the ICTs will exacerbate the entrenched information and knowledge divides that separate developed and developing countries and thereby allow new forms of exclusion. As has been concluded by Adulis, ‘at present, there are no realistic prospects that the relations between ICT-rich and ICT-poor countries will change in the near future’ (2001, n.p). According to the French philosopher

Philippe Breton, who criticizes the ‘cult of the Internet’, ‘We can fear that the new world, far from reducing the inequalities in knowledge access, is reinforcing the layers of inequalities already present’ (Breton, Hamelink, 2000 as cited in Adulis, 2001)

This rather pessimistic view of the Internet and emerging ICTs is not shared by all those who are concerned with the digital divide. Other scholars are more optimistic about the potential for ICTs to become tools for alleviating current social inequalities. According to Uimonen (1998), for the Internet to be socially beneficial, it needs to be used for alleviating poverty, improving access to health care and education, conserving and fairly distributing resources, and strengthening participation in decision-making process. Haddad argues that closing the digital divide will not automatically solve the wider social problems, claiming that ‘. . . the most serious divide is in the extent and quality of human knowledge and learning. It is not digital; it is educational. It is necessary but not sufficient to provide avenues to information and knowledge. What is more important is to empower people with appropriate educational, cognitive and behavioural skills and tools’ (Haddad, 2000). This more ‘holistic’ approach to bridging the divide between developed and developing countries accepts that a number of factors must be assessed: from basic literacy skills right through to cyber fluency; receiving and creating the content you need; and enhancing community development.

Human capital disparities, as measured by years of schooling, are important in contributing to the global ‘digital divide’. It has been claimed that differences in education explain from 9.9 to 14.4% of the gaps in computer penetration rates (Chinn & Fairlie, 2004). The average number of years of school range from 3.7 years in Sub-Saharan Africa to 8.3 years in Europe and Central Asia. In contrast, the average years of schooling in the United States are 12.1 years (Chinn & Fairlie, 2004). Computers obviously require substantial levels of education for optimum use, limiting demand in countries with relatively low levels of human capital. Hence, this indicates that, even after allowing for differences in income, human capital disparities are important in creating a global digital divide. A parallel result can be found in research using US micro data to explain the digital divide across racial groups. Demand for computers increases significantly with higher levels of

education, resulting in large independent contributions from education to gaps in computer use (Chinn & Fairlie, 2007, p. 38).

It is relevant to note that the measurement of the digital divide first began with studies of households. The household is the traditional standard by which access is defined in the U.S. and elsewhere. Governments around the world use the household as a unit of measure enabling world-wide comparisons as well as in country comparisons. The U.S. government has been tracking the universality of telephones in households for many years (Lynch, 2002).

An example of attempts made to bridge the digital divide is evidenced by the Gates Foundation which developed its U.S. Library Program to work in partnership with public libraries to provide access to computers, the Internet and digital information for patrons in low-income communities. Through its program the Foundation has provided computers to many public libraries as well as technical training for library staff on how to teach computer classes on e-mail, Internet searching and Microsoft Word. Training also is provided in on-going technical assistance. According to Lynch; the U.S. government also has responded with the education or e-rate discounts on telecommunications services for schools and libraries. The e-rate was passed by the Congress as part of the Telecommunications Act of 1996. It specifies that, upon request, individual telecommunications carriers must provide service to schools and libraries at 'affordable' rates. In most public libraries in the U.S. there are computers and Internet access. Who is using these computers and for what purposes are questions of interest (Lynch, 2002).

These and other such initiatives show that there have been concerted efforts to bridge the digital divide at national, local, sector, communal, and also individual levels in the U.S. However, according to Selwyn, Gorard & Williams (2001), 'the role of technology in overcoming social exclusion in education and lifetime learning practices has often failed to be objectively discussed, with a tendency for many educationalists to adopt either overtly optimistic or pessimistic positions' .

### **3.3 Language on the Internet**

According to Warschauer (2001) language has always played an important role in the promotion and the expression of identity in the information age. This is likely to be true of all forms of Internet based communication, be it for social, business, governance or educational purposes, where users can potentially reach a global audience consisting of speakers of most extant languages. In such a communication environment language becomes an important marker of the content providers identity and culture. It is apparent, however, that despite the potentially democratising effect of this ultimate form of broadcasting, the Internet is far from a 'level playing field' with regard to language.

The Internet is grounded in computing codes based on English characters, in particular ASCII (American Standard Code for Information Interchange). The code referred to as US-ASCII has been the most commonly used character coding set on the Internet. English speaking countries were at the forefront of the creation and early use of the Internet and they rapidly came to provide the bulk of the content providers.

Ali (2003) indicated the extent to which a 'linguistic divide' is evident on the Internet. Of more than 6000 languages spoken around the world, there are only 500 languages represented on the Internet. Global Reach (2004) estimated that approximately 75% of Internet pages are in English, and 68.4% of total content, with almost all other languages underrepresented in terms of their global speakers due to this domination by one language. Global Reach has tracked non-English online populations since 1995, revealing that 64.2% of the world's online user population, as of March 2004, was non-English speaking. This includes speakers of Chinese (14.1%); Japanese (9.6%); Spanish (9.0%); German (7.3%), and Korean (4.1%). Arabic represented only 1.4% of Internet content. In addition, Global Reach reported that just 0.11% of the total Arab population has Internet access, and only 5% of Arab homes have a telephone (Global Reach, 2004). To put these figures in context it should be noted that Arabic is one of the six most frequently spoken world languages, with approximately 300 million native Arabic speakers, or 4.7% of the

world population. Arabic scholarship has also had a long history of contributing the enrichment of the sciences and human development, but this status is not apparent from its low level of representation on the Internet (Yahyawi, 2005; Al-Aufi, 2007).

As Chinn & Fairlie (2007) note many of the issues regarding creating and using the Internet in local languages relate to their use of non-Latin fonts. The majority of the Western European languages are based on a Latin script, so even if French (3.8%) or German (7.3%) do not dominate the Internet, it is sufficiently easy to post and search for content in those languages. The situation with regard to the variants of Arabic, Indian and various other Asian scripts is far less straightforward. Some of these languages have been forced to represent their scripts in graphical format since there are no fonts that easily display them as Internet text. While improvements have been made in this regard, there is little doubt that the delay in adapting non-Latin scripts to the Internet has been a further contributing factor to the slow adoption rates in some regions of the world (Chinn & Fairlie, 2007).

The dominance of English on the Internet has, not surprisingly, been extended to those elements of content associated with ‘scholarly’ information. English has long been established as the preferred language for international scholarly communication in many disciplines to the point where many scholars who do not have English as a first language will choose to publish in English to ensure accessibility (Global Reach, 2004; Munster, 2005). As a result English dominates in all of the various ‘realms’ of information that users access via the Internet; be it free Internet websites provided by individuals, business or governments; free scholarly information found in digital repositories or open access journals; and subscribed databases of scholarly content (i.e. e-journals) provided by libraries.

While it might be assumed that a substantial number of non-English speaking users can access Internet content in English, little is known as to how users decide which language to use; how they utilize multilingual resources; and how they approach or conduct multilingual searches on the Internet. It might also be assumed that many global users are learning English in order to optimise the use of the Internet, and that using the Internet in turn becomes part of their education in English. This raises

important issues related to the preservation of Internet diversity when one language has become so dominant.

### **3.3.1 Arabic language on the Internet**

According to the *Arab Human Development Report 2003: Building a Knowledge Society*, Arabic is a ‘language in crisis’. The Report identified a number of aspects of this crisis, including the ‘challenges raised by information technology, which relate to the computerised automation of the language’ (UNDP, 2003, p. 7), and emphasised the central role of language in the maintenance and well-being of any cultural system. In addition it called for the ‘Arabicisation’ of university education in relevant countries, noting that the ‘failure to Arabicise science creates obstacles to communication between scientific disciplines and slows knowledge exchange’ (7). In other words, the current policy of the Jordanian government of promoting the use of English for educational use is conceivably detrimental to not only the long-term development and well-being of Jordanians—and the wider Arab—culture, but also to the productivity and significance of its academic sector.

According to Al-Khatib (2000), one impact of the domination by English of the scholarly information on the Internet has been the global advance of English as a standard second language to be acquired in the primary stages of education. This phenomenon was noted particularly with regard to the Arab countries of the Middle East. It is the case that many developing Middle Eastern countries, including Jordan, have taken the decision that it is easier to adapt their systems of education and technology use to English, rather than try to create, or acquire access to, a parallel range of content in their own language. Students learn English at school from as early as five years of age, and most Jordanian universities now require teaching in English for at least some disciplines. There is also a considerable pressure on native Arabic-speaking Jordanian academics to teach in English and publish in English language journals. As argued by the *Arab Human Development Report 2003*, however, by doing so they may run the risk of suppressing vital aspects of their own cultural memory, development and identity.

Several recent studies have investigated attitudes within Arab societies to the encroaching use of English, not only for the purpose of education but also as a second language that is increasingly used for business and social reasons (Gee 2002; Warschauer, El-Said & Zohry, 2002; Al-Jurf 2004; Findlow, 2006). Elements of these studies investigated how English and Arabic are used in the Internet environment by groups of young professionals, students, and academic staff in different countries in the Arab World. The results indicate that English is preferred for the purpose of formal e-mail communication, while Arabic, or a combination of Arabic and English, is favoured for the purpose of informal communication such as ‘chat’.

These studies also report generally positive attitudes toward English with, for example, many respondents indicating that they will or would enrol their children in pure English teaching schools or colleges in the future. These attitudes toward using English are seemingly largely determined by the domination of the Internet by English language content—particularly scholarly information—which is an important issue for parents who are ambitious for their children’s scholastic future. The study conducted by Findlow (2006) in Arab Gulf countries was typical in that it revealed a positive preference for English over Arabic amongst a group of students and academic respondents. Reasons provided for this preference included the following:

- English is the international language,
- English is the language of the world educational market,
- Learning in English will help achieve a satisfactory employment outcome,
- Learning in English is a service to the development of their country of origin in a way that would not be achieved if Arabic was the only choice. (Findlow, 2006)

Evidence for the preference for English websites is provided by Laroussi (2003), who indicates that Internet sites in non-Arabic languages are heavily used in various Arab countries. For example, French and English websites in the North-African Arab countries such as Morocco, Tunisia, Algeria, and Libya, are more visited than Arabic web sites. Many Arab users apparently found that using the Internet by

means of English or other languages based on a Latin alphabet is preferable due to the increased content and enhanced accessibility. Other studies identified various problems in using Arabic in professional and academic circumstances in particular. The barriers to the use of Arabic in these environments include:

- Lack of translation and ‘Arabization’,
- Lack of research and authoring in Arabic, thereby negatively impacting on the use of Arabic as a medium for teaching and learning,
- Lack of Arabic texts suitable for teaching in the science disciplines in particular,
- Lack of scientific vocabulary in Arabic thereby requiring scholars to adopt English words,
- Lack of Arabic software,
- Failure to adopt the use of ‘standard’ Arabic in the digital environment,
- Difficulty of teaching and learning computer and Internet technologies by using Arabic (Warschauer, El-Said and Zohry, 2002; Diab, 2003; Laroussi, 2003; Al-Jurf 2004; Findlow, 2006).

It has also been claimed that Arabic lacks systematic support from regional governments including unified strategies to help improve its position in the Internet environment; lower quality software products; and fragmented ICTs markets (Al-Aufi, 2007).

In contrast to these somewhat pessimistic findings, Ali (2003) expressed the view that the advent of the Internet has had the benefit of forcing Arabic speaking societies to address the issue of how to promote the language as an appropriate choice for use in the digital environment.

Certainly there is evidence of the growing willingness of Arab countries to create databases of repositories of Arabic content. For example, the initiatives of the Egyptian Government in promoting Arabic digital content in collaboration with the Centre of Documentation of Heritage and Natural (CULTNAT) of the Alexandria Library (Economic and Social Commission for Western Asia, 2005). Similarly, the Dubai Government has actively promoted e-government services with a goal of

raising the amount of Arabic digital content for use in the public sphere. The libraries serving Jordan's universities have also been active in not only facilitating access to internationally-sourced digital content, but in also creating digital repositories of locally-sourced Arabic information.

Another important development has been in the successful attempts to produce effective Arabic Internet search engines. The important Arabic search engines include Sawafi (سوافي), launched in April 2006 by a Saudi-German company; and Araby, launched by the Saudi based Maktoob Group in 2007. These search engines provide for the first time Internet users with the capability of accurately processing Arabic searches and websites (ESCWA, 2007).

The most thorough examination of the place of Arabic in research and scholarly communication has been provided by Al-Aufi (2006), in a survey of 287 respondents from Sultan Qaboos University in Oman conducted in 2004. Amongst the key results from the survey were that 65.7% of respondents agreed or strongly agreed that, 'The absence of Arabic e-journals and sufficient Arabic networked information is a reason why Arab academics favour English'; 58.9% agreeing or strongly agreeing that, 'Sufficient availability of Arabic networked information would have improved my intellectual productivity' (p. 146). Al-Aufi noted, however the degree of ambivalence in responses to a range of questions that asked respondents to reflect on the comparative role of English and Arabic for scholarly uses. This included a generally high number of 'Neutral' responses (in excess of 30% for a number of questions). Respondents were also divided on several key questions. One of these put the proposition that, 'The domination of English language will lead to the continuous decline of the Arabic language for academic purposes', which attracted some level of agreement from 47.0% of respondents and disagreement from 30.2%. Although respondents therefore registered concern about the future of Arabic that also expressed some confidence in its future, with 59.6% agreeing or strongly agreeing that, 'The presence of Arabic networked information on the Internet will improve to a great extent in the next few years' (p. 146). Al-Aufi concluded with a warning that the results of the survey,

. . . indicate that Arabic language—and presumably therefore Arabic speaking populations—will not be able to contribute to

the human and scientific development unless it is adequately represented on the Internet. (p. 147)

### **3.4 Digital libraries and the digital divide**

In recent years the focus on issues regarding the digital divide has inevitably included the institutions that are responsible for providing digital content and services, including libraries. This has resulted in speculation as to the roles and functions that digital libraries can play with regard to the ‘bridging’ of the divide, with the sources of this literature often coming from developing countries such as Nigeria (Omekwu, 2006) and Iran (Aqili & Moghaddam, 2008), where the need is most pressing.

The literature dealing with digital libraries is now vast. This chapter will be confined to a coverage of that literature which is relevant to the central concerns of this research—that is, the critical role played by digital libraries in delivering information services to academic communities. This includes assisting in the activities of students, teachers and research scholars, by organising and managing collections of information in digital form (Oppenheim & Smithson, 1999; Meyyappan, Al-Hawamdeh & Foo, 2002).

#### **3.4.1 Defining the digital library**

Since the advent of digital content and the emergence of the concept of the digital library (or as it is sometimes called, the electronic library) there has been discussion as to its exact nature and its relationship to the more traditional forms of library services. Borgman (1999) noted the complexity of this ‘new’ form of library when he noted that ‘a digital library is a service; architecture; a set of information resources, databases of texts, numbers, graphics, sound, video, etc.; and a set of tools and capabilities to locate, retrieve, and utilize the information resources available and powerful search and browse facilities invest the digital libraries with ‘open access library’ characteristics facilitating serendipitous discovery of information’ (p. 233).

Bhattacharya (2004) defined digital libraries as libraries that manage collections of digital items, created or acquired according to the established principles of library-based collection development. Information is stored and distributed in digital form with the associated value-added services necessary to allow users to retrieve and use the resources just as in a traditional library. According to Bhattacharya (2004) the main components of digital libraries are:

- Content - digital objects, and collections
- Design and architecture
- Resource discovery tools
- Interfaces

Importantly, digital library content is not limited to documents or text; but can include any object that can be reproduced in a digital form (Urs, 2001; Fox & Urs, 2005).

Provision of abundant and appropriate content is central to digital libraries. Stakeholders in libraries such as authors, publishers, users and librarians, are connected through content (Buehler & Boateng, 2005). It has been argued that the effectiveness of digital libraries depends upon the representation and rendering of digital content (Urs, 2001). This may be in the form of text, images, audio, video or computer programs. Newly created content often is born digital, while older resources are typically digitized through a conversion process. Recently it has been noted that content is increasingly originating from regions such as South America, India, the Pacific Rim or the Arab World, because these regions have produced enough technology-literate individuals to pioneer language-appropriate content (Chinn & Fairlie, 2007).

One of the outstanding features of the digital library paradigm is that information can be accessed anytime and anywhere, so that the library is available '24 hours x 7 days' wherever there is a personal computer—or a hand held device—with a network connection. This access to library content in a way that is not confined by either space or time is a critical advantage for digital libraries when compared to more traditional forms of library service. It also means that digital library services have a

constant global presence, and that users in developing countries *may* be in a position to take advantage of their rich offerings of scholarly and other content.

Discussion of the provisional nature of definitions of digital libraries is frequently associated with the very attempts to define them. As Seadle & Greifeneder (2007) wrote quite typically;

Digital libraries are in fact probably too young to define in any permanent way, but how we think about them will have a great deal to do with how future generations of librarians conceptualize their mission in the digital world (p.172).

One part of that mission may well be to use the benefits of digital libraries in order to reduce the digital divide.

For the purpose of the current research a digital library is defined in its most general sense—that is, as an information service that uses digital content and services in order to meet the information needs of its user group, and that has the potential to provide content and services beyond its immediate, primary users.

### **3.4.2 Digital libraries and scholarly communities in developed countries**

The development of digital libraries in developed countries can be traced to the early 1970s (Meyyappan, Chowdhury & Foo, 2000). Digital libraries (or at least libraries with a significant digital component) are now widespread throughout the developed world, with academic libraries having already met most of their users' expectations for access to digital library content via the Internet. The role of digital libraries in academic contexts not only includes providing services such as web-based catalogs, full-text e-journals, and reference services, but they also frequently engage in building repositories of digital content to be provided for the benefit of other libraries and scholars (Sharma & Vishwanathan 2001; Raber, 2002; Gaur 2003; Steenbakkers , 2004; Mahmood, Abdulhameed & Haider 2005). Typically, they use their websites to provide users with a structured gateway to a world of digital content and services.

The (digital) librarian of the 21st century is also expected to play a vital role in anticipating and meeting the changing needs of tomorrow's information community as users adapt to the emerging forms of ICTs and digital content (Kurzweil, 1992; Bryan & Blandford, 2000; Fahmi 2002; Witten, loots, Trujillo, & Bainbridge 2002; Faiks, 2003; Bundy, 2004; Dorner 2004; Kebede, 2004; Bailey, 2005; Blandford, Cunningham, & Gwo, 2006; Nicholas, Huntington, Jamila, & Watkinson, 2006; Mitchell & Gilbertson, 2008).

Linked to the implementation of IT and the role of digital library in bridging the digital divide then, is the utilisation of information technology in developed countries to promote, fund, and encourage digital libraries in support of scholarly endeavour. The evidence on use of ICTs in higher education in developed countries is revealing of the rapid uptake in order to achieve a competitive edge and/or maximise research productivity. Hewitson (2002) found in a survey at Leeds Metropolitan University (England) that academics used the electronic information services more often when they are involved in research projects or conducting higher degrees by research rather than when teaching or engaged in other academic activities. The majority of the respondents indicated that the level of the academics' skills in using networked information impacted positively on their take up of electronic services provided by libraries. In addition, a number of studies indicate the United States has been more effective than other countries in shifting many services to the Internet or in accessing digital library content and services via the Internet (Washington-Hoagland & Clougherty 2002; Barnett-Ellis & Griffin 2003). At both the University of Iowa and Jacksonville State University, survey respondents indicated they used the digital library remotely via the Internet from their offices and homes with services such as indexing, abstracting, bibliographic databases and electronic journals being accessed remotely. In addition, the respondents reported that the library networked services decreased their number of personal visits to the library, and they feel that the diversity of Internet information is important for their research (Washington-Hoagland & Clougherty 2002; Barnett-Ellis & Griffin 2003).

United States academic users have also reported that they use full-text e-journals and online databases more frequently than other forms of networked information provided by their library (Heterick 2002; Jones & Johnson-Yale, 2005). Zhang

(1999) reported that access to the Internet was found to be higher from the workplace than the home for purposes of study and research when the researcher examined the use of Internet based electronic resources by academic staff of Library and Information Science in the United States. The findings also indicated that more than 84% of respondents locate electronic resources through using search engines or via Internet-based personal communication. It is assumed; however, that results of this study were not necessarily typical due to the information studies based professional experience and background of this group of scholars.

Likewise, in Israel Bar-Ilan, Peritz & Wolman (2003) conducted a questionnaire survey to investigate the use of e-journals and web-based databases by academics at Israeli universities. The findings indicated that the majority of the respondents use web-based databases (73%) and e-journals (60%). In a finding that has been replicated in other studies, respondents reported preferring to use e-journals rather than print journals. Findings also indicate unbalanced disciplinary differences with the use of e-journals and databases, with less use in the humanities than other disciplines.

Studies have also been undertaken in Australia over a number of years in order to explore how academics' attitudes toward the use of scholarly information provided from electronic or digital sources. Examples of these studies are the works done by Applebee, Clayton & Pascoe (1997); Applebee, Bruce, Clayton, Pascoe, & Sharpe (1998) and a more recent study conducted by Genoni, Merrick & Willson (2006). Each of these studies investigated the use of the Internet and library services and their applications in an academic or research environment. The research conducted by Genoni, Merrick & Willson (2006) in 2004 at Curtin University of Technology (Perth, Western Australia) is particularly relevant to the current research as Curtin University was also used for the document availability test to be reported in Chapter 5 of this research. The researchers undertook a questionnaire survey that attracted 246 responses from research staff and students of the university. The survey charted the heavy use of various Internet based content and services in addition to those specifically sourced from the University's library. Respondents reported positive outcomes from their use of digital library services in terms of their research productivity; exposure to research literature; willingness to contact researchers and

be contacted by them; and engagement in collaborative projects. The research also indicated that although personal visits to the library had declined for many users (52.2% of respondents), that there was nonetheless an increase in the use of library collections and services (62.5% reporting increased use). Additional detail from this survey will be reported in Chapter 6 for comparison with the survey conducted at Yarmouk University.

The research literature consistently reports on a narrow range of barriers facing university libraries and academic staff in developed countries for the implementation of digital libraries. These barriers notwithstanding, the academic libraries of Australia and other developed countries are potentially major contributors in closing the digital divide. Libraries do this both by facilitating access to internationally-sourced digital content and in creating digital repositories of locally-sourced information. The literature identifies several key roles that digital libraries can play in closing this divide. However, the studies conducted in Australia and elsewhere indicate some barriers, including lack of time and heavy work-loads, and some respondents also report that they lack sufficient training.

### **3.4.3 Digital libraries and scholarly communities in developing countries**

Although studies based on the role of digital libraries in developing countries are a relatively recent development, they generally indicate that there remains a significant gap in the extent to which Internet and other digital content is used when compared to developed countries. Also, it should be reiterated that the result of the studies in the developing countries may vary according to the state of their development. For example Middle East and Asian countries are likely to report greater levels of Internet use than many African countries, but even within regions there are discrepancies.

One of the problems that developing countries, including the Arab World, are facing is that research scholars are not producing adequate or accurate research to meet the communities' needs to develop or improve their social and economic development

(Meyyappan, Chowdhury & Foo, 2000). Currently many institutions in developing countries cannot afford to build and maintain adequate traditional (i.e. print-based) libraries in support of research and scholarship. In other words libraries in developing countries until 1991 were in the process of using CD-ROMs, and other information technologies. However, many encountering problems due to lack of networked databases, lack of strategic automation plans, and the ineffectiveness of library education to deal with modern technologies and pointing particular the lack of infrastructure.

Gbaje (2007) discussed the challenges of developing digital libraries for universities in Nigeria. The researcher indicated that the main problems with the country's growing number of universities was the severe shortage of funding as the result of which the libraries suffer from problems including lack of training programs, poor national information services, insufficient software and hardware, and inadequate infrastructure for the support of high-speed computing needs including Internet access.

Recent years have witnessed the emergence of initiatives to address the deficiencies in library collections of developing countries, some of which are potentially highly advantageous to researchers and scholars in the developing world. This has included the implementation of digital library services as a means of reducing the need for large-scale funding of traditional library collections. Okoye (2008) described how academic libraries in Nigeria have commenced providing universal access to digital collections and services, and argued that;

The emergence of information and communication technology has repositioned the frontiers of academic library resources, operations, and services as well as expectations of user groups. The practice of walking to the library to consult the card catalogue and browse the shelves is moribund in developed countries, and this trend is quickly approaching developing countries as well. Academic libraries must embrace this scenario. (p.4)

After the 1996 Asian economic crisis, state university libraries in Indonesia commenced new forms of collaboration, including co-operative acquisition, using emerging technologies to create web-based union catalogues, publish electronic journals, and encourage networking (Ramzan, 2004). For example, the Digital Libraries in Indonesia project is a voluntary initiative to manage the Indonesian intellectual capital owned in electronic form and to make it available on the Web. This initiative arose after the team developed in 2000 a Web site for using the CDS/ISIS database software, which became the basis of the Indonesian Digital Library Network (IDLN), which focussed on sharing local content 'such as students' final projects, theses, dissertations, research reports, heritage, and regional influences' (Sulistyo-Basuki, 2004, p.2). An example of libraries in addressing the digital divide is the efforts of Indonesian librarians in establishing the Indonesian Cyberlibrary Society (ICS), a virtual discussion forum for Indonesian librarians, created in order to foster and support the distribution of e-book content of Indonesian origin within Indonesia (Ramzan, 2004).

Likewise, Malaysian librarians have made similar efforts to use digital library and Internet services to proactively address information deficiencies. The attempt in Malaysia to overcome the digital divide commenced in the late 1980s by establishing a national online database populated with local content. According to Ramzan (2004), 'Its national networking system enables resource sharing among libraries and provides access to different databases through the Internet' (p. 275). Through this network databases provided by the major libraries in Malaysia are searchable through the Internet (Ramzan, 2004).

According to Haider (1998) and Ramzan (2004) ICTs were first used in libraries in Pakistan at the Scientific and Technological Information Centre (STIC) in 1968 to produce the country's first union catalogue of scientific periodicals, followed by the automation of libraries of agriculture universities and research centres. The year 1992 was important in the implementation of library automation in Pakistan when the country's telecommunication sector started to overcome the barriers to the use of ICTs by expanding its services with five computer-training centres being established for working librarians. About twenty university libraries were quick to implement Internet use for various library functions. The government encouraged institutions to

automate their libraries, provide Internet access, and acquire digital and multimedia content. Recently, Ameen (2008) discussed the collection sharing and role of librarians in overcome of barriers, the results indicated that the librarians aware for the importance of cooperation between libraries will help to overcome the technical, procedural, and behaviour barriers. In addition Amiree & Khabbazan (2009) and Ebrahimi (2009) reported that the use of ICTs in higher education changed the role of librarians in overcoming the distance education barriers and improving the instruction in the use of libraries and retrieval of information. Some of the important impacts and issues include:

- Virtual institutions providing more convenient and rapid services for students.
- New relationships and communication between teachers, students, and librarians.
- Librarians in digital libraries having greater responsibility in offering services for learners.
- Librarians needing to acquire new skills in technology use in order to provide better services.
- Libraries needing to develop new paradigms for user services.

In addition, other studies undertaken relevant to developing countries (Dhanavandan, Esmail & Mani, 2008; Dastgerdi, 2009) have stressed that the role of librarians in the age of digital knowledge has changed, and requires greater effort and the increased acquisition of new skills in order to effectively use ICTs in order to improve the resources and services to meet the needs of users.

#### **3.4.4 Digital libraries and scholarly communities in Arab countries**

The important role of university-based digital libraries in higher education and scholarly communication in developing countries includes countries of the Arab World. As noted previously, however, there are particular aspects of the development experienced in this region that make it different in nature from other developing countries, particularly those that are sometimes described as comprising the ‘Third world’.

Academic libraries in Jordan began to change their emphasis from collecting and disseminating information in printed form to providing access to digital content, as early as the mid-1980s (Younis, 2005). First local area networks were developed, and by 2000, online databases, with the Internet as the prime gateway were in place (Yarmouk University website, 2007). Today, all academic libraries in Jordan are computerised and provide services such as OPACs, Internet access, access to e-journal databases and online searching.

Other Arab countries also started using computers by the end of the 1980s, and library based technologies soon followed. In Saudi-Arabia, for example, cd-rom technology was introduced during the early 1990s, followed by the Internet and local area networking in specialist and academic libraries (Al-Zahrani, 2000). Syrian libraries entered the Internet era in 1998 when Al-Assad National Library allowed visitors to use the Internet and made its catalogue available on the Internet (Askhita, 2000)

For other countries in the region, information regarding the beginning of digital library services is less available. However, in countries such as Yemen, Egypt, Oman, and United Arab Emirates, reports from 1999 to 2001 indicate that use of the computer technology by academic staff for scholarly purposes varied from a high of 60% in Egypt, to 15% in Yemen (Abdullah 1999; Jirjees & Nashir, 1999; Boumarafi, 2001; Hamshari & Bu-Azzah, 2001). In Iraq and other states of the Gulf region, where the benefits of oil revenues have not been as strong as elsewhere, the amount of foreign currency income has been insufficient to fund the development of a modern information infrastructure, and consequently, the implementation of new library technologies has also been slower.

Linked to the implementation of ICT is the utilisation of the technology to promote, fund, and encourage digital libraries for scholarly work. From the literature around the turn of the century, the statistics on the use of ICTs across the region is revealing. In Yemen Jirjees & Nashir (1999) found in a 1998 survey of university academics in Sanna City that 85% of the respondents had not used the Internet at all. Of the respondents who had used the Internet, the most frequent uses reported were for e-

mail and information access. Likewise, Hamshari & Bu-Azzah (2001) at Sultan Qaboos University in Oman found very low use of the Internet (37%) among academic staff. Interestingly, academics working in science disciplines reported higher use than their social science colleagues, and e-mail was the service most frequently used. Boumarafi (2001) after conducting research at Al-Sharjah University in the United Arab Emirates, also reported similar very low rates of Internet use by academic staff. There were higher rates of usage reported in some studies conducted at this time, including a usage rate of 60% of recorded at the University of Cairo by academic staff (Abdullah, 1999), and a positive response and uptake amongst library staff for work related uses in Saudi Arabian academic libraries (Al-Zahrani, 2000). This latter study, however, also pointed out a barrier to usage in the lack of training, and it was reported that less than half (48%) of survey respondents had sufficient skill to make effective use of the new technology.

Subsequent studies indicate that the situation regarding IT use and the development of digital libraries has improved in the region, although the improvement could be described as gradual rather than rapid. A study by Ibrahim (2004) investigated the use of electronic resources by United Arab Emirates University academics. The findings—from 125 respondents from a total academic staff of 560—revealed that the most frequently used electronic library service was online reference work, followed by e-journals, then web-based catalogues and, less frequently, bibliographic databases. Generally, academics of science disciplines indicated higher use than their humanities and social sciences colleagues. Most academics stressed the importance of electronic resources to their research and other academic activities. Bin-Alsabti (2003) investigated networked communication and electronic exchange of information for 160 of 1773 academics at Mentouri University of Constantine. Respondents continued to prefer traditional methods of communication more than electronic methods, although 60% used networked methods of communication. When respondents were asked about the reasons for the use of networked communication, the majority (53%) indicated exchange of information, ahead of updating and improving knowledge (22%), indicating that they were slow to realise the research potential of the technology. A study at Cairo University and Ain Shams University in Egypt (Abdulaziz, 2005) investigated the impact of the Internet on social science academics. Half of the respondents reported having a connection to the

Internet at home, while less than 15% had personal connection at work. Participants' use of the Internet was mostly for research and e-mail, but some 60% of the respondents used the Internet less than 10 times per month.

More recently, Al-Ansari (2006), at Kuwait University, explored the Internet sources used by academics; the impact of the Internet on both teaching and research, and the common problems that academics encounter using the Internet. The greatest number of respondents (47%, n= 67) had been using the Internet for 6 to 10 years. Surprisingly, nearly 7% (n=11) of the respondents reported no use of the Internet or computers in general. All non-users were from humanities and social sciences disciplines, and seven were nationals of Arab countries other than Kuwait. The most frequently reported reasons for using the Internet were, 'to send and receive e-mail' (94%); 'to look for information for my research' (89%); for research related publishing (85%); and for teaching related uses (70%).

Al-Aufi (2006) undertook a survey of academic Internet usage (including library-based services) at Sultan Qaboos University in Oman in late 2004. The 287 respondents reported that the use of email was high (88.7% reported 'weekly' or 'daily' use), as was the use of Internet search engines (85% weekly or daily). The use of full text sources was less prevalent, with e-journal use reported by 48.4% on a weekly or daily basis, and for 'full-text sources other than e-journals' 50% reported weekly or daily use. The level of little non-use was also interesting, however, with 13.9% indicating they 'never' or 'rarely' accessed e-journals, and 14.8% never or rarely using 'full-text sources other than e-journals' (p. 140).

Al-Aufi also quizzed respondents as to their reasons for using the Internet for certain scholarly communication activities. Informal scholarly communication was important with respondents corresponding with colleagues at the same institution (54.8% 'frequently'); globally (36.9% frequently); within other Arab states (13.1% frequently); and at other institutions in Oman (13.5% frequently). Information gathering related to research was also important, with 86.3% indicating the 'occasionally' or 'frequently' use networked information 'to keep current in an area of research' (p. 141).

The literature consistently suggests there are a variety of barriers facing university libraries and academic staff in the Arab World when it comes to the implementation and use of digital library services. In Jordan, the range of reported barriers include lack of technically-trained staff; insufficient funding; users' unfamiliarity with new forms of catalogues or databases; a lack of skills or knowledge of search strategies for electronic information; administrators' resistance to change; and expensive computer systems (Younis, 2005).

Another major barrier identified is the lack of supporting information infrastructure that might be provided by other research libraries (i.e. national libraries or libraries serving government departments). Without the support of such libraries academic libraries are often relied upon to develop collections and service beyond those required to meet the needs of their immediate academic community. For an academic library this might mean their digital content may need to represent all a country's languages, and be relevant to minorities and disadvantaged groups, including the illiterate and newly literate (Fahmi 2002; Blandford, Cunningham & Gwo, 2006; Nicholas et al, 2006). Language has also been reported as a barrier to effective use of the Internet and digital library services, with those who know less or no English reporting lower rates of use (Ramazan, 2004).

Al-Aufi's research at Sultan Qaboos University in Oman (see above) included an investigation of respondents' attitudes towards their networked (digital) library services. While the respondents seemed satisfied that the librarians were 'very collaborative or helpful' (69.3% agreeing or strongly agreeing), they were less positive about particular aspects of the service. For example, 41.7% agreed or strongly agreed that they were 'overall satisfied about the networked information services facilitated by the library', and 30.7% agreed or strongly agreed that the 'availability of networked information at the library is sufficient'. The lack of library-initiated training or promotion also seemed to be a problem with a very low 22.8% agreeing or strongly agreeing that the 'library invites me to attend sessions on networked information' (p. 143).

The Sultan Qaboos University respondents also indicated some dissatisfaction with the general availability of digital content, with 29.1% indicating some level of

agreement with the statement that, ‘Electronic journals in my field are adequate and useful’, as compared to 47.9% who registered their disagreement (23% neutral) (p. 143). This dissatisfaction appears to be possibly the result of the lack of Arabic, with 66% reporting they do not use Arabic e-journals, and 59.3 that they do not use other full text Arabic resources (see section 3.4.1 above for further discussion of the responses in this survey dealing with issues relating to language).

These various barriers notwithstanding, there are also those who argue that academic libraries of Jordan and other Arab countries are potentially major contributors to overcoming the digital divide. For example, Askhita (2000) advocates that the Arab World should be involved in information production, e-commerce, and the production of local content to ‘Arabitize’ the Internet. He argues that effective use of ICTs can establish local databases, networks for sharing of resources, and information products that could benefit from commercialisation, and suggests that for academic needs to be met digital libraries need to:

- Create connectivity to online users,
- Integrate with existing networks,
- Acquire relevant digital content,
- Optimise the potential of the world wide web as an information source and delivery platform,
- Digitize existing library resources.

In general, these previous studies conducted in the Arab World have indicated low and slowly developing use of the Internet and digital library services. The indicators are that the low adoption of the Internet and electronic information might be due to a variety of factors. The lack of technology and associated infrastructure has been an issue—in some countries more than others—but there are also indications that the lack of institutional support, lack of a mature research culture, inadequate training, and inability to access relevant content, have also played their part.

### **3.4.5 The role of the Internet and digital libraries in bridging the digital divide**

There has been debate as to whether digital content as provided by libraries can help bridge the gap between information rich and poor, or whether it will simply widen the divide (Witten et al, 2002). Certainly many governments concerned about social inequalities in their own countries have expressed positive views about the ability of digital libraries—or other providers of access to digital content—to enhance equity of access to information and thereby help address the localised digital divides. In such circumstances digital networks and access points are developed and strengthened in various sectors (i.e. educational, business, domestic) to support the building of various forms of National Information Infrastructure (Urs, 2001).

Libraries are not, however, the only possible providers of such services, with Jordan being an example of one of many countries that has established forms of ‘telecentres’ to help provide widespread availability of access to digital services. The potential for libraries to assist in narrowing the digital divide depends on factors such as their primary orientation (i.e. educational, national, public), the resources placed at their disposal, and their location and influence within the system of knowledge production and distribution. Libraries in developing countries may also experience an acute shortage of appropriately skilled librarians and IT staff which will hinder their contribution to bridging the digital divide (Lor, 2007b)

Librarians have a long established interest in overcoming the information divides within their communities and therefore have argued that an interest in bridging the digital information divide is a natural progression of this professional challenge (Calvert, 2002; Lim, 2005; Durranc and Fisher-Pettigrew, 2003). The International Federation of Library Associations (IFLA) has consistently reaffirmed the role of libraries in social development, stressing the profession’s engagement with public education and research. IFLA leadership has highlighted the range of roles for libraries and librarians in assisting global development by improving literacy rates, dealing with intellectual property matter to assist the free flow of information, and bridging the digital divide (Gelfand, 2004).

In the context of a developing country, Lim (2005) has described the implementation of policies within India designed by government to reduce the country's digital (and social divide) divide between urban and rural communities. This has been achieved by initiatives aimed at building the digital services capacity for public libraries, schools, and rural health clinics. The Indian example is relevant, in that in terms of addressing the internal digital divides it is likely to be public libraries, and to a lesser extent school libraries, that are at the forefront of government initiatives. It is these libraries that are best placed to provide some equity of access to individuals who might otherwise be deprived due to their social and economic circumstances. The situation is different, however, when it comes to addressing the global inequalities in access to digital content and services, when the responsibility is more likely to fall on national or academic libraries (Lor, 2003). It is these libraries that play a part by not only providing access, but by creating and building content that in turn becomes a component of the scholarly systems of research and knowledge generation that are the true incubators of development. It is to libraries with the capacity to engage in knowledge and content creation that librarians from developing countries have turned their attention when discussing the global digital divide.

For example, Omekwu (2007), writing from Nigeria, has claimed that, 'The central challenge for librarians from developing countries in the digital age would be to bridge the digital divide' (p. 859). He has discussed the various strategies by which they can achieve this aim while emphasising that;

If librarians fail to advance their national information resources into the cyberspace, mere internet connectivity will only make them strangers in the information superhighway. The unenviable consequences would be the widening of the digital divide between North and South. (p. 857)

Also writing in an African context of the 'north-south divide in scholarly communication', Lor (2007a) has argued that;

. . . the Knowledge Society only dawns in a country when its scholars are not merely users of imported knowledge, but themselves contribute to knowledge creation. This implies active

participation in scholarly work, not merely absorbing knowledge produced elsewhere. (p. 305)

Lor proceeds to describe, and advocate for, the important role that libraries play in building and sustaining the content sources that result from the creation of knowledge. These roles he describes as selection, acquisition, perseveration, integrated access, dissemination, information literacy education, and user support (p. 309). Lor argues that both digital and print sources will remain critical to attempts to bridge the digital divide, and concludes that there is a need for ‘greater awareness of the continuing central role for academic and research libraries, whether digital or hybrid’ (p. 311).

Recently, Iranian authors Aqili & Moghaddam (2008) have considered the role of libraries in bridging the digital divide in developing countries, and concluded that ‘librarians and information professionals can play a vital role in making information accessible, bridging the digital divide, or at least diminishing it via their information services’ (p. 228). They also note (citing Lor, 2003) that one of the ways in which libraries can achieve this is by, ‘Adding to the critical mass of national content on the Internet’ (p. 232).

Aqili & Moghaddam also stressed that the digital services alone can bridge the digital divide. They concluded by stressing the ‘economic, social, political, and cultural’ (2008, p. 235) requirements that must be met if this goal is to be achieved. Certainly this is true, not only of Iran, but also its near-neighbour Jordan. Despite the intentions and policy of government, Jordan and other Arab countries are frequently constrained by conservative bureaucratic cultures that pay little heed to the value of information. Citizens still find it difficult to obtain data from government institutions that are troubled by a lack of technological sophistication; inappropriate systems; unreliability of telecommunications, and insufficient maintenance of equipment. Similar problems are frequently manifested in the library and information sectors, that also remain hamstrung by a lack of depth in collections; difficulty in acquiring relevant local content, and a shortage of competent information professionals. Needless to say these problems are all impacting on the development of academic digital libraries and their capacity to tackle the global digital divide.

In such circumstances digital libraries in developing Arab countries face great challenges in meeting the expectations of government, and of their own profession, in implementing library services up to the standard of developed countries. That they have access to the necessary ICTs is of course critical, but they also require a wider culture of excellence in higher education and research, and an understanding that Arab scholarship has quite specific content requirements if universities in the region are to reach their potential.

### **3.5 Summary**

The literature review in this study was conducted in order to provide background data and information relevant to the current research—with a focus on the role of digital libraries in bridging the digital divide in academic environments—and in order to assist in developing the research methods and instruments to be used in the research. The review has identified a number of recent and relevant studies regarding academics use of the Internet and digital library services in developing countries, and discussed how these might be related to the broader literatures dealing with the global digital divide and social, cultural and economic development. There was also a particular consideration of some of the literature relating to languages and Arabic on the Internet, with a view to designing research instruments which considered, *inter alia*, the role of Arabic as a scholarly language in the digital context.

Relevant to the current research is that although there is some recent commentary and discussion regarding the role of libraries in addressing the digital divide, there is little empirical research which has attempted to address the issue of measuring the divide or establishing its characteristics. This is true for developing countries in general, and particularly for the developing Arab countries. Indeed much of the literature reviewed has indicated that extent to which it is difficult to generalise about developing countries, plus the degree to which the literature of the digital divide has tended to focus on those parts of the world in the greatest need.

There is, however, sufficient previous research related to digital service in the developing Arab World to provide some context for the current research, while also establishing that this research will make a new and important contribution to knowledge about the localised manifestations of the ‘global’ digital divide, and the potential for these to be addressed by digital library content and services.

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## Chapter 4 Research Methodology

### 4.1 Introduction

This chapter presents and discusses the research methods and procedures used in this study. This includes descriptions of the research instruments, research populations and sampling procedures. The chapter also discusses some issues of data management and analysis, data storage, and ethical matters that were encountered during the research.

Both quantitative and qualitative methodologies have been used in this study. The quantitative methods used included a large scale document availability test (DAT) and a questionnaire survey, while the qualitative method consists primarily of semi-structured interviews. The quantitative methods are important and effective in studying a range of variables in a large number of samples. On the other hand, the qualitative method, which is suited to a detailed study of a small population, is used to examine and confirm the quantitative results. The results from the DAT and the questionnaire indicated that additional investigation was required in order to further explain the results derived from the quantitative techniques.

As discussed in preceding chapters, the study was conducted at Yarmouk University in Jordan. Yarmouk University is considered to be a very advanced educational institution in the Arab World. It has the largest and most advanced library in the Arab world, and was the first university to have a digital database of all journals published in the Arab countries. The academic staff and PhD students at Yarmouk University were the major subjects of this study, which also included government officials and academic librarians.

The study used a DAT to measure the document availability potential of both paper and digital content at Yarmouk University, and undertook a comparison with Curtin University of Technology, Perth, Western Australia. Curtin University

serves as an example of an established university in a developed country of the English speaking world. This DAT served as the basis for a subsequent survey of Academic staff and research students at Yarmouk University, and interviews with academics and library staff from Yarmouk University, plus senior government policy makers of the Jordanian Government. The purpose of both the quantitative and qualitative methods was to measure the existence and extent of the digital divide, and to assess the role of digital libraries in closing that divide.

## **4.2 User studies**

User studies have been widely used in library and information science to derive information from library users that can enhance understanding of how users respond to various aspects of a library's collections and services. Various forms of user studies now constitute a large part of library studies research literature since they first appeared in the late 1940s. From that date, the number of researchers that have relied upon user studies has increased significantly (Siatri, 1999; Wilson, 1994, 2000).

According to Siatri (1999), the early 1960s was the 'take-off' point for user studies. From that time the number of studies increased rapidly, and in the 1970s, user studies flourished and introduced a diversity of target user groups. During this period user studies frequently investigated the use of particular information systems, and how their efficiency and effectiveness can be maximized. The 1980s was a decade characterized by an increasing awareness of the conceptual framework and methodological issues associated with user studies. User studies have continued to be a key research tool in following decades as the establishment and tremendous growth of digital libraries and the Internet have provided researchers with a new basis from which to examine the response of users.

Mick, Lindsey & Callahan (1980) described nearly three decades ago how the behaviourists within the information science community were arguing that ICT innovations have delivered changes in information availability far beyond the capacity of users to adapt. One strand of user studies has therefore been focused on

understanding the ways in which users adapt their behaviours in response to new technologies and content.

As a result, a number of studies investigated issues concerning the role of digital information in the academic environment, and in particular the impact of the Internet on the user and the wider information community. Siatri (1999) concluded that in an era of continuous developments in digital information, including the emerging impact of 'information overload', user studies continue to be a vital tool enabling researchers and information professionals to improve their understanding of information availability, accessibility and use.

### **4.3 Methodological triangulation**

The term 'triangulation' is used to describe the use of multiple methods (both quantitative and qualitative) for data collection, or it can be used to describe two or more researchers using the same methods to check the accuracy of data collected in one form. In either case triangulation is undertaken to improve both the reliability and validity of data (Massey, 2002). Arksey & Knight (1999, p.21) indicate that one data set alone is not as strong as data that are confirmed through triangulation. By undertaking triangulation there is less chance of making errors or of drawing inappropriate conclusions than would be the case if relying upon just one data set. In general, triangulation using complementary and multiple methods for collecting data, helps researchers overcome possible shortcomings, limitations, or deficiencies in any one method and thereby improves the reliability of the overall research process.

Three major methods for data collection are used in this study. Firstly, a DAT relying upon citation checking in the catalogue and databases of both Yarmouk University and Curtin University of Technology and the Internet was completed. Secondly, a questionnaire survey was sent to a large sample of academics at Yarmouk University; and thirdly, semi-structured interviews with a number of participants who had responded to the questionnaire survey and self-nominated to be available for interview. In addition senior government policy makers and senior

librarians were also interviewed. Each method yielded important independent data, but the findings of the study are the outcome of the effect of triangulation achieved when the three methods are combined.

These three methods of data collection were preceded by a broadly based review of the literature relating to the research question and objectives of the project.

#### **4.4 Reviewing the literature**

An extensive review of the previous literature was undertaken with a focus on the role of digital libraries in overcoming the digital divide in the academic Arab environment. A second important element of the literature review was the role of the Arabic language on the Internet and in the wider digital environment. The researcher used relevant key word, title and author searches to retrieve a large number of resources related to this study. The retrieved items included books, articles, conference proceedings and papers, theses, and other published and unpublished studies related to the digital divide, digital libraries, citations studies and document availability testing, and the role of language in the use of the Internet.

Inter-library loans and document delivery services were used to retrieve required items when necessary. A range of databases including *ProQuest*, *Science Direct*, *Library and Information Science (LISA)*, *Information Science Abstract (ISA)*, *Educational Resources Information Centre (ERIC)*, *Web of Knowledge* and other sources were thoroughly searched.

Generally it was found that research literature concerning the role of digital libraries in bridging the digital divide in either academic or public environments is surprisingly limited, with of course only a small subset of this literature dealing specifically with the situation in the developing Arab countries of the Middle East. In presenting the results of the literature review in Chapter 3 the researcher divided the coverage into three sections. These are digital divide, digital libraries, and the place of language on the Internet. This division helps to make clear the nature of

the research problem and identify the shortage in the existing literature—particularly the Arab based literature—relating to the research topic. The literature review also provided important information that assisted in designing the document availability test, questionnaire survey and the semi-structured interviews.

#### **4.5 Qualitative and quantitative methodologies**

According to Neuman (2003) quantitative methods are very useful in assisting planning prior to qualitative data collection and analysis, because they provide tools for measuring concepts, helping with the design of the qualitative stages, and for dealing with sampling issues.

Many researchers have discussed the relationship between quantitative and qualitative research. Denzin & Lincoln (1994) highlight issues regarding the relationship between quantitative and qualitative research. Quantitative inquiry, for them, may be described as the objective analysis of cause and effect that arises out of the relationship among independent and dependent variables. Qualitative inquiry, on the other hand, is concerned with the process of ‘how’ things happen. Qualitative researchers want to understand the nature of a phenomenon, with that nature not being separated from the social context that influences it. Berg (1998) argues that the social sciences, despite their qualitative beginnings, have developed a preference for quantitative research methods. Qualitative research requires the researchers to ‘get close’ to the participants being investigated, to be an insider. This view is different from quantitative research. By becoming an insider and getting close to their participants, the qualitative researchers can view the world as participants in a particular setting (Bryman & Burgess, 1999).

Padgett (1998) characterises quantitative research as using numerical data and a closed system. In contrast, qualitative research is differentiated by its use of non-numerical text. It seeks to discover, not to test explanatory theories, using an open system and thick description. However, there are similarities between qualitative and quantitative research, in that both are empirically based on first hand

observation and data collection, and may be used in scientific enquiry. Qualitative and quantitative methods are systematic and can be done randomly.

According to Richard & Grinnell (1988, p. 195) ‘quantitative methods are probably most useful when we have extensive prior knowledge of the culture and environment in which our study will take place’. They added that ‘qualitative methods are more suitable when we are entering relatively unfamiliar social system’.

**Table 4.1: The Distinction between qualitative and quantitative research methods (Padgett 1998, p. 3).**

<b>Quantitative</b>	<b>Qualitative</b>
Deductive	Inductive
Scientific Method	Naturalistic
Controlled Conditions	Uncontrolled Conditions
Closed System	Open System
Particularistic	Holistic; Thick Description
Stable Reality	Dynamic Reality
Standardized Data Collection Instruments	Researcher as Instrument of Data Collection
Categories Precede Data Analysis	Categories Result From Data Analysis

In order to answer the research question set for this project, neither approach alone was sufficient. Quantitative data was required in order to discover, explain and examine the research variables; and qualitative data to describe the experiences of the individual research participants from their perspectives and experience. The methodology of this research is therefore based on both quantitative and qualitative approaches, using three distinct methods to collect the data that would form the basis of the analysis.

#### **4.6 Document availability test**

It was first necessary to devise a method of addressing research objective 1; that is, to measure the extent of the digital divide as it applies to Yarmouk University. On

the basis of the literature review conducted to date it was hypothesised that a measurable effect of the digital divide will be found if the availability of scholarly content available at Yarmouk University was compared to that available at a university in a developed country. The need for a control study arises because any discussion of the 'digital divide' implies a comparison between the advantaged and disadvantaged. Curtin University of Technology is taken to be representative of a mid-ranking university in a developed country, offering a modern and integrated digital library service to a student population slightly larger than that of Yarmouk University.

The method used to test for the 'reality' of the digital divide at Yarmouk University was a document availability test (DAT). The instrument used was a modified version of the DAT as developed by Lancaster (1993), which was in turn based on previous studies in document availability and delivery undertaken by Gaskil (1934), and Orr & Schless (1972). More recent DAT based research includes Hawkins (2001) and Chiweza (2005). Elements of the DAT methodology used in the current research are, however, entirely original.

Some innovation to the DAT method was necessary in order to adapt the test to the particular requirements of the research; that is, to test for the existence of a digital divide between a developed and developing country. In order to understand the extent and nature of the divide necessitated the use of two samples; one to test for differences in the capacity to supply international scholarly content; and another to test for differences in the availability of 'local' content. More detail is provided later in this chapter.

Amendments to standard DAT procedure were also required of the current study due to the different technological environments in which the tested libraries now operate when compared to pre-Internet document availability tests. The earlier studies referred to above were undertaken before the advent of the Internet and digital libraries, when the presence of an item within a library's 'collection' could be easily deduced. However the prevalence of leased and freely accessible digital content in the libraries included in the DAT for this study necessitated a revision of the definition of a 'library collection'.

For the purpose of this study an item was deemed to be in the collection of the library if it was listed in the library catalogue and with access provided to a physical or digital copy of that item, or if it could be freely accessed from an Internet website from the library or within the immediate vicinity. Items that could be provided by the library but at additional cost associated with acquisition and delivery of that item (i.e. inter-library loan or commercial document delivery) were deemed *not* to be in the collection of the library.

The Google and Yahoo search engines were used to test the availability of items on the Internet. Google and Yahoo are available at both of the universities, with both being widely used at Yarmouk University, while Google is apparently more commonly used at Curtin University. As different search engines have differing capabilities to retrieve particular items from the Internet, a bias could have been introduced had different search engines been used to test sample items in each library. The researcher was also aware that complete retrieval of information items on the Internet is unattainable, as even the best search engine would retrieve less than 100 percent of all information items available on the Internet. The dual use of the two most widely used search engines was, however, considered more than sufficient to replicate the likely Internet search habits of the users of the two libraries and thereby provide an adequate test of their capacity to retrieve the sample items.

The criterion used in this study for determining availability on the Internet is retrieval of the full text version of the items in the samples list, without cost. For this purpose ‘full text’ could refer to a complete version of an article in any widely available format, such as Word or PDF. The items that were retrieved in full text were then categorized according to the type of website (for example, a personal website maintained by an author or an institutional repository) from which these sources were retrieved.

It was also understood that the technical infrastructure that a digital library depended on could itself be a restraint to the library’s ability to access Internet-based items. For example, if the Internet was ‘too slow’ then users would simply

cease depending on it as a source of information and use some other method of locating and retrieving material.

### **4.6.1 Sample**

The DAT was based on an analysis of the availability of three samples of randomly selected citations drawn from academic journals.

*Sample 1:* 500 citations drawn from international journals to be checked for availability at Curtin University of Technology Library, Yarmouk University Library and on the Internet.

*Sample 2:* 250 citations drawn from Australian journals to be checked for availability in the collection of Curtin University of Technology Library (in either print or electronic format) and on the Internet.

*Sample 3:* 250 citations drawn from Arabic language journals published in Jordan to be checked for availability in the collection of Yarmouk University Library (in either print or electronic format) and on the Internet.

Sample 1 (international items) were used to *directly* compare the availability of the same ‘international’ items at the two universities. Samples 2 and 3 were used in order to *indirectly* compare the capacity of the two universities to provide researchers with access to items of particular national or regional interest, and was necessary in order to test for differences in the availability of items in Arabic and English.

For the purpose of a DAT, a sample population of 750 items (for each library tested, and 1000 items in total) is more than sufficient to assess the capacity of a library to provide access to selected documents. Steynberg (1995) constructed a sample of 307 citations published in 1989 to test the delivery of biomedical journals in South Africa. The availability of each article was determined at each of seven medical library sites to evaluate the availability of local content in the biomedical journals for South African researchers. The researcher tested each item individually in the

collection to affirm the availability of the journals. Orr & Schless (1972) used a sample of 300 items to test the document delivery of US Medical Libraries. Penner (1972) used 296 sample items in the field of library and information science to test two libraries. More recently, Chiweza (2005) constructed a citation of 300 items in agriculture, economics and health to test the document delivery of journals at the University of Malawi. In this research a population of 750 sample items for each library is therefore considered adequate to test the comparative availability of documents in a developed and a developing country.

The DAT results based on this sample will provide quantitative data that will allow an objective assessment of the existing state of the digital divide as it applies to Yarmouk University.

It should be noted that:

- Journals used for citation selection are leading journals in their field. For international journals these were chosen with the assistance of ISI derived *Journal Citation Reports*. For Australian and Arabic journals other evidence was used to identify appropriate journals.
- In order to ensure a discipline spread, the journals used for harvesting the citations have been drawn from the five areas of economics, humanities, education, engineering technology and information technology. Samples 1 and 2 used 50 citations selected from each of these five subjects, and Sample 3 used 100 citations from each subject.
- Stratified sampling and systematic sampling was used to select the citations used in the three samples.

#### **4.6.2 Sampling technique**

The study used stratified sampling for coverage of the population and systematic sampling in order to determine the sample citations. From the citations of the available issues of journal titles that were selected through stratified sampling, came the total population, also called the  $N$  population. From this  $N$  population, a sample population, known as the  $n$  population, was selected. In this study an  $n$

population of 1000 citations had been decided on. A desired sampling fraction was calculated using the formula (let  $k=N/n$ ) and every  $k$ th member of the  $N$  population is selected as a member of the sample population beginning from any number between 1 (one) and  $k$ .

#### **4.6.2.1 Selection of international journals**

The DAT was based on a stratified sampling of citations that would form the basis of an assessment of the difference in information available to users of academic libraries in developed western, and developing Arab, countries. Stratified sampling reduces the total quantity of required measurements which in turn means saving time, cost, and effort (Wunderlich, Wenisch, Falsafi, & Hoe, 2004). The stratified sampling technique had several stages to select the items of sample citation as, the follows. The stratified sampling method was used to select sample citations from journals covering the literature of disciplines that are relevant in both developed and developing countries. The disciplines (subjects) had to be offered for study at both Yarmouk University and Curtin University of Technology to ensure that there was likelihood that they would be included in each library's collection. The subjects selected were;

- Education,
- Economics,
- Engineering,
- Information technology,
- Management.

The second step in the stratified sampling was to determine the journals from which the population of citing articles would be drawn. It was decided that in order to increase the possibility that these citing articles might actually represent a search done by a library user, then the citing articles should be drawn from high impact or established journals in the chosen disciplines. A journal's 'impact factor' refers to its influence and importance within a particular discipline. To determine the impact factor for international journals this study used the Science and Social Science editions of *Journal Citation Reports* (2006) published by the

Thomson Scientific International Science Institute (ISI). The *Journal Citation Reports* provide a bibliometrical analysis of journals included in the ISI database. *Journal Citation Reports* is the leading international source of citation data for journals, with a set of quantitative tools for ranking, evaluating and comparing journals back to 1900. It provides impact factor assessments for nearly 22,000 of the world's leading journals.

The third step was to choose the particular journals from which the sample items would be selected for the test of international journals. The *Journal Citation Reports* ranks journals within branches or subcategories of a broad subject. It was decided that the selected journals had to be accessible to the researcher in the libraries at Curtin University of Technology Library and Yarmouk University Library during the time of study. If the number one or next ranked journal was not available in Curtin University of Technology Library, then the next ranked journal title available was selected, until five journal titles had been selected. The same process was followed in Yarmouk University Library. See Table 4.2 for a full list of the selected international journal titles and their 2006 ISI rankings.

**Table 4.2: A summary of selected journal titles (international sample)**

<b>Title of Journals</b>
<i>Academy of Management Perspectives</i>
<i>American Journal of Speech-Language Pathology</i>
<i>British Educational Research Journal</i>
<i>Canadian Journal of Civil Engineering</i>
<i>International Journal of Computer Vision</i>
<i>International Journal of Electronics</i>
<i>International Journal of Human Resource Management</i>
<i>Journal of Evolutionary Economics</i>
<i>Scandinavian Journal of Statistics</i>
<i>Trimester Economico</i>

#### **4.6.2.2 Selection of national journals**

A different method needed to be used for selecting the populations of Australian and Arabic journals as the *Journal Citation Reports* does not offer reliable coverage of these titles. In these cases the researcher selected the journals based on different criteria, including the period of time for which a journal has been published; the approximate frequency of citation to a journal established by scanning selected articles in the chosen disciplines; and a journals reputed eminence within its discipline.

**Table 4.3: A summary of selected journal titles (Australian Sample)**

<b>Title of Journals</b>
<i>Australian Journal of Education</i>
<i>Australian Journal of Language and Literacy</i>
<i>Australian Literary Studies</i>
<i>Journal of Australian Studies</i>
<i>Labour History</i>

**Table 4.4: A summary of selected journal titles (Jordanian Sample)**

<b>Title of Journals</b>
<i>Abhath Al-Yarmouk</i>
<i>Almanarah- Al-Albayt University</i>
<i>Derasat- University of Jordan</i>
<i>Journal of Irbid University</i>
<i>Muta'ah for Research and Studies</i>

#### **4.6.2.3 Systematic sampling**

The first step in the systematic sampling of citations was to establish which articles within the selected journals would be selected. Beginning from the first article in the most recent issue of the chosen journal title, every fifth article was selected, counting from the first article in the most recent issue available in the respective libraries at that time.

The journals had to be available in the collection of Curtin University of Technology Library for the international and Australian samples, and in the

collection of Yarmouk University Library for the international and Arabic samples.

The second step was to establish which citations from the list of references (bibliography) for each selected article would be sampled. Since (for the national journals) 250 citations were required, it meant that 50 citations would be selected from each of the five journals. Using the formula ( $k=N/n$ ) for each subject area, 250 citations (the  $N$  total per subject) were divided by 50 citations (the  $n$  population per chosen journal title) and  $k$  was found to be equal to 5. Therefore, every fifth citation was selected, beginning with the first citation in the first article of the most recent accessible issue. If, by using this method, the first five sampled articles did not produce the required 50 citations, this method of selection was continued to include however many articles were necessary. Using this method for each of the chosen subjects, 250 citations were sampled from the Australian journals to be checked for availability at the Curtin University of Technology Library; 250 citations were sampled from the Jordanian journals to be checked for availability at Yarmouk University; and 500 items were selected from the international journals to be checked at both universities.

The 1000 samples were numbered according to the following pattern:

- From 1 to 250 were the Australian citations,
- From 251 to 500 were the Jordanian citations,
- From 501 to 1000 were the international citations.

Each number thus allocated became the 'sample number' for that particular citation.

### **4.6.3 DAT Instrument**

As noted above, the exact details of the methodology used in DATs vary from one study to another depending on the objectives of the research. The design of the DAT in this study was influenced by the specific objective that sought to assess the availability of the digital sources of the two libraries being surveyed in order to

measure the extent of the ‘divide’ that exists between Arab developing countries and the developed western countries.

A data sheet shown in Appendix G was developed by the researcher to collect and record the information regarding the availability of selected items from the libraries. The datasheets were divided into three main sections as follows:

- The first section recorded the unique identifier (sample number) allocated to each item included in the DAT. It also recorded the relevant bibliographic details of each item, including the name of the author, title of the publication, publication details (for example volume, part and page numbers for journal articles; and name of publisher and place of publication for books). The date of publication was also recorded. All the variables were coded as ‘ID’ from ‘ID1 to ID6’ as shown on the data sheet in Figure 4.1,
- The second section of the datasheet recorded additional characteristics of each item, including the language of publication, the source of the item in terms of the three selected samples of source items (i.e. international journals; Australian journals; Arabic journals), and the form of publication (i.e. journal article, book, website or conference paper). These characteristics were coded as ‘IC’, from ‘IC1 to IC3’.
- The third section was used to record the availability of the cited item in the catalogues of Curtin University and Yarmouk University, and the form in which the libraries made an item available (print or digital). The availability (or not) of an item from a free website was also recorded. The data in this section was coded as ‘IA’, from ‘IA1’ to ‘IA4’.

#### **4.6.4 Procedure**

The diagram below (Figure 4.1) shows the data gathering and analysis procedure employed when undertaking the DAT. The procedure follows a dual direction that starts with the question on the availability of an item in the catalogue of the libraries. If ‘yes’, the next task is to establish whether the item is available in the physical (print) collection of the libraries, and/or whether it is part of the libraries



- Datasheet number 1 to 250 represented the sample items searched in the Curtin University of Technology Library,
- Datasheet number 251 to 500 reflected the sample items searched Yarmouk University library, and
- Datasheet 501 to 1000 is for the sample items searched in both the Curtin University of Technology Library and Yarmouk University Library.

## **4.7 Questionnaire**

A self-developed questionnaire (appendix A) was conducted. The questions were developed with an emphasis on gathering data relevant to the role of digital information and libraries in bridging the digital divide as it applied to a developing Arab country. A quantitative approach was chosen in order to generate a basic understanding regarding the current use of Internet information and digital library collections and services for the purpose of research and associated academic activities at Yarmouk University. It was assumed that a questionnaire would function in two ways.

- Firstly, it would indicate the respondents' patterns of use of, and attitudes towards, the Internet and digital library collections and services for the purpose of research and scholarly communication at Yarmouk University.
- Secondly, the many variables associated with this research topic can only be appropriately investigated by the use of a questionnaire in which respondents report the demographic data that is essential to developing an appreciation of the different cohorts that form part of the larger populations being studied.

The questionnaire is a research method 'commonly used to determine the present status of a given phenomenon' (Powell & Connaway, 2004, p.83), and librarians have a long history of conducting surveys with the purpose of gaining detailed information about libraries or educational institutions and settings (Busha & Harter, 1980). Busha & Harter described some of the phenomena that are frequently investigated in library and information science research for which a questionnaire would be a suitable instrument for data collection. These include:

- The level of satisfaction of library users or nonusers with a library's collection or services;
- The level of satisfaction with the amount of publicly available information about a library's collection and services;
- The kind of information needed by library users and nonusers, as well as the sources on which people most commonly rely;
- Attitudes and opinions of librarians about their profession;
- What librarians think about their status within the profession;
- Attitudes of students toward library school curricula and education for librarianship in general;
- How well library schools have prepared former students to meet the demands of actual library employment; and
- The degree to which trends, new developments, and innovations are anticipated, accepted, and utilized by librarians (Busha & Harter, 1980, p.55).

Some issues that required investigation in the current study are similar to those described by Busha & Harter as being highly suited to examination by means of a questionnaire. Examples of these issues are the frequency and extent of use of digital information and library services; users' satisfaction with digital information and library services; academics' attitudes to the use of the Arabic language in the digital scholarly environment, and the impact of digital information on research and scholarly communication at Yarmouk University.

#### **4.7.1 Advantages and disadvantages of questionnaires**

Each research method or data collection technique, including questionnaires, has advantages and disadvantages. Recognized authors in research method design for library-related research such as Busha & Harter (1980) and Powell & Connaway (2004) have discussed thoroughly the advantages and disadvantages of questionnaires. Some of the advantages that are commonly cited include the following:

1. More objective than the interviews ;
2. Eliminate interviewer bias;
3. Have fixed content and format and thereby eliminate variations in the process;
4. Make data easy to collect and analyse;
5. Are inexpensive to administer;
6. Can be answered at the time of choosing by the participants;
7. Straightforward to analyse. (Busha & Harter, 1980; Powell & Connaway, 2004; Adomi, Ayo & Nakpodia, 2007).

Powell & Connaway (2004) report that it is relatively quick and easy to collect large amounts of information by using questionnaires, and they are a useful method for investigating the frequency, ease and success of use of services; the relevance of services to users' needs, and shifts in users' attitudes and opinions.

There are, however, several problems with questionnaires as a data gathering device. Some of these problems can result from poor question design. For example, participants may ignore some questions if they are poorly phrased and are misunderstood (for example, use terminology with which the respondent is not familiar). It can also be difficult to obtain a sufficient number of responses to some questionnaires. Adequate response rates are critical to ensuring the reliability of results, but some populations are reluctant to return questionnaires unless there is an obvious relevance to them. This problem of low response rates also applies to electronically distributed questionnaires where the issue of low response may be exacerbated by some recipients' unfamiliarity with the distribution technology (Evaluation Cookbook: Questionnaire: advantages and disadvantages). Moreover, the use of a distributed questionnaire makes it difficult to go back to participants if the researcher forgets to ask a particular question or requires additional information.

In the case of this study, however, some of these disadvantages mentioned (for example lack of education or familiarity with the method) are not applicable because the survey was applied in an academic environment. Careful efforts were made in order to eliminate or reduce the disadvantages of poor design that might

apply to this questionnaire. This was achieved by pre-testing of the questionnaire with the assistance of two referees, one from Curtin University of Technology and one from Jordan University of Science and Technology, and then subjecting it to a process of review and further testing with the aid of a pilot phase, helped strengthen the instrument and reduce susceptibility to the disadvantages described above. The final questionnaire was distributed in print versions to five faculties at Yarmouk University. These faculties are engaged in teaching the five subject areas used in the DAT.

In order to maximise the rate of return reminders were sent via the heads of departments and some by e-mail. These reminders included an attached copy of the questionnaire, and were also sent twice to the recipients of the original questionnaire. This produced additional electronically completed questionnaires.

#### **4.7.2 Questionnaire design**

A list of 55 questions was developed in four key areas:

1. Demographic information relevant to respondents,
2. The respondents' use of Internet-based information,
3. The respondents' use of digital library collections and services,
4. Problems and issues arising from the use of the Arabic language for the purpose of scholarly communication, with a particular focus on digital content.

Developing the questions commenced by conducting a literature review relevant to the research questions and objectives of the study. The form of questions ranged from those requiring multiple choice responses to five *Likert-type* scales, and included the following types:

- Closed-ended answers where participants were asked to select one answer from a finite list of responses.
- Questions with a multi-option list of answers where participants were asked to select several responses.

- Open-ended questions giving participants the chance to express their point of view on nominated issues.

The intention was to produce a questionnaire which enabled data to be efficiently coded, tabulated, and analysed, using the Statistical Program for Social Science (SPSS). The English version of the questionnaire survey is presented in Appendix A, and the details of the general structure and different sections of the questionnaire (section A to D) are discussed in the following sections.

#### **4.7.2.1 Section A**

The first section (A) of the questionnaire collects the respondents' demographic information, covering five independent variables as follows:

1. Gender
2. Age
3. Discipline affiliation
4. Level of educational attainment
5. Current level of academic appointment. This particular question has carefully considered the structure of the levels of academic appointments at Yarmouk University, ranging from Postgraduate students to Professor.

#### **4.7.2.2 Section B**

The second section (B) was designed to investigate respondents' patterns of use of the Internet for research and scholarly communication at Yarmouk University. It was intended that responses to section B will help address the second research question of this study. Section B contains questions related to the following:

1. Place of access of the Internet for work purposes
2. Length of time using the Internet
3. Frequency of use of the Internet for work purposes. For this question a frequency scale was employed, ranging from 'Less than an hours' to 'More than 6 hours' per 'day'.
4. Reasons for using the Internet.

5. Attitudes and opinions to various aspects of Internet use. This final question required a response to fourteen statements or proposition regarding the Internet, based on a 5- point *Likert* scale.

The statements in question B5 were designed to investigate the impact of Internet-based information on the respondents' patterns of research and scholarly communication. It raises matters related to the equipment, facilities and accessibility of information at Yarmouk University, and comparisons between electronically sourced information and traditional, print-based information. Also, some statements ask respondents to address the advantage (or otherwise) of using the Internet in western countries and languages and compared to the Arab world.

Furthermore, two open ended questions were added to this section; question B6 addressed the participants' opinion about the benefits of using the Internet information in teaching or learning at Yarmouk University in particular and the impact of this information on research and academic work. Question B7 asked participants about the barriers to effective use of Internet information in teaching or learning in an academic environment.

#### **4.7.2.3 Section C**

The third section (C) of the questionnaire was devoted to investigating the current issues relating to the role of libraries and librarians in the delivery of information services, including issues of information quality, and barriers to access to digital information. It explored the extent to which the digital library environment at Yarmouk University, including networked library services, has become useful, practical and supported. The questions addressed the following:

1. Frequency of the respondent's visit to the university library
2. The impact of the Internet on the frequency of their library visits
3. The Yarmouk Library respondent's access via the Internet.
4. Awareness of the content of electronic resources to which the Yarmouk Library subscribes.

5. Level of satisfaction with aspects of Yarmouk Library collections and services. This question required a response to six statements or proposition regarding the Internet, based on a 5- point *Likert* scale.

Generally, the statements used in 5 (C) were designed to investigate the role of the library in providing adequate access to digital collections and services. Several statements required respondents to compare western and Arab countries in terms of quality of scholarly information, the time needed to access electronic information, and the cost of databases.

The open-ended question (C 6) in this section gave respondents the opportunity to make additional comments. They were also invited to indicate the impact of the digital library on the academic environment and the impact of this information on their research.

#### **4.7.2.4 Section D**

Section (D) of the questionnaire was designed to be exclusively answered by Arabic speaking academics. This particular part of the questionnaire investigates an issue that has received only limited research attention to date. It surveys Arabic speaking academics to assess their use of Arabic scholarly content and their perceptions of Arabic as a scholarly language in an environment that is dominated by English. For questions D1—5 respondents were asked to indicate their comparative use of Arabic and English for the purposes of information retrieval, teaching or learning, and scholarly publishing.

The final question in this section (D6) contains eleven statements requiring participants to indicate their attitudes towards aspects of the use of Arabic and English, again using a 5- point *Likert* scale. It contains questions to assess opinions regarding the quality of Arabic information on the Internet; and as to whether Arabic sites are of considered to be of sufficient quality and authority to make them appropriate for scholarship and research.

Two open-ended questions, D7 and D8, were added at the end of this section. Respondents were invited to discuss the role of universities in the Arab countries in promoting the use of Arabic language for the purpose of scholarly communications.

### **4.7.3 Pilot questionnaire**

Dillman (2000) indicates that a pilot study has always been an important part of questionnaire design. A pilot study allows the researcher to identify questions that might be misunderstood and also to identify questions that tend to be frequently unanswered or are too complicated. Pilot studies are considered as a form of ‘pre-testing’ (Baker, 1994; Zikmund, 2003; Powell & Connaway, 2004) since they consist of data collection from a small set of subjects, and serve as a guide for the major study. They are a form of experimental study used to assess and perhaps prove whether or not a particular research instrument (typically a questionnaire) fulfils the purpose for which it was designed.

Dillman (2000) summarised the main objectives of a pilot study as follows:

1. Identify the problem spots in the questionnaire;
2. Enable the investigator to determine whether he/she is asking the right question in the most effective way;
3. Assess whether the participants are able to answer the questions properly;
4. Determine whether any amendments or rewordings are necessary;
5. Examine the content and format of the questionnaire to prevent any ambiguity before the final version is distributed;
6. Determine whether the questionnaire is clear and understandable;
7. To make sure that the questionnaire was ready to be distributed to the target population;
8. Check the average time required to complete the survey.

Before the pilot phase was commenced the questionnaire was translated from English into Arabic (Appendix B) to allow academics who do not speak English to

respond, and those native Arabic speakers who speak English to have the choice to respond to an English or Arabic version. Initially, the questionnaire was translated by the researcher and then the translated draft was sent to a professional translator with considerable experience in translating bilingual documents from English to Arabic and vice versa. Another copy of the translated questionnaire was sent to a professional librarian at Yarmouk University Library.

The translator and professional librarian reviewed both English and Arabic versions of the questionnaire and suggested some revisions to be made to the Arabic version. After the revisions were made and the final draft of the Arabic version was completed, both versions were sent to an academic from the Department of Library and Information Science at Philadelphia University (private university in Jordan) in order to review and endorse the validity and appropriateness of its content in relation to the research questions. This review endorsed the translation and asked for some words to be changed, which was done. This process has further assured the reliability and trustworthiness of both the English and Arabic versions of the survey instrument. The Arabic version of the questionnaire is presented in Appendix B.

In addition, a copy of the questionnaire was sent to one referee from Curtin University of Technology Library who specialize in the area of statistical analysis and another copy was sent to a referee from Jordan University of Science and Technology who specializes in the area of Library and Information Science. The referees were asked to assess the design and content of the questionnaire with regard to the ease of comprehension, and to assess the extent to which it related to the research questions and objectives of the study. Minor modifications to the questionnaire were made in response to the referees' suggestions.

The first stage of the pilot questionnaire was conducted in August 2006, when a print copy of the questionnaire was distributed to 12 postgraduate students with Arabic background at Curtin University of Technology. All were undertaking research in different disciplines. In addition, an electronic copy of the questionnaire was sent via e-mail to a further 10 Arabic postgraduate students at Curtin University of Technology, asking them to take part in the pilot study. Both

sets of participants were given two weeks to complete the questionnaire and return it with their comments and feedback. Some of the participants were uncomfortable with the wording of some questions, so they rewrote these questions in their own words. Several participants contacted the researcher for clarification of some questions that they considered were not clear, especially in the Arabic version

The second stage of the pilot questionnaire was distributed to 20 Academic staff at Jordan University of Science and Technology. The recipients of the pilot were chosen randomly but selected purposefully to include representatives from the five relevant colleges at Yarmouk University. The questionnaire was distributed after face-to-face explanation of the purpose of the study, and informing them that their responses would not form part of the final study. Several suggestions were adopted with a view to making some questions easier to comprehend, and the questionnaire was modified accordingly. The time required for completing the pilot questionnaire ranged between 15 and 25 minutes, which was believed to be within the range that would balance the need to gather sufficient information while not be too long and thereby discouraging responses.

#### **4.7.4 Population and sampling**

The academic staff of Yarmouk University served as the target population for the distribution of the final version of the questionnaire. It was decided that the study required sampling from the target population, based on the University's five faculties, including Postgraduate (PhD) students, for the following reasons:

1. The five faculties' broadly corresponded to the five subjects used for the DAT, and allowed every individual the opportunity to respond thereby enhancing the validity of the study;
2. The study population does not exceed 1000 and therefore does not necessarily require a random sampling procedure;
3. It would be difficult to apply a random sampling procedure due to problems in obtaining an accurate current list of Yarmouk University academic staff.

The surveyed population consists of the following characteristics:

1. Academic staff in five faculties at Yarmouk University who are involved in teaching and conducting scholarly research.
2. Postgraduate (PhD) students.

The population has the following variables:

1. Gender.
2. Age.
3. Discipline affiliation as indicated by Faculty.
4. Level of Education
5. Academic Rank.

According to the Yarmouk University Website, there was a total of 540 academic staff and 425 postgraduate students (PhD) at five faculties at the University in 2007. Table 4.5 illustrates the total number of academic staff and postgraduate students classified by the five faculties.

**Table 4.5: Distribution of academic staff at Yarmouk University 2006/2007**

<i>Faculty</i>	<i>Jordanian</i>	<i>Non-Jordanian</i>	<i>Male</i>	<i>Female</i>	<i>Postgraduate students PhD</i>	<i>Total</i>
<b>Social Science</b>	212	7	189	30	123	<b>219</b>
<b>Humanities</b>	170	10	157	23	302	<b>180</b>
<b>Engineering Technology</b>	44	2	45	1	0	<b>46</b>
<b>Economics</b>	61	1	53	9	0	<b>62</b>
<b>Information Technology</b>	32	1	25	8	0	<b>33</b>
<b>Total</b>	<b>519</b>	<b>21</b>	<b>469</b>	<b>71</b>	<b>425</b>	<b>540</b>

It should be noted that all non-Jordanian—including Arab—academic staff at Yarmouk University hold positions under one year extendable contract agreements. Some of these academics stay for a number of years on these contracts. Jordanian academics, however, usually hold permanent academic appointments.

Table 4.6 illustrates the actual and sample number of academics at Yarmouk University based on their level of academic appointment. Professors represent the

highest number (n=143), while Teaching Assistants represent the lowest number (n=21). The distribution of the numbers of academics at Yarmouk University included in the sample by academic level indicates that this sample approximately reflects the actual distribution based on level of appointment.

**Table 4.6: Actual and sample distribution of academic staff**

<i>Rank Faculty</i>	<i>Teaching assistant</i>	<i>Instructor</i>	<i>Assistant Professor</i>	<i>Associate Professor</i>	<i>Professor</i>	<i>Total</i>
<b>Social Science</b>	13	32	65	44	65	<b>219</b>
<b>Humanities</b>	4	23	45	52	56	<b>180</b>
<b>Engineering Technology</b>	0	3	21	18	3	<b>46</b>
<b>Economics</b>	1	15	11	18	18	<b>62</b>
<b>Information Technology</b>	3	16	8	5	1	<b>33</b>
<b>Total</b>	<b>21</b>	<b>89</b>	<b>150</b>	<b>137</b>	<b>143</b>	<b>540</b>

#### **4.7.5 Major questionnaire**

During December 2006 the questionnaire was distributed at Yarmouk University. The final format was designed as a brochure and an enveloped copy was distributed to each member of the survey population. An envelope was also provided to facilitate the return of completed questionnaires. The researcher had first contacted the office of the Vice-President of Yarmouk University seeking approval to distribute the questionnaire and acquiring a letter encouraging the academic staff and postgraduates of Yarmouk University to participate in the research. The letter was approved by the Office of the Vice-President and distributed to all academic departments in the five faculties.

The researcher then contacted personally the heads of departments in each college. All heads of departments were willing to assist, and correspondence and liaison were initiated by the heads of departments through the coordinators of each department. The researcher obtained from the coordinators further details concerning the numbers of academics who were available at the time of the questionnaire distribution. Excluded from the survey were those staff who were on leave for a period exceeding one month; those who were on a sabbatical leave

outside the university, and lecturers who were on extended leave and pursuing higher education overseas. Each department was provided with a number of questionnaires equal to the number of academic staff who were available at the time of distribution. It should be noted that the questionnaire was distributed during a teaching period with the intention of maximizing the response rate. This was after the two week period of non-teaching between first and second semesters—during which some students return home while some academics take short leave and possibly travel overseas.

Table 4.7 illustrates the number of the academics in each faculty and the number who responded to the survey within the period specified for the data collection.

**Table 4.7: Actual and sample distribution of academic staff**

<i>Rank</i>	<i>Number of individuals</i>	<i>% of Total</i>	<i>Number of responses</i>	<i>% of Sample</i>
<i>Professor</i>	143	14.8	19	5.2
<i>Associate Professor</i>	137	14.2	70	19.2
<i>Assistant Professor</i>	150	15.0	51	14.0
<i>Instructor</i>	89	10.0	45	12.3
<i>Teaching assistant</i>	21	2.0	11	3.1
<i>Postgraduate students</i>	425	44.0	168	46.2
<b>Total</b>	<b>965</b>	<b>100.0</b>	<b>364</b>	<b>100.0</b>

In all approximately 625 copies of the questionnaire were distributed, as not all staff and postgraduate students could be located. It is not possible to know exactly how many of these were received by possible respondents. The category of postgraduate students, who potentially comprised 44% of respondents, proved to be particularly difficult to reach with certainty. In most cases these students do not have a permanent office space or mailing addresses at the University. Distribution of the questionnaire therefore depended upon academic staff acting on behalf of the researcher. Some questionnaires were distributed individually by staff to students and others in group or classes. Staff were also responsible for collecting the completed questionnaire and returning it to the researcher. Nevertheless, postgraduates' students provided over 46% of all returned questionnaires.

Other copies of the questionnaire were provided to academic staff by relying on administrative staff or heads of departments for distribution. It is not possible to know exactly how many of the copies distributed in this way were received.

The researcher allowed the coordinators two weeks before returning to collect the completed questionnaires. A week after the questionnaire was distributed; the researcher reminded the heads of departments and emailed a follow up letter using the academics' email addresses taken from the faculties' websites and the Yarmouk University telephone directory (see Appendix C for a copy of the first follow up letter).

After approximately four weeks 250 questionnaires had been returned, a number that was less than hoped for. Therefore, a second follow up letter was sent again to encourage recipients of the questionnaire to respond (see Appendix D). It was also decided that the researcher would extend the period of time allowed for the completion of the questionnaire. Two more weeks were allocated. Most importantly, the researcher decided to personally visit academics in their offices to encourage completion of the questionnaire. A total of 373 questionnaires were ultimately collected. From these, nine questionnaires were excluded because substantial parts had not been completed or some responses were unclear. The total number of completed and returned questionnaires was therefore 364.

The response rate to the survey was approximately 58% (n=364) of the 625 distributed questionnaires. The overall response rate of the whole number of academics including postgraduate students at five faculties' in Yarmouk University (364) is 37.7%. Therefore, if 37.7% is considered to be the valid response rate, it is quite acceptable given that the response rate achieved from surveys of academic staff is generally low (Tomney & Burton, 1998; Weingart & Anderson, 2000; eJUST, 2002).

## **4.8 Interviews**

Interviews constituted the major component of the qualitative research conducted in this study. According to Powell & Connaway, ‘Qualitative research focuses on attempting to understand why participants react as they do...[It] tends to apply a more holistic and natural approach to the resolution of a problem than does quantitative research’ (2004, p.59). Interviewing is primarily useful in obtaining detailed information regarding the participants’ personal experiences, practices and opinions. The interviews, in the current study, served as a triangulation method which aimed to reduce the weakness of any other single research method (Gorman & Clayton, 1997), and also functioned as a follow-up to the questionnaire to further investigate particular issues in relation to the use of digital content for research and scholarly communication at Yarmouk University, and in particular to further address the issue of the digital divide. Emphasis was given to the participants’ perspectives about Arabic as a scholarly language in the networked academic environment, including the comparative efficacy of English and Arabic for scholarly communication. Moreover, a further purpose of the interview was to determine whether the role of the library/librarians is clearly understood by academics and research students, and the extent to which digital library collections and services at Yarmouk University are seen to be facilitating the availability and use of digital information. The interview schedule is located in Appendix E.

The interviews provided insights that would not be possible by relying upon the questionnaire only, and they proved to be an effective means of discovering detailed information from the participants about their practices, opinions, and attitudes.

### **4.8.1 Interview design**

A semi-structured interview was used so that all interviewees would be asked the same broad set of questions, but also be given the opportunity to guide the discussion and provide opinions and views on related areas of interest as they arose in the

course of the interview. The content and scope of the interviews covered the following key issues:

- Background information and the participant's area of research.
- Challenges and frustrations of Arabic-speaking researchers.
- Potential for digital library services to better serve Arabic-speaking scholars.
- Changing roles of library and librarians.
- Role of academics, librarians, and policy makers in bridging the digital divide.
- Impact of English on Arabic speaking academics and Arabic scholarship.
- Policy initiatives and constraints that may impact upon the future of Arabic as a scholarly language.
- The 'trouble spots' where a clear shortage or need might be found in the information infrastructure in higher education in Jordan and other Arab countries.

After the interview was designed and the questions were determined, the researcher pre-tested the format with an academic from Philadelphia University, Jordan (who was not included in the schedule for interviewing), and a librarian from Yarmouk University. This process of pre-testing the interview allowed the researcher to reflect on the interview questions; determine the average time needed to complete the interview, and also rehearse and conduct the process beforehand. As a result several minor changes to particular questions were made in order to achieve greater clarity. Interviews were conducted with:

- Ten self-nominating researchers from Yarmouk University who had responded to the questionnaire.
- Four selected government policy makers in the area of information technology/ research and development.
- Three selected senior library staff (five were interviewed, but two of these interviews were discarded as they produced no usable data).

### **4.8.2 Population and sampling**

The selection of the interview participants commenced at an early stage when the questionnaires had been completed and returned. On the final page of the questionnaire was a question asking the respondent to indicate whether he/she was interested in being a prospective participant in a follow-up interview investigating the same topic. Therefore, the respondents to the questionnaire were asked to self-nominate for the interview. As a result 97 respondents indicated they were willing to be interviewed. Of these respondents, 75 were males, while 22 were females; 49 were Assistant Professors, 19 were Associate Professors, 7 were Professors, 16 were Lecturers, and 6 were Postgraduate students.

The researcher also contacted the supervisor of the public universities network to organize a meeting with the senior librarians to ask them if they were interested in participating in an interview. As a result 9 senior librarians indicated they were willing to be interviewed. Five of these senior librarians were selected for interview. The researcher then selected a third interview sample from government and institutional managers (the 'policy makers') to participate in an interview.

There were, however, several difficulties faced in order to complete the interviews with the librarians and policy makers. These difficulties arose because a number of them were very busy and frequently absent from their offices; most of the government policy makers were only accessible in Amman, while the offices of the senior librarians were distributed in other cities in Jordan. As a result it was only possible to complete four interviews with the government policy makers.

Unlike questionnaires, random sampling is not as necessary in qualitative research, which typically assumes no great concern for generalization, although this does not mean generalization is not possible (Arksey & Knight, 1999). However, the selection procedure for inclusion in the interview phase for this study was done purposefully. That is, there were some definite criteria followed in determining the most appropriate participants for the interview. Firstly, since the topic of the interview was focused on the use and perception of digital content and its impact

on the current academic activities at Yarmouk University, it was also decided to give priority to the academics and librarians who self-identified as being active users of the Internet for their research, scholarly activity, and/or general work. In selecting relevant policy makers those selected had identifiable responsibility for information technology and were likely to influence government in matters relating to bridging the digital divide. In addition, it was decided that the sample should include representation from the five faculties at Yarmouk University.

It was also important to consider how many subjects or participants should be included in the interviews. Interviewing is a time consuming process, which imposes certain limits. Arksey & Knight (1999) indicate that if the purpose is to explore a topic, a sample of eight participants is quite adequate. They also suggest that sufficient interviews have been conducted once it is found that interviewees no longer provide new or different points-of-view or opinions (Arksey & Knight, 1999). For this study, it was initially decided that there would be twenty interviewees. The final number of interviews conducted was nineteen. Tables 7.1, 7.2, and 7.3 in Chapter 7 provide the demographic features of the interviewees.

### **4.8.3 Data collection**

There was a time gap of eight months (October 2006 – May 2007) between collecting the questionnaire data and conducting the interviews. Therefore, it was important to notify and remind the participants who had self-nominated to participate in the follow-up interview. The interviews took place in April and May 2007. However, there were unexpected difficulties in locating some of the participants, particularly (as discussed above) the policy makers.

Once the interviewees were identified, they were contacted by phone and/or personal visits to their offices and thanked for completing the questionnaire. The researcher also reminded them about the topic of the study and that they had been selected to participate in the interviews. They were also asked if they would agree to the video-recording of the interview. One academic staff member participant refused to allow the interview to be video-recorded. All of the potential

interviewees contacted in this way responded positively and expressed their willingness to participate further in the study. Appointments were confirmed at least two days before conducting the interview. Interviewees also received by e-mail copies of the interview schedule and additional details about the topic of the study and the process of conducting the interview. This included an estimate of the amount of time required for the interview.

All interviews took place in the interviewees' offices or at some other quiet places that would not be susceptible to disturbance. General conversation and discussion between the researcher and the interviewee was carried out first in order to establish a friendly atmosphere for the interview and encourage participants to feel at ease. The researcher re-described the aim of the project and emphasized the expected significance of the findings for enhancing research in Jordan and in using digital libraries to bridge the digital divide at Yarmouk University in particular, and in the Arab academic environment generally. Prior to commencing the formal part of the interview, the interviewees were given the consent form (Appendix F) to read and sign.

As mentioned previously, the same first eight questions were asked in sequence to all of the interviewees; also the researcher added some questions for the senior librarians and policy makers in order that they could expand on the role of digital libraries and government information policy with regard to the digital divide. The semi-structured format therefore enabled some flexibility and allowed for new and relevant issues to be discussed whenever they seemed to be appropriate and important.

The average time taken to complete the interviews was approximately 30 minutes. All of the interviews were conducted face-to-face and all of them were video-recorded except for three interviewees who provided their responses in a written form. Of the 16 face-to-face interviews, twelve were conducted in English, while four were conducted in Arabic upon the request of the participants. Each of the participants interviewed in Arabic claimed that they speak English to some extent, but they found it more comfortable to express their opinions and thoughts in Arabic. At the transcription phase the interviewer translated the Arabic interviews

into English. Of the three participants who responded to the interview in writing, two provided their responses in Arabic and one in English.

Video-recording the interviews allowed the researcher to pay additional close attention to the discussion and to later enrich the analysis of the interviews by drawing upon direct quotations from the transcribed text. A professional transcriber was used to transcribe the video tapes and once full transcriptions were completed; the researcher checked the accuracy of the completed transcripts against the video tape-recordings. Interviewees were also provided with copies of the transcripts and invited to either add further comments or—in relevant cases—to correct the translation or transcription. All interviewees found that the transcripts were accurate and they had no wish for amendments or additional comments.

## **4.9 Data analysis**

The Statistical Package for Social Sciences (SPSS) version 14 was used for the statistical analysis of the survey data. The quantitative data derived from the questionnaire required statistical analysis, while the qualitative data resulting from the interviews required the imposition of a conceptual framework which necessitated coding, generating themes, weighting, contrasting, comparing data, and interpreting the data.

### **4.9.1 Questionnaire analysis**

The questionnaire data were coded and entered into SPSS. Each variable in the questionnaire was given a separate code, resulting in a total of 55 codes for the questionnaire. Responses to the questions were entered as numeric values. Some questions in the demographic part of the questionnaire (Part A), such as faculty affiliation and level of education, were re-categorized using numerical data. For the purpose of coding, each variable was given the same value that was previously

assigned to it in the questionnaire itself. For example, nominal variables, such as gender (male and female), were assigned numeric values of '1' for Male and '2' for Female; and ordinal variables, such as those derived from *Likert* scales, were assigned numeric values of '1', Strongly Disagree; '2', Disagree; '3', Neutral; '4', Agree; and '5', Strongly Agree.

#### **4.9.2 Interview analysis**

Data analysis of the interviews is 'the process of moving from raw interviews to evidence-based interpretations that are the foundation for published reports' (Rubin & Rubin, 2005). It involves categorizing, contrasting, weighing, and merging results from the interviews, in order to develop meaning and implications or to reveal patterns. The analysis of the interviews and reporting of the results is a process of reflection based on the interviewees' responses to the questions they were asked (Rubin & Rubin, 2005).

After full transcripts of the interviews were prepared, the investigator examined these transcripts to identify and elaborate concepts and themes, and then coded the interview data according to these themes. Additional themes were also derived from the literature review and the research objectives and questions. The process of labeling or coding the interview data based on the categorized themes was undertaken manually using a process in which labels or codes were placed next to data units which matched particular themes. These were then typed and organized using Microsoft Word. This process of coding allowed the researcher to quickly locate relevant excerpts and direct quotes from the interview transcripts.

#### **4.10 Ethical considerations and data storage**

Since this study was undertaken under the auspices of Curtin University of Technology, it was required that approval for the research be obtained from the University's Human Research Ethics Committee. The questionnaire was submitted to the Committee at Curtin University and the approval for the research to proceed was granted in August 2006 (Appendix A). In addition, approval to conduct the

research and collect data from Yarmouk University was also granted by the Vice-President of Yarmouk University.

Care was exercised to ensure the confidentiality of the data and the anonymity of questionnaire respondents and interview participants. All participants were informed about the aims and significance of the study, and signed consent forms were obtained from all of the interview participants. Anonymity was guaranteed to all participants, and to the researcher's knowledge, there were no ethical issues arising from the questionnaire or interviews.

All original data will be stored securely either in print or electronically in the School of media, Culture and Creative Arts at Curtin University of Technology for five years after the completion of this study. The secure storage and management of data was assisted by the researcher's supervisors.

#### **4.11 Summary**

The process of this research involved four phases. In the first phase, a literature review was conducted to determine the issues relevant to the research topic and to identify the most frequently employed methodologies for user studies in the digital environment. The literature review also assisted in constructing the later stages of the research. The results of the literature review are presented in Chapter 3 and elsewhere as relevant.

In the second phase, a citation based document availability test was conducted to measure the extent of the digital divide in the academic environment in Jordan. This document availability test was conducted at Yarmouk University Library in Jordan, and results were compared with those from a similar test conducted at Curtin University of Technology Library in Australia. In all 1000 sample citations, of Australian, Jordanian and International origin were tested and the results analyzed using SPSS. The results of the DAT are presented in Chapter 5.

The third phase of the research process involved designing the questionnaire instrument, pre-testing it, and then undertaking the major (final) questionnaire. The final questionnaire was distributed on December 2006 to academic staff and postgraduate students in five faculties available at Yarmouk University at that time. In all 364 questionnaires were returned and analyzed using SPSS. The results of the questionnaire are presented in Chapter 6.

The fourth phase of the research involved designing the interview and collecting qualitative data from selected participants. The interviews took place after the completed questionnaires were returned and analyzed. This process assisted in designing and identifying the interview questions relevant to the data gained from the questionnaires. The results of the interviews are presented in chapter 7

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## Chapter 5 Document Availability Test Results

### 5.1 Introduction

This chapter presents the data and the results of the analysis collected from the document availability tests (DAT) that were conducted at Yarmouk University Library and Curtin University Library. The primary purpose of this aspect of the research project was to address the objective regarding the measurement of the extent and nature of the digital divide which may exist with regard to Yarmouk University. A comparison of the results obtained from Yarmouk University with those gathered from Curtin University will also be used to provide evidence regarding the extent to which digital academic library services could bridge the digital divide between developed countries and Arab developing countries.

As indicated in Chapter 4, a total of 1000 sample items, divided into three groups, was searched in the physical and digital collections provided by the Yarmouk University and Curtin University libraries. The sample items in Group 1 (International sample, n=500) and 2 (Arabic sample, n=250) were searched at Yarmouk University Library, and those in Groups 1 and 3 (Australian sample, n=250) were searched at Curtin University Library. The sample items in all three groups were also searched for their availability from free Internet resources. A comparison of the results from the two institutions enables an assessment of the possible impact digital content could have on the document availability for academic libraries in developing Arab countries as compared to developed countries.

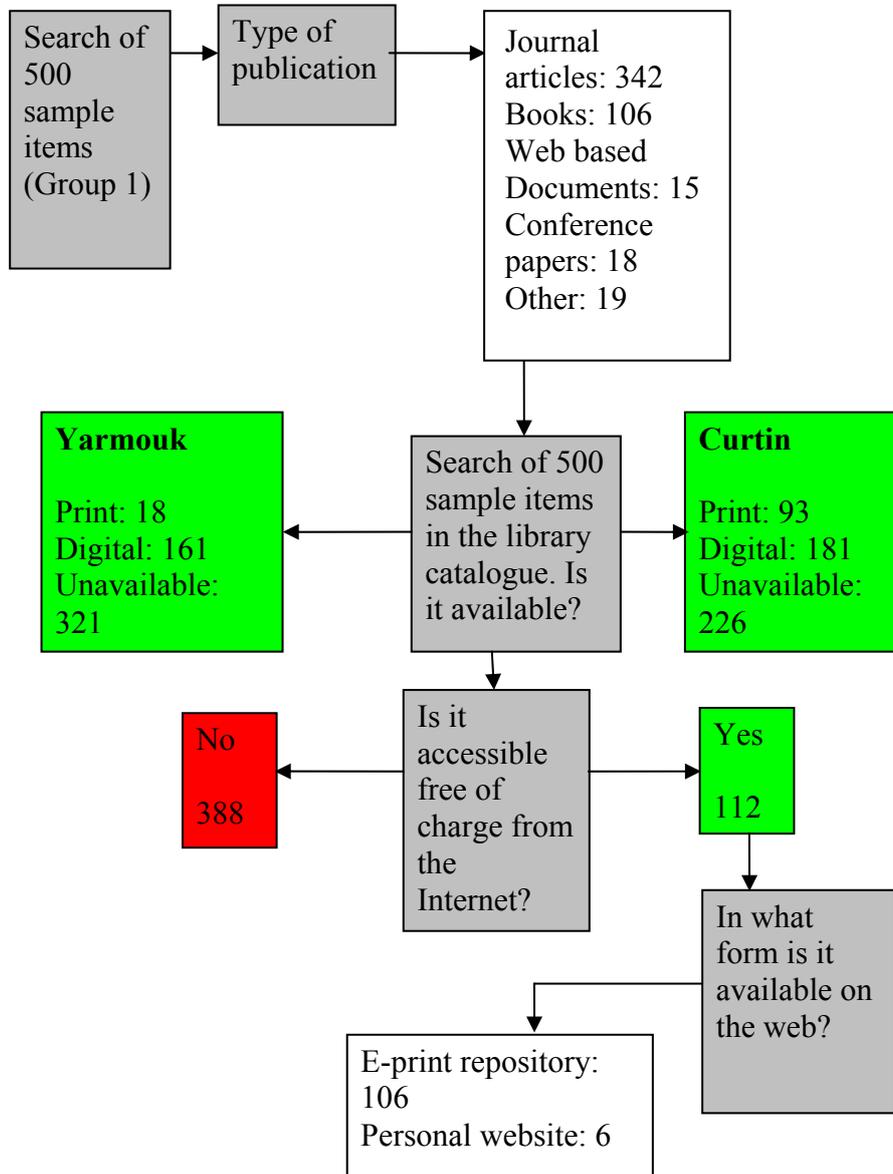
### 5.2 Document availability test (International sample - group 1)

Figure 5.1 below displays a flowchart showing the search procedures used for the sample items selected from citations in international journals (Group 1). It incorporates a summary of the results obtained from the catalogues of both libraries indicating the number of cases in which the libraries can provide immediate access to

an item from their collections in either print or digital form, or provide access from the Internet. The method used for the selection of these sample items has been described in Chapter 4.

The items in the international sample were comprised of 342 (68.4%) journal articles; 106 (21.2%) books or chapters within books; 15 (3%) web-based documents; 18 (3.6%) conference papers, and 19 (3.8%) other (i.e. a thesis, dissertation or government publication). The sample items also consisted of 495 (99%) in English, and 5 (1%) in other European languages.

Figure 5.1: A schematic view of the major findings of the study (Group 1 – International Sample Items, n=500)



These results for the holdings of the two universities can also be represented and compared by using Venn diagrams.

**Figure 5.2: International Sample: availability at Curtin University, n=500**

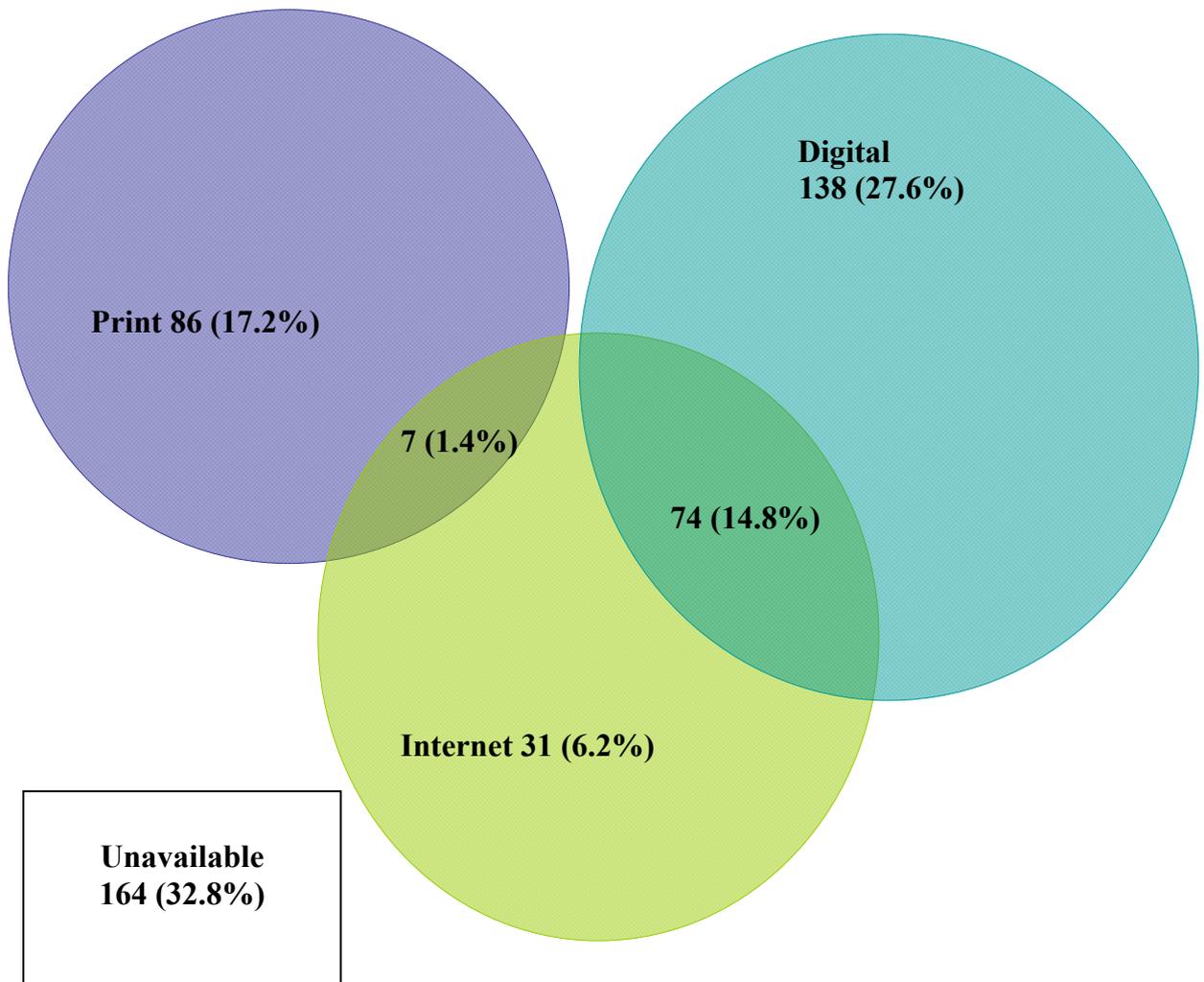
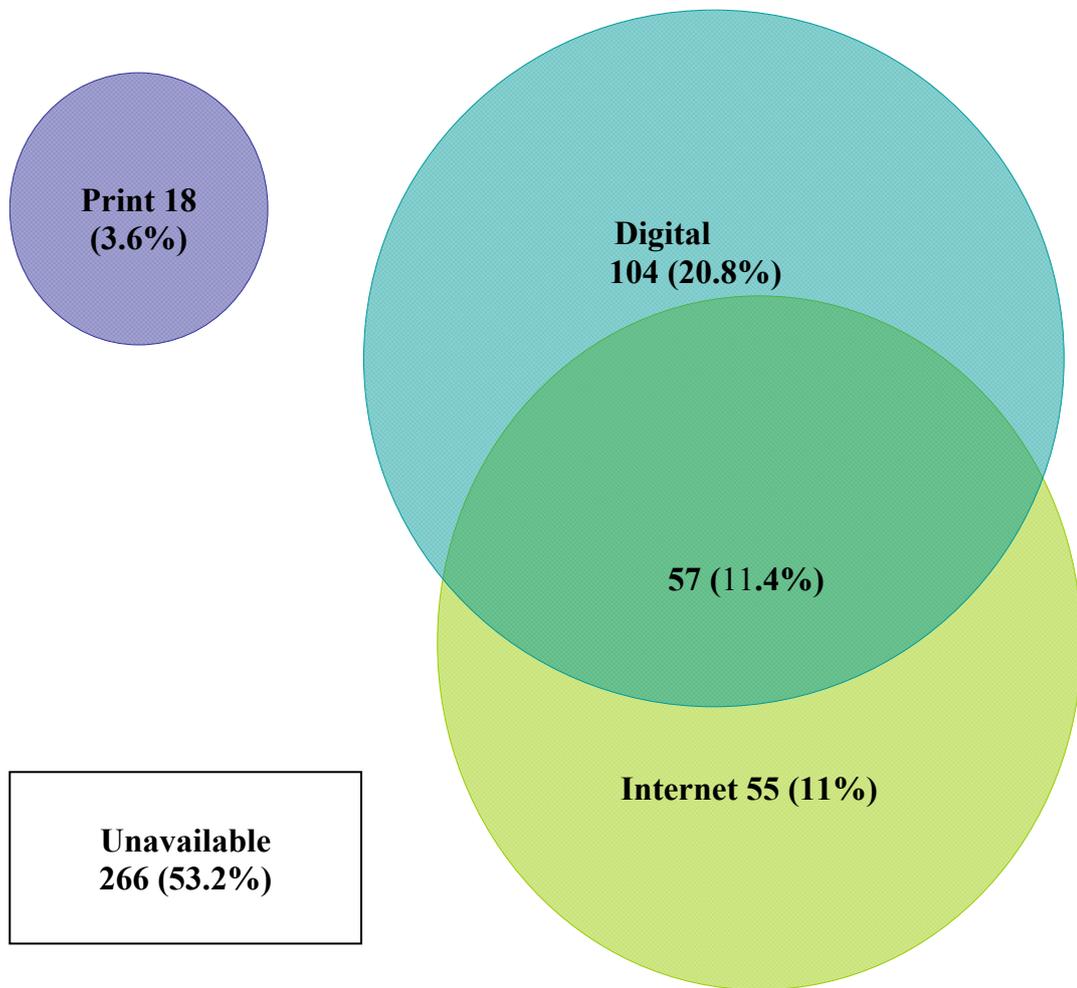


Figure 5.3: International Sample: availability at Yarmouk University, n=500



The results indicate that based on a comparison of this sample of 500 international citations, Curtin University Library was able to provide users with a greater amount of direct access to the sample items than was Yarmouk University Library. Overall, Curtin University had a 61% success rate in accessing the sample items compared with the 35.8% of sample items available from the Yarmouk University Library.

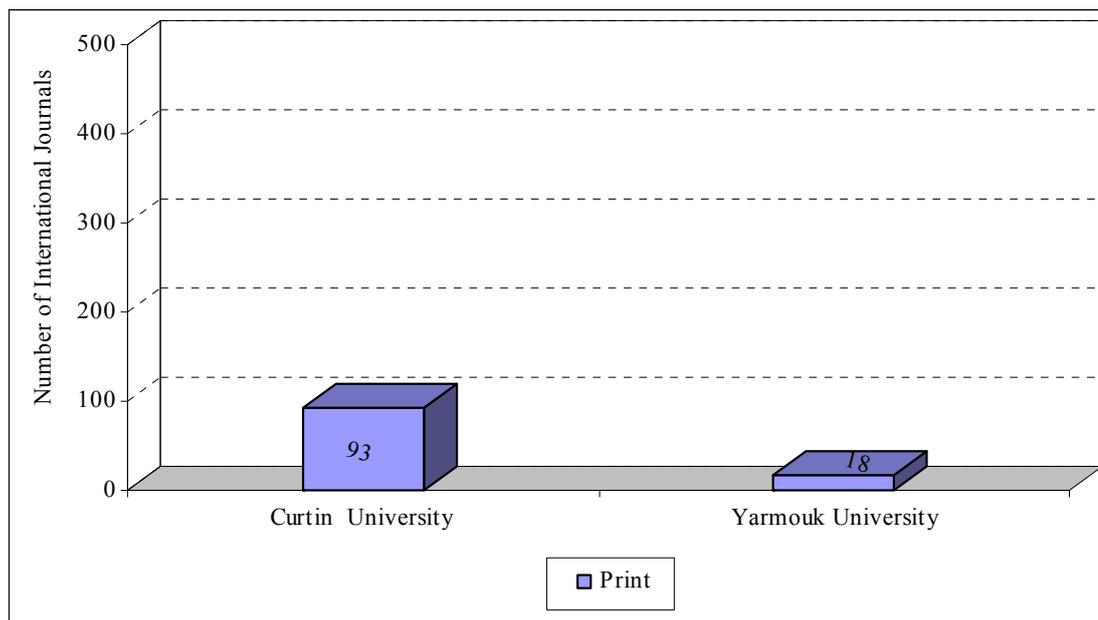
While knowing the availability of sample items within a library is relevant in assessing a library's capacity to 'deliver' information, the format in which the items are made available also plays an important role in assessing any form of information divide that may exist between the two libraries, and in determining the extent to which this divide can be attributed to any particular technology gap. The study was therefore interested in finding out whether the sample items identified as being in the respective collections were available in print or digital form. The sample items categorised as 'print,' were those available in the library collection in hard copy.

### **5.2.1 Sample items from Group 1 (International sample) available in print**

The results of the DAT indicate that Curtin University Library holds a much greater number (18.6%; n=93) of the sample of international items in print form than does Yarmouk University Library (3.6%; n=18).

Of the 93 sample items held in print form at Curtin University Library, 51 were held as journals (representing 14.9% of the journal articles included in the sample items), and 42 as books or chapters within books (39.6% of the books included in the sample items). In contrast, of the 18 sample items that were successfully identified as being available in Yarmouk University Library, only 1 was found in a print journal article (0.03% of all journals in the sample items), and 17 were printed books or chapters within books (16.0% of all books in the sample items).

**Figure 5.4: Sample items in Group 1 (international sample, n=500) available in print form**



It is apparent from these results for the 500 ‘international’ items available in print that users of the Curtin University Library have a substantial advantage over those of the Yarmouk University Library. This is likely to be the result of:

- Curtin University having been founded a decade prior to Yarmouk University has had a longer period in which to establish its library collection.
- Greater expenditure on library content at Curtin University in an attempt to boost research and support undergraduate teaching at a level that could not be sustained at Yarmouk University.
- A more focused acquisition of the type of items included in the international sample, which is dominated by English language items.

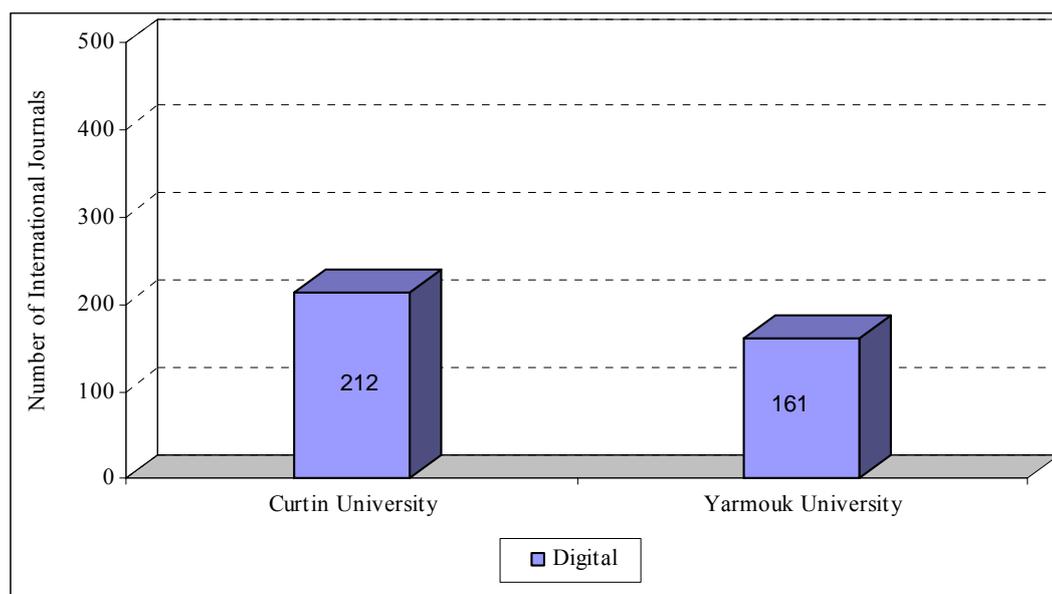
At the time the DAT was conducted the Yarmouk Library collection consisted of approximately 350,000 book titles (many in Arabic); 25,000 non-Arabic journal subscriptions (all in digital formats); and 600 Arabic journals. Curtin University at the same time had a collection of approximately 500,000 books (including 10,500 e-books), and 55,000 journal subscriptions. Nearly all of the Curtin Library collection is in English.

The results of the DAT for international items confirms that, as expected, the print journal collection of Yarmouk University Library is particularly poor, supporting the assumption that the Library has a negligible collection of backsets of English language journals in print form.

### **5.2.2 Sample items from Group 1 (international sample) available digitally**

The sample items categorised as available in ‘digital’ form in the library collection included those located in full text in databases and other digital formats which are either owned or subscribed to by the library at the time of undertaking the survey.

**Figure 5.5: Sample items in Group 1 (international sample) available in digital form**

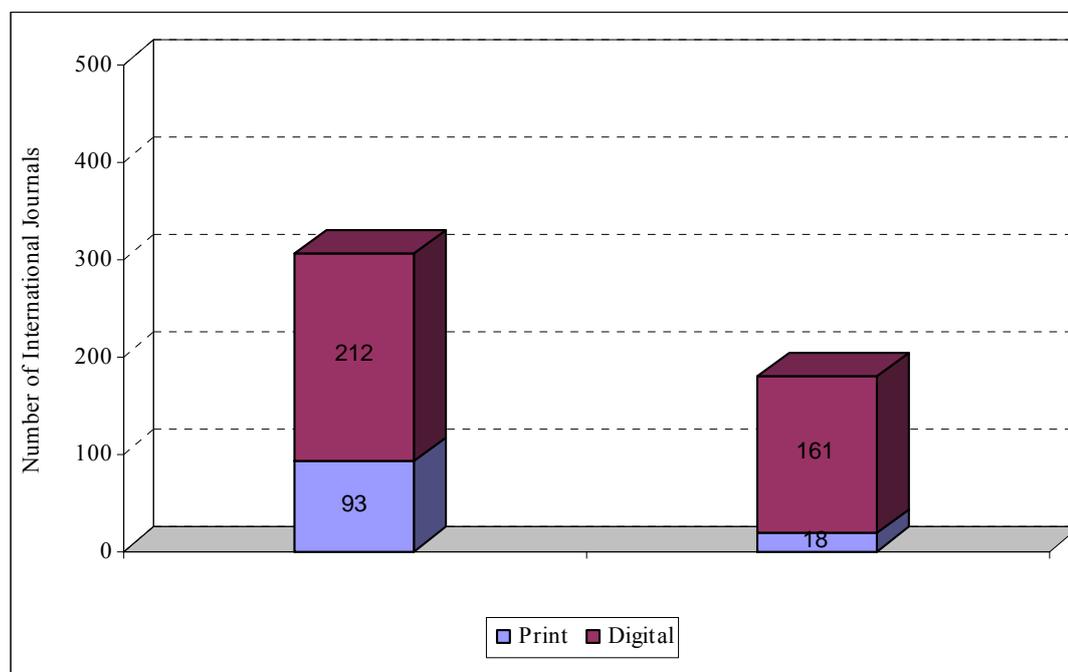


The data from the DAT indicates that for both Curtin and Yarmouk University Libraries it is more likely that items would be available from their collection in digital form rather than print. Curtin was able to provide 42.4% (n=212) of all sample items in digital form, as compared to 18.6% in print. Yarmouk was able to provide 32.2% (n=161) in digital form was compared to 3.6% in print. For neither library were there any of the sample items that were available in both print and digital forms, although it is apparent that both libraries would have examples of content duplicated in this way. (As noted previously, Curtin University Library has

instituted a policy of canceling subscriptions to journals which are also available electronically, and in many cases they have also discarded backsets of print copies of journals that are now available in digital form.)

It is apparent from these figures that Curtin University Library users can access a greater amount of the international sample items in digital form. What is also the case, however, is that the Yarmouk users receive a bigger *comparative* advantage than Curtin users when the digital items are summed with the print content. This is demonstrated in Figure 5.6.

**Figure 5.6: Sample items in Group 1 (international sample) available in print or digital form**



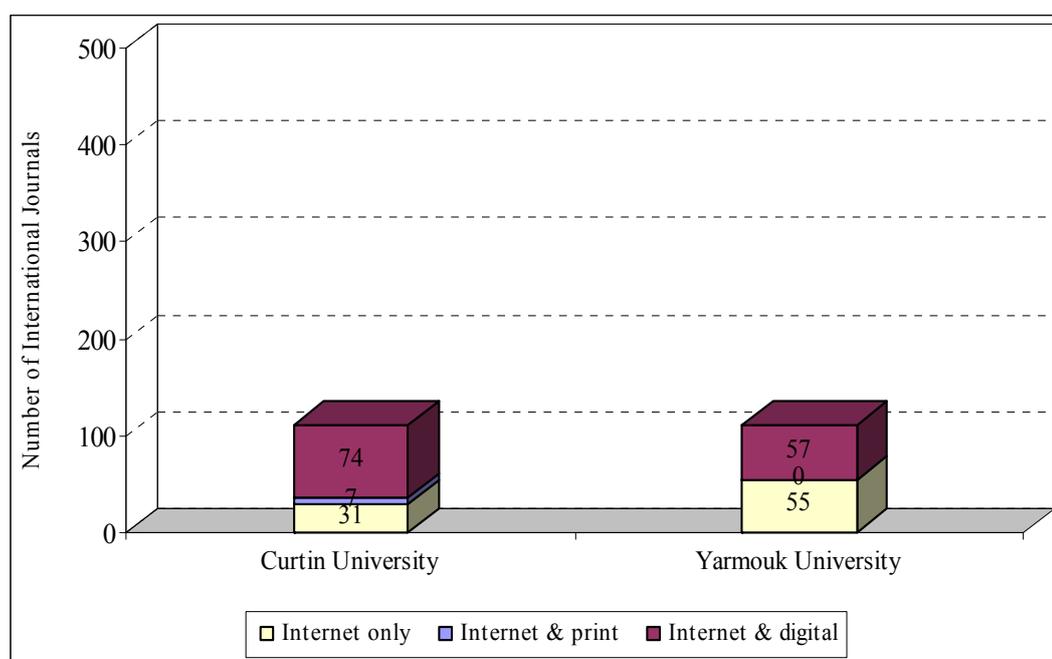
Of the items available at Curtin Library in print or digital form, 69.5% are digital; while of those at Yarmouk Library 89.9% are digital. This comparison of digital content works in Yarmouk favour due to their paucity of English language journals in the collection prior to the advent of large databases of full text periodicals. By acquiring just two such databases they have been able to rapidly compile a representative collection of current international journals, including in many cases substantial backsets. While their capacity to deliver items in digital format does not

equal that of Curtin University Library, they have been able to use the availability of digital databases to begin to close the considerable information deficit they had previously experienced with regard to ‘international’ journals.

### 5.2.3 Sample items from Group 1 (international sample) available free from the Internet

All 500 sample items in Group 1 (international sample) were also searched on the Internet using Google and Yahoo search engines, in order to determine if those items could be accessed from a website free of charge. Only those sample items identified on the Internet as full text were recorded as being available; that is, it was not sufficient to find only a bibliographic record or abstract of an item, or to find a record of an item from a source that required payment before providing access to the full text. An item was recorded as available if it could be determined that the item was substantially similar to the published version (i.e. it did not have to be a pdf version of the published item).

**Figure 5.7: Sample items in Group 1 (international sample) available from the Internet.**



The DAT found that exactly the same ‘set’ of 112 sample items was freely accessible when using the Internet at both universities. This means that 22.4% of the sample items were available without cost to the user or the libraries. That the result was the same for both libraries indicates that for this sample there was no blocking or filtering of access by either university library that prevented access to the relevant items. Of these 112 items, 87 (77.7%) were journal articles; 10 (8.9%) conference papers; 8 (7.1%) from web based pages; and 7 (6.25%) from other sources (i.e. a book or book chapter).

Access to scholarly (and other) information on the Internet can be provided by many different types of websites. Many scholars now choose to use not only journal publications as a means of providing access to published research, but when permitted by copyright they will also place copies on one or more websites in order to maximize access to their research. These websites may include the personal website of individual scholars; institutional websites such as the university based institutional repositories which are provided for this purpose; the subject based repositories which are now provided within many disciplinary areas; and the websites of conferences where papers may have originally been presented. In addition there are the ubiquitous websites that contain non-scholarly publishing—such as they produced by government, business, news and media outlets, and individuals—but which nonetheless include information or content that might be referred to in the course of scholarly research and publishing.

The samples items in Group 1 (international sample) that were found to be freely available on the Internet were analysed and grouped according to the type of website where they were located. These results are displayed in Table 5.1.

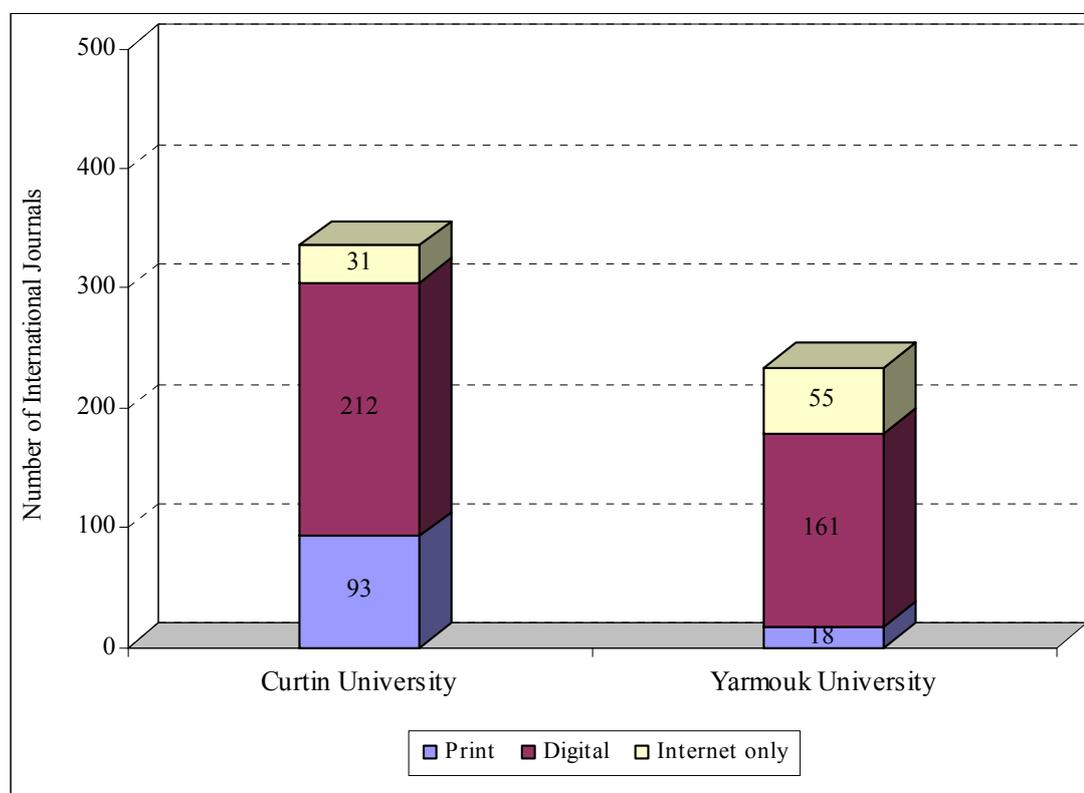
**Table 5.1: Type of websites providing access to sample items in Group 1 (international sample) free from the Internet**

<b>WEBSITE TYPE</b>	<b>Total</b>	<b>Percentage %</b>
e-Print Repository	106	21.2
Personal Website	6	1.2
Conference Website	0	0
Free online periodical	0	0
Other	0	0
<b>Total</b>	<b>112</b>	<b>22.4%</b>

The results indicate that a substantial majority of the items that were retrieved from the Internet were from free e-print repository websites with a smaller number accessed from personal websites. Of the 112 sample items available free of charge from the Internet, 106 (21.2%) were accessible from the website of either a subject-based or institutionally-based e-print repository. Of these 106 sample items, 87 (94.6%) were repository copies of journal articles; 10 (9.4%) were conference papers; 5 (4.7%) were web based documents, and 1 (0.9%) was from a book. It is perhaps surprising that no sample items were accessed from websites that might be said to be the ‘original’ source of such items; for example a conference website or free online periodical.

Figures 5.1; 5.2 and 5.3 indicate that there was, as expected, duplication in the holding of both libraries between items available on the Internet and those that were available in print or digital form in their collections. The overlap for Curtin Library was 81 of the 112 items (74 print and 7 digital), and for Yarmouk Library was 57 items, all duplicating items in the Library’s digital collection. The result of this duplication is that of the 112 items available on Internet, 31 (6.2%) only were additional to the Curtin collection, while 55 (11.0%) were additional to the Yarmouk Collection. The impact of this duplication on the net availability of items at the two libraries is represented in Figure 5.8.

**Figure 5.8: Sample items in Group 1 (International sample, n=500) accessed in print, digital, and Internet forms, with duplicates removed.**



These results of the test for available items from Group 1 suggest that in terms of supplementing access to international scholarly material, that the countries that are likely to receive the greatest advantage from the Internet are those with less developed library collections. This is achieved because they have less duplication with existing collections. That the items retrieved from the Internet were mainly journal articles sourced from institutional repositories and personal websites indicates that the open access movement is having an important and beneficial impact with regard to access to this category of international scholarly material. And while this impact is enjoyed by the users of both libraries, it is of greater comparative benefit to the users of Yarmouk University Library.

The overall results indicate that for all content in digital form (i.e. either part of a library's collection or available from the Internet) Curtin Library was able to provide access to 243 (48.6% of all sample items) separate items, and Yarmouk to 216 (43.2%) separate items. While Curtin users are therefore the greater beneficiary in

absolute terms, it is arguable that in real terms Yarmouk receives the greater benefit based on the size of their previous collection. Access to digital material has enhanced the availability of material at Curtin Library by 161%; while at Yarmouk Library the increase is 1100%.

### **5.3 Document availability tests, groups 2 (Jordanian sample, n=250) and group 3 (Australian sample, n=250)**

The following figures 5.9 and 5.10 below present flowcharts demonstrating the search procedure for the sample items comprising Group 2 (Jordanian sample) and Group 3 (Australian sample). It also includes a summary of the results obtained from the search of the catalogues of the two libraries for the relevant sample items (Group 2 items at Yarmouk University Library and the Group 3 items at Curtin University Library), plus those relevant sample items available free of charge from the Internet through each University's network and local Internet providers.

Figure 5.9: A schematic view of the results of the test for Group 2 (Jordanian sample, n=250)

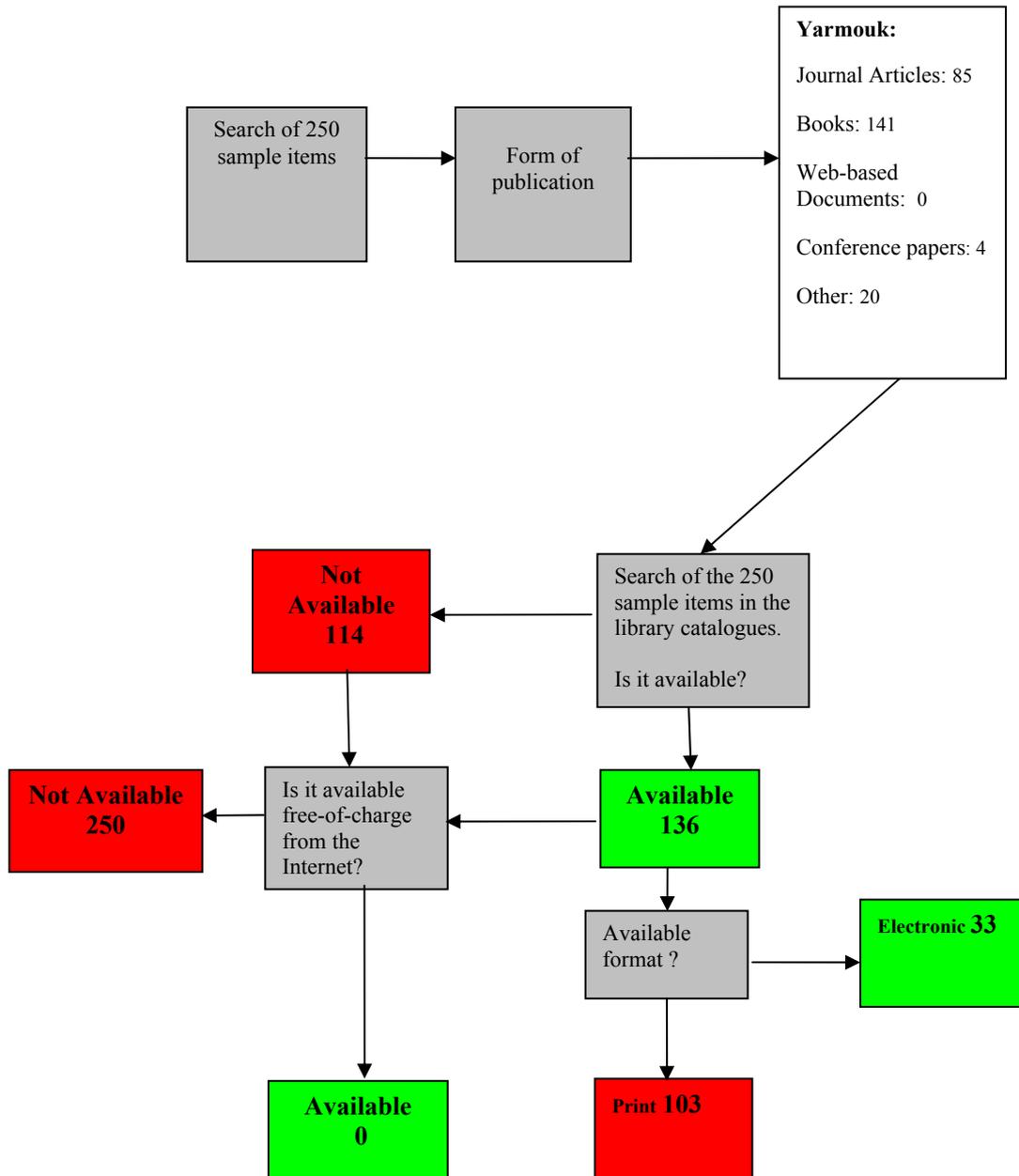
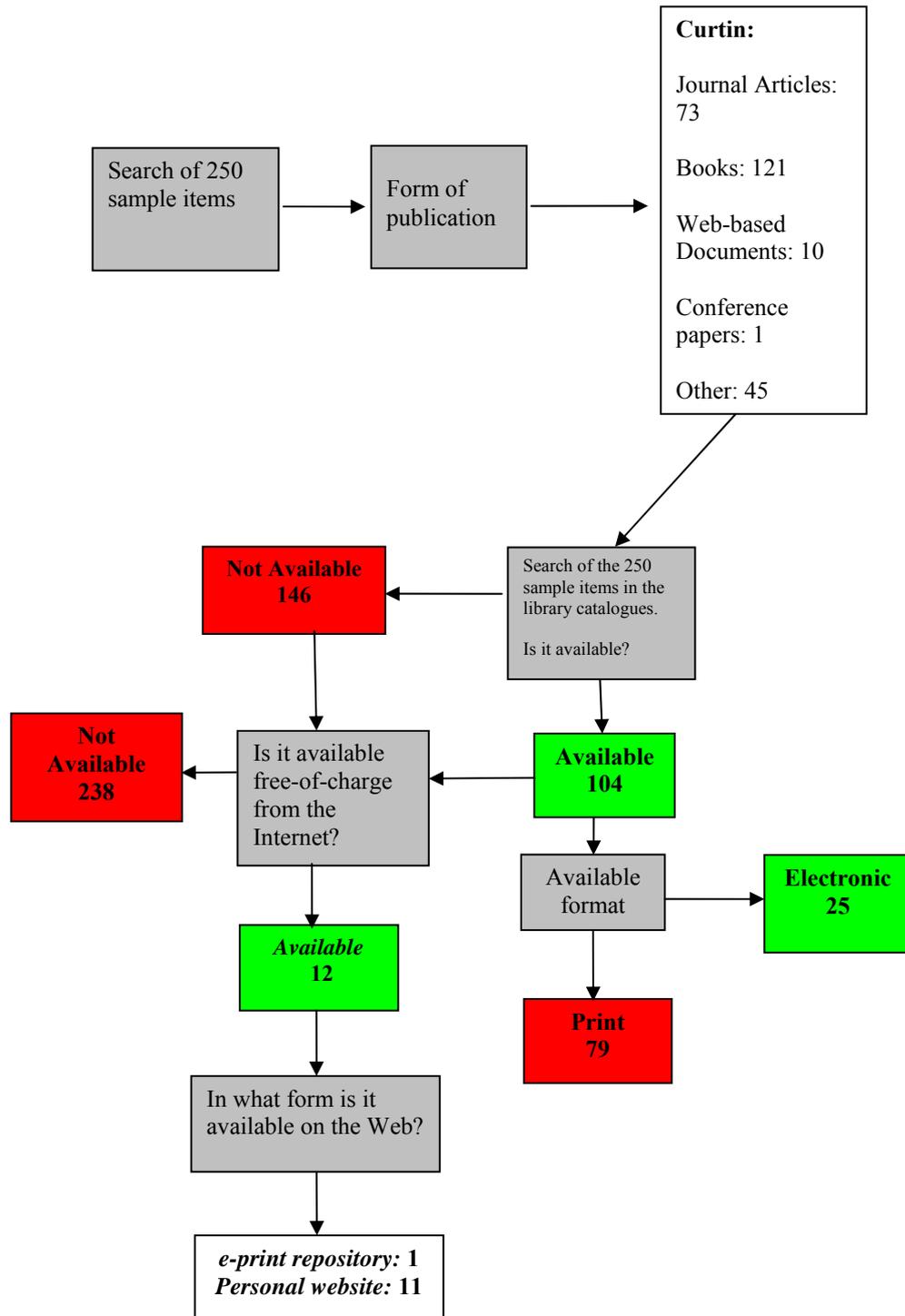


Figure 5.10: A schematic view of the results of the test for group 3 (Australian sample, n=250)



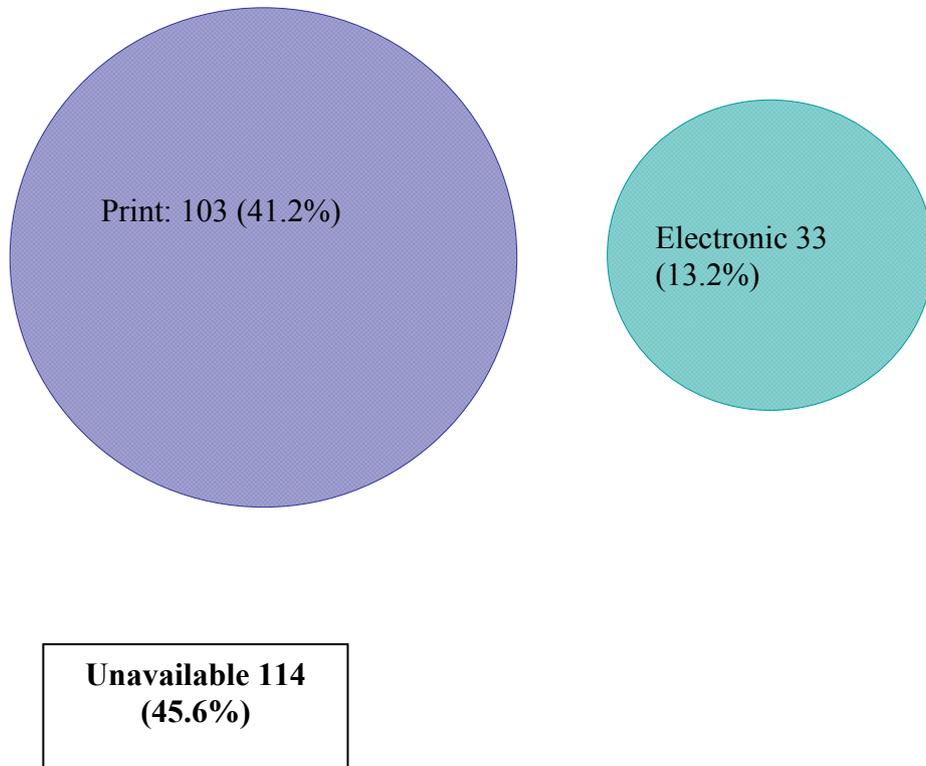
The results for the two samples indicate that Yarmouk University Library was able to provide access to a greater number of items (n=136, 54.4%) from its collection than was Curtin University Library (n=104, 41.6%).

### **5.3.1 Sample items in Group 2 at Yarmouk University Library**

The 250 sample items identified in the catalogue covering the Yarmouk University were comprised of 85 journal articles, 141 books, 4 conference papers, and 20 other types including government publications, (thesis, dissertation or similar documents).

136 (54.4%) of these sample items were successfully located in the Library's collection and 114 (45.6%) were not. Of the located items 103 (41.2%) were in print form. These consisted of 1 journal article, 96 books, and 6 from other sources. In addition there were 33 items (13.2%) that were available in full text from the Library's journal databases. Of the total 136 sample items that were successfully located, there were 34 journal articles, 96 books, 0 conference papers, and 6 'other'.

**Figure 5.11: Group 2 (Jordanian Sample, n=250): availability at Yarmouk University Library**



These results indicate that for these 'local' items Yarmouk University Library was more successful in meeting users' needs from their print collection than the electronic collection. The 41.2% of items retrieved in print form is in sharp contrast to the result for the international sample searched at Yarmouk University, where only 3.6% of sample items were located in print. It is apparent that these contrasting results reflect the difference in the nature of the two samples, with the international sample being largely English language items, while the local sample consists of largely Arabic items.

The result of 33 items (13.2%) being available from library databases indicates the extent to which the digitisation of Arabic journals, a project led by Yarmouk Library, has progressed. It is the case, however, that no sample items were retrievable free of charge from the Internet. This is a likely indication of the lack of development of subject or institutional repositories for Jordanian and/or Arabic content.

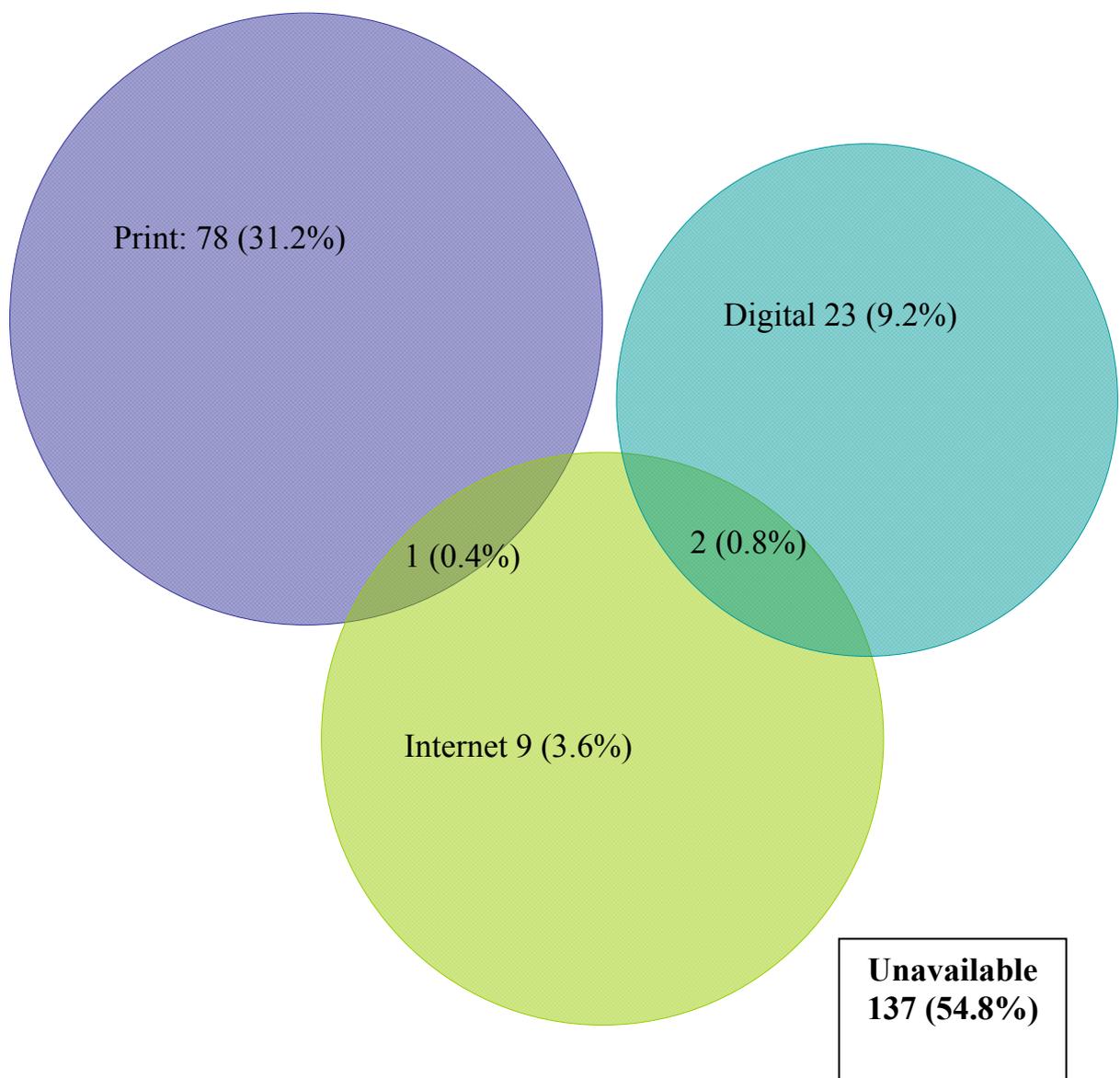
An analysis of the Group 2 items identified from the catalogue of Yarmouk University Library as being available indicates 71% were books or book chapters, and 25% were journal articles. This contrasts with the Group 1 (international sample) for which 10% were books or book chapters, and 85% from journal articles. This difference in source material may reflect the differences between the scholarly communication patterns of these disciplines (i.e. sciences as compared to social sciences and humanities), but it may also reflect a scholarly culture that still relies more on books than journals for communicating research.

### **5.3.2 Sample items in Group 3 at Curtin University Library**

The 250 sample items in Group 3 (Australian sample) were comprised of 73 journal articles, 121 books, 10 web document, 1 Conference paper, and 45 from other sources (for example theses or government publications). Of the 250 sample items selected from Australian sources which were searched for in the catalogues at the Curtin University Library, 104 (41.6%) were successfully located and 146 (58.4%) were not. Of the 104 sample items that were successfully identified as being in the Library's collection, there were 32 journal articles, 63 books, 3 web-based

documents, 1 conference paper, and 5 from other sources. 25 (10%) of the sample items successfully identified through Curtin University's catalogue were available in full text from the Library's databases of full text periodicals.

**Figure 5.12: Group 3 (Australian sample, n=250): availability at Curtin University Library**



In addition to the items located in the Curtin Library's collection, 12 (4.8%) were also able to be located on the Internet, of which 3 were duplicated in the Library's collection. This included 3 (1.2%) journal articles and books, 5 (2%) web based documents, and 1 other. This result contrasts with those obtained for Group 1 (international sample), wherein 112 of the 500 sample items (22.4%) were found to be available on the Internet. The explanation for this discrepancy is again likely to be found in the disciplinary differences between sample items in Group 1 and Group 3. It is notable that the bulk of the Internet/collection overlap (74 of 81; 91.4%) in Group 1 sample items was with items available in the Library's digital collection, suggesting that the electronic availability of international science items is significantly greater than that of Australian social science/humanities items. It is therefore likely the figures reflect a difference between disciplinary citation practices rather than the country of origin, with the more recent sample items from Group 1 have a higher probability of being included in free web sites such as institutional repositories or personal webpages.

This disciplinary based difference in the characteristics of the literature included in the sample groups is also evidenced by the type of publication in each group. Group 1 (International sample) includes 342 (68.4%) journal articles as sample items, and Group 3 (Australian sample) includes 73 (29.2%) journal articles as sample items. Again this represents the difference between a science based sample with a heavy dependency on journals, and a social science/humanities sample with a heavier reliance on monographs and other forms of non-journal publishing. It is largely journal articles which have been used to populate institutional repositories and therefore likely to be more readily accessible from the Internet.

### **5.3.3 Comparison of results at Yarmouk University Library (Group 2) and Curtin University Library (Group 3)**

As discussed, in order to measure the extent of a digital divide, it is necessary to identify items both in terms of their availability and the format in which they are available. A comparison between the two libraries indicates the comparative difference in making 'local' sample items available in various formats.

Figure 5.13: Sample items from Group 2 and Group 3 available in all forms, availability at Curtin University Library and Yarmouk University Library.

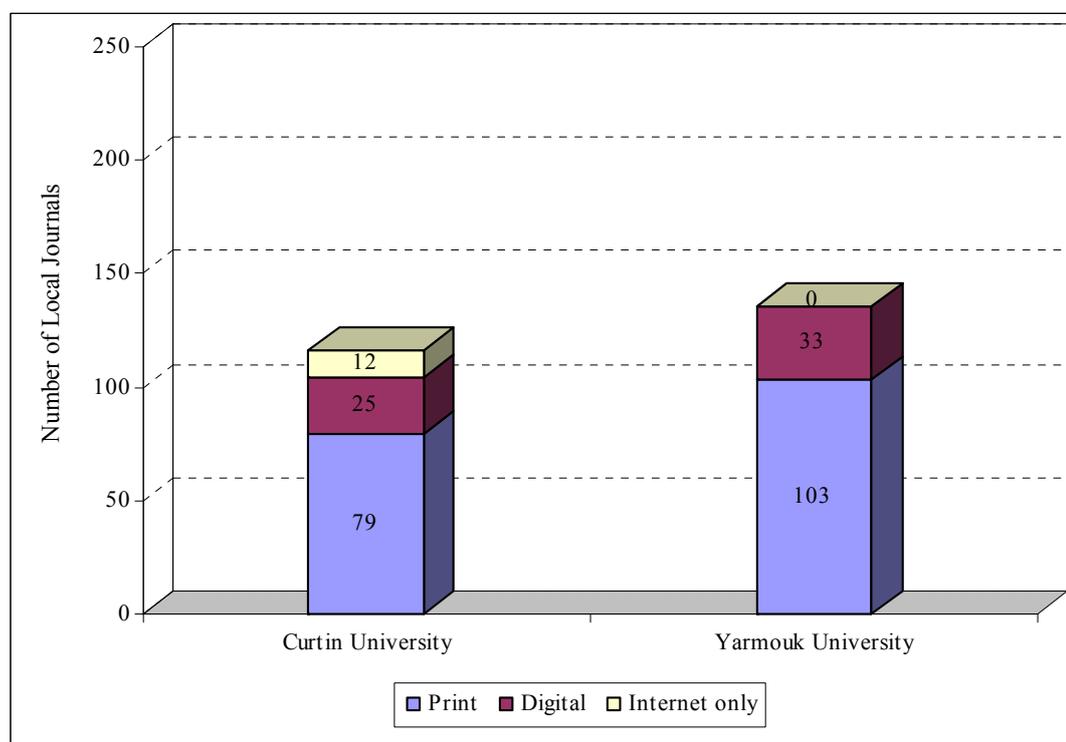


Figure 5.13 illustrates that for sample items included in Groups 2 and 3, both universities had more available in print rather than digital form. This is in contrast to the Group 1 results where both libraries were able to provide more items from their collections digitally rather than in print.

The greater success in locating items from the collection at Yarmouk University Library is perhaps unexpected. It *may* be explained by the different scale of scholarly publishing originating from Australia and Arabic countries. That is, the greater number of journals and books produced by the Australian scholarly publishing industry means that it is difficult for any but the very largest research libraries to collect this material comprehensively. The Arabic scholarly publishing industry is in comparison considerably less developed and produces a smaller number of journals and books, and therefore a university library such as that at Yarmouk (boasting the largest collection in the Arab Middle-East region) can reasonably expect to collect a higher proportion of published material. A related phenomenon is that citation

patterns in Arabic are likely to be more repetitive, in that there is, for example, a narrower range of journals from which citations might be possibly be derived.

These factors will almost inevitably (as evidenced by these figures) result in major Arabic libraries holding a greater percentage of cited material in print form. Additionally, when Arabic journals began to appear in digital form in recent years, Yarmouk University was identified as a key centre and as a result became a deposit centre for all print and digital scholarly journals from Arab countries.

Therefore whereas the Internet produced a comparatively greater advantage for users of Yarmouk University than Curtin University in terms of its capacity to provide ‘additional’ access to items from Group 1 (International sample) that were otherwise not held in the libraries collections, the situation is reversed when it comes to their ‘national’ collections. Whereas Curtin University users benefit by having access to nine (3.6%) additional items, users at Yarmouk University receive access to no additional items.

As with Group 1, the websites that provided access to sample items from Groups 2 and 3 were evaluated and grouped according to type.

**Table 5.2: Type of websites where sample items (Groups 2 and 3) are available from the Internet**

<b>WEBSITE TYPE</b>	<b>Curtin University</b>	<b>Yarmouk University</b>
e-Print Repository	1 (0.4%)	0
Personal Website	11 (5%)	0
Conference Website	0	0
Free online periodical	0	0
Other	0	0
<b>Total</b>	12	0

Table 5.2 indicates that of the 250 sample items in Group 3 (Australian sample) only 12 sample items were found to be available free of charge the Internet, with only 1 (.4%) sample item accessed from a free E-print repository and the remaining 11(5%) from personal websites. None of sample items identified were accessed from conference websites or free online periodicals. This is unlike the results obtained for Group 1, where the majority (94.6%) of web-based items were sourced from subject or institutional e-print repositories.

## **5.4 Summary**

A total of 1000 sample items divided into three groups were searched using the catalogues of Curtin University in Australia and Yarmouk University in Jordan. In the first instance, the search focused on the availability and access of the selected sample items from each library's print and digital collections. In the second instance, a further search of sample items was conducted using popular Internet search engines to ascertain the availability of the sample items as free web-based resources.

In terms of assessing the digital divide analysis of the data indicates the following:

1. Prior to the advent of digital content there was a substantial 'information divide' between the two universities and their libraries, measured by Curtin Library's far greater capacity to provide print based access to international content.
2. Access to sample items located in the libraries collections was greater from digital sources than print sources. It is clear that on this evidence that for both libraries digital has replaced print as the primary source of content.
3. While the 'free' Internet may be a useful and widely used information source, in terms of providing scholarly content it does not as yet serve to provide substantial access compared to the content collected by libraries. This is particularly the case for Arabic material, with not one of the 250 'local' items checked at Yarmouk University being available on the Internet.
4. Curtin University Library users enjoy the benefit of greater access to international items from their digital collections, but the situation is reversed with regard to 'local' items where the advantage is with Yarmouk University Library users.

The situation with regard to drawing conclusions about the existence and extent of a digital divide is neither clear nor straightforward. The complicating factors include Yarmouk University Library's role as a deposit centre, and the different scale of scholarly publishing in Australia and Jordan (or indeed, in English and Arabic). A preliminary conclusion on the evidence of the DATs, however, would suggest that while there is evidence of a digital divide, it appears that the advent of digital content has had the affect of narrowing rather than exacerbating the information divide that previously existed between users of Yarmouk University Library and Curtin University Library. In particular this narrowing of the information divide results from the increasing availability of scholarly content in open access repositories. This conclusion is further complicated, however, in that it appears that one critical regard—the development of open access Arabic content—there has yet to be any significant benefit, thereby disadvantaging the users of Yarmouk University Library with an interest in Arabic scholarship.

In the terms of the current research, the DATs have been successful in providing an important quantitative insight into the phenomenon of the digital divide.

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## Chapter 6 Questionnaire Results

### 6.1 Introduction

This chapter describes the results from the second instrument which was used to collect data for this research. This was a questionnaire delivered to academic staff at Yarmouk University in Jordan. As described in Chapter 4, the questionnaire consisted of 55 questions designed to assess the role of digital content in bridging the digital divide in the Arab academic environment. The questions were formulated as both closed and open-ended. The first part of the questionnaire collected demographic information relating to the respondents; the second part investigated the extent of their use of the Internet for scholarly purposes; the third part assessed attitudes towards the digital scholarly environment and the library collections and services provided by the Yarmouk Library; and the fourth and section focused on the use of the Arabic language for scholarly communication.

The total population of the research was 965, from whom 364 questionnaires were completed and returned (Postgraduate students,  $n= 222$  and Academic staff,  $n= 142$ ), giving an overall response rate of 37.7% of the population, and 67% of the available population. The data collected from the questionnaire were coded and entered into the Statistical Package for Social Sciences (SPSS).

The data derived from the questionnaire are presented in this chapter. Cross-tabulations have been undertaken where appropriate in order to elucidate differences according to various demographic or other variables, and in order to highlight the comparative frequencies of the participants' responses.

A number of similar studies have been conducted at universities in other developing countries (including developing Arab countries) and where appropriate results from the current study will be compared with these other studies. Reference will also be made to results from a survey undertaken of the Internet and library use of academic staff and postgraduate research students conducted at Curtin University in 2005

(Genoni, Merrick & Willson 2005; 2006). This survey, which drew responses from 107 academic staff members and 139 postgraduate students, is relevant to the current study because of Curtin University's role in the previous stage of the research involving the use of a document availability test (see Chapter 5).

### **6.1.1 Descriptive analysis**

The presentation of the data in this chapter follows the sequence in which questions were presented to respondents in the questionnaire.

### **6.1.2 Demographic information (Part A)**

In Part A of the questionnaire respondents were presented with five questions (A1-A5) that aimed to establish basic demographic data.

**Table 6.A1: Gender of respondents.**

<b>Categories</b>	<b>Frequency</b>	<b>%</b>
Male	305	83.8
Female	59	16.2
<b>Total</b>	<b>364</b>	<b>100.0</b>

The Yarmouk University web site (2006/2007), reports that the majority of the University's academic staff in five faculties are male (87%, n=479), while female members constitute only 13% (n=71) of the staff. As indicated in Table 6.A1, this study sampled representative percentages of male (83.8%, n=305) and female (16.2%, n=59) respondents, thereby reflecting the distribution of male and female academic staff at Yarmouk University. This disparity between the number of males and females making up the academic staff is likely to be explained by attitudes held in Arab societies, whereby women may be reluctant to pursue their studies beyond an undergraduate degree due to socio-cultural expectations that they will marry and their focus would be on the home and family rather than on higher education and professional careers.

**Table 6.A2: Age of respondents.**

Categories	Frequency	%
20-29 years	122	33.5
30-39	136	37.4
40-49	85	15.9
50-Upward	48	13.2
<b>Total</b>	<b>364</b>	<b>100.0</b>

The age variable reported in Table 6.A2 indicates that there was a similar distribution across the age ranges 20-29 years (33.5%, n= 122) and 30-39 years (37.4%, n=136). The results also report that there were fewer respondents in the older age ranges of 40-49 years (15.9%, n= 85), and 50 years of age or upwards (13.2%, n=48). These results indicate that the academic and research populations at Yarmouk University are comparatively young, an outcome that is to be expected given the comparatively recent development of higher education in Jordan. These figures pointing to the relative youthfulness of the Yarmouk University academic staff are also likely to be relevant when assessing their attitudes towards digital technologies and changes in the scholarly communication environment.

**Table 6.A3: Faculty.**

Discipline categories	Frequency	%
Social Sciences and Humanities	155	42.6
Education and Arts	135	37.1
Business and Economics	38	10.4
Information Technology	20	5.5
Engineering	16	4.4
<b>Total</b>	<b>364</b>	<b>100.0</b>

The number of academics employed by the faculties of Yarmouk University is broadly dependent on the number of students enrolled in each faculty. Respondents to the questionnaire were drawn from eight of the eleven faculties at Yarmouk University. The discipline categories as described in the questionnaire consist of the following; Social Sciences and Humanities (including the Faculties of Shari'a and Islamic Studies; Law; and Fine Arts); Education and Arts; Business and Economics; Information Technology; and Engineering. The number of respondents drawn from each of the faculties varied considerably, from 155 in the Faculties of Shari'a and

Islamic Studies, Law and Fine Arts (42.6% of all respondents), to 16 (4.4%) in the Faculty of Hijjawi for Engineering Technology. For the Faculty of Information Technology and Computer Science and the Faculty of Hijjawi for Engineering Technology it was difficult to attract respondents due to their small number of academic staff and low number of students enrolled in postgraduate studies. The imbalance between respondents from the eight faculties means that there is a significant weighting towards respondents from the arts and Sharia'a disciplines at the expense of the science and technology disciplines.

By comparing the sample of the academics who participated in this study to the total number of the academics working in the eleven faculties at Yarmouk University (based on data gathered from the web site of Yarmouk University, 2006/2007, (<http://www.ddp.yu.edu.jo/FMG/default.asp>), the distribution of the academics according to their academic standing is broadly similar to the distribution of the sample included in this study.

**Table 6.A4: Highest completed level of education.**

<b>Categories</b>	<b>Frequency</b>	<b>%</b>
Masters	222	61.0
PhD	142	39.0
<b>Total</b>	<b>364</b>	<b>100.0</b>

The data in Table 6.A4 reports the outcome when respondents were asked to indicate the level of their last degree obtained. Given the academic status of the population (that is; either current academic staff or PhD students) the minimum qualification of respondents was a Masters degree. The completion of a Masters is the requirement before entry to a PhD program at Yarmouk University. Almost 61% (n=222) of the respondents have completed a Masters degree, while 39% (n=142) have already completed a PhD.

**Table 6.A5: Academic rank.**

<b>Categories</b>	<b>PhDs %</b>	<b>Masters %</b>	<b>Total %</b>
Professor	24 16.9%	0 0%	24 6.6%
Associate Professor	48 33.8%	0 0%	48 13.2%
Assistant Professor	34 23.9%	0 0%	34 9.3%
Lecturer	36 25.4%	26 11.7%	62 17.0%
Other staff	0 0%	28 12.6%	28 7.7%
Postgraduate Student (PhD)	0 0%	168 46.0%	168 46.0%
<b>Total</b>	<b>142</b>	<b>222</b>	<b>364</b>
<b>%</b>	<b>39.0%</b>	<b>61.0%</b>	<b>100%</b>

Table 6.A5 reports the distribution of respondents according to the current level of their academic appointment or rank, including those who are currently enrolled in a PhD. The rank most frequently indicated by the respondents (46%, n=168) was postgraduate (PhD) student. The remainder of the respondents (54%, n=196) were currently working on the University's teaching and research staff, with their rank fairly evenly distributed between Lecturer (17%), Associate Professor (13.1%), and Assistant Professor (9.3%). The most senior category of Professor (6.6%) and the most junior category of 'Other staff' (consisting of teaching assistants and research assistants) (8.0%) were reported by lower numbers of respondents.

All respondents of the rank Assistant Professor and above (Associate Professors and Professors) hold a PhD. All those below the rank of Lecturer (Other staff and Postgraduate students) currently have a Masters degree as their highest qualification. Of those at Lecturer level there are 36 with a PhD and 26 with a Masters qualification. A number of the results presented in this Chapter are cross-tabulated according to the respondents' highest qualification (PhD or Masters). For these cross tabulations, the Masters graduates are therefore either currently studying for a PhD and/or working at the junior end of the academic rankings, while the PhD graduates are in the senior academic positions. There is some overlap between these two groups at the Lecturer level.

## 6.2 Use of the Internet (Part B)

In Part B of the questionnaire, respondents were asked questions which aimed to assess the extent to which academics and postgraduate research students at Yarmouk University use information from the Internet. Further questions investigated respondents' opinions on the Internet's impact on their research and scholarly practice.

### 6.2.1 Location of Internet access

Respondents were asked to indicate the location where they accessed the Internet. Four options were provided and respondents could choose all those which applied to them.

**Table 6.B6: Location of respondent's access to the Internet for work purposes.**

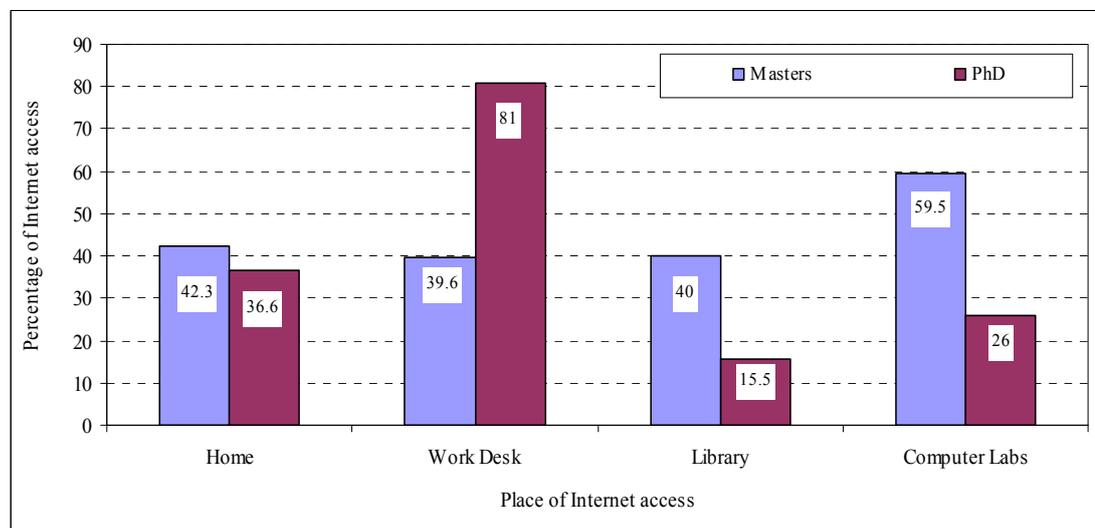
	<b>QB1. Where do you access the Internet for work purposes?</b>				
<b>Highest Qualifications</b>	At home	At work desk	Library	University computer labs	<b>TOTAL %</b>
Masters	94 42.3%	88 39.6%	89 40.0%	132 59.5%	<b>222</b>
PhD	52 36.6%	115 81%	22 15.5%	37 26%	<b>142</b>
<b>TOTAL %</b>	<b>146 40%</b>	<b>203 55.7%</b>	<b>111 30.4%</b>	<b>169 46.4%</b>	<b>364</b>

The responses indicate that access to the Internet was most likely to occur on campus rather than in the respondents' home. Of the respondents, 203 (55.7%) indicated that they access the Internet from their offices at Yarmouk University. This result can be compared with that obtained by Uddin (2003) in research conducted survey at Rajshahi University in Bangladesh which found that 51% of academic respondents access the internet from work offices. In another earlier study from a developing Country Seyal, Abd-Rahman, and Mahbubur-Rahim, (2002) reported on Internet use by Brunei academics, indicating that 48% of respondents used the Internet at home and only 12% had access from their university work desk at the time of the survey.

Other university based access was also important to the respondents, with 46.4% (n=169) using the computer laboratories and 30.4% using the Library. Home access to the Internet is considerable at 40% (n=146) but far from universal, and certainly well below the level of penetration expected in more technologically developed countries. This reliance on non-home based access is particularly noticeable given that respondents represent the more educated and technology literate classes in Jordanian society.

Importantly, the data collected supports the idea that the use of Internet information for research and work purposes in the academic environment is universally accepted by the staff and students at Yarmouk University, with 100% of the respondents indicating that they use Internet services from at least one of the sites provided. It is also likely that some respondents, particularly postgraduate students, rely upon access from other sources, such as internet cafés or friend's houses.

**Figure 6.B1: Location of Internet access (comparison of Masters Graduates, n=222 and PhD. Graduates, n= 142).**



The responses from Masters graduates are considerably different from those of PhD graduates. The result of cross-tabulation indicates those Masters graduates are less likely to have Internet access from their desktop, with 39.6% of Masters graduates accessing the Internet in this way compared to 81% of PhD graduates. This is not unexpected as most of the Masters graduates are current PhD students who have considerably less access to the Internet from a personal work desk. This result would

also suggest, however, that not all staff yet have access from their desktop at work. Students make considerably more use (in comparative terms) of the other university based forms of Internet access (libraries and computer laboratories) in order to compensate for their lack of desktop access. The rates of home access are quite similar for the two groups, with 42.3% of Masters graduates and 36.6% of PhD graduates having home-based access. It could be speculated that due to their better workplace access there is less incentive for university staff to have home access to the Internet.

### **6.2.2 Length of time using the Internet**

Respondents were asked to indicate how long they had been using the Internet for research and work related purposes. They were given four time-scale categories from which to choose (Table 6.B7).

**Table 6.B7: Length of time using the Internet.**

<b>Highest Qualifications</b>	<b>QB2. How long have you been using the Internet?</b>				<b>TOTAL</b>
	Less than one year	1-3 years	4-6 Years	More than 6 years	
Masters	20 9.0%	70 31.5%	79 35.6%	53 23.9%	<b>222</b>
PhD	12 8.5%	35 24.6%	29 20.4	66 46.5%	<b>142</b>
<b>TOTAL</b>	<b>32</b> <b>8.8%</b>	<b>105</b> <b>28.8%</b>	<b>108</b> <b>29.7%</b>	<b>119</b> <b>32.7%</b>	<b>364</b> <b>100.0</b>

The results reveal that while 137 (37.6%) of respondents reported that they had been using the Internet for research and work related purposes for 3 years or less, over 62% indicated that they had been using Internet information for 4 years or more. 119 respondents (32.7%) indicated that they had been using the Internet for more than six years. These results indicate that for both groups of respondents there is a considerable percentage who might still be considered relative ‘newcomers’ to the use of the Internet. It is likely that these periods of use are substantially less than those reported from research communities in developed western countries.

The results regarding use the of the Internet at Yarmouk University also indicate no substantial discrepancy between the two groups (those with a Masters qualification

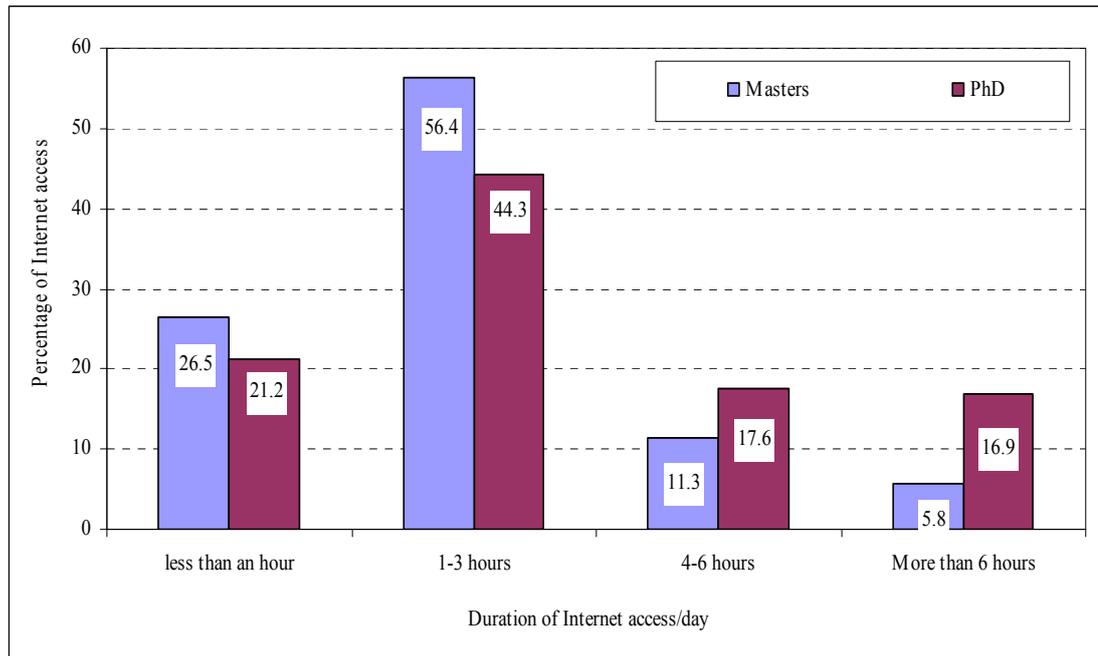
and those with a PhD) with regard to the number of years they have been using the Internet. There was some difference with regard to use in excess of six years, where as may be expected, PhD graduates reported a higher response (46.5%) than Masters graduates (23.9%). This result was to some extent contradicted by the response in the 4-6 year range, where Master graduates (35.6%) reported a larger response than PhDs graduates (20.4%). Both groups of respondents reported results in the vicinity of 40% for use of three years or less (37.6% for those who hold PhDs, and 40.5% for Masters graduates).

**Table 6.B8: How many hours do you use the Internet for work purposes?**

<b>QB3. How many hours do you use the Internet for work purposes?</b>					
<b>Highest Qualifications</b>	Less than one hour a day	1-3 hours a day	4-6 hours a day	More than 6 hours a day	<b>TOTAL %</b>
Masters	59 26.5%	125 56.3%	25 11.2%	13 5.8	<b>222</b>
PhDs.	30 21.1%	63 44.3%	25 17.6%	24 16.9%	<b>142</b>
<b>TOTAL</b>	<b>89</b> <b>24.5%</b>	<b>188</b> <b>51.6%</b>	<b>50</b> <b>13.7%</b>	<b>37</b> <b>10.2%</b>	<b>364</b> <b>100.0</b>

Nearly a quarter (23.9 %, n=87) of respondents indicated that they use the Internet in excess of 3 hours per day. Of these, 50 respondents (13.7%) indicated they use the Internet between 4 – 6 hours daily; and 37 (10 %) use the Internet for more than 6 hours per day for research and work related purposes. Only 24.5% (n=89) of all respondents reported that using the Internet for one hour or less a day for research and work related purposes. These figures further support other indications that the Internet is an important part of the work habits of researchers at Yarmouk University.

**Figure 6.B2: Hours per day spent using the Internet (comparison of Masters Graduates, n=222 and PhDs. Graduates, n= 142).**



A comparison of the results for PhDs graduates and Masters graduates in terms of the amount of Internet use indicate that PhDs (i.e. senior staff) are the heavier users. Of the PhDs respondents 34.5% use the Internet in excess of four hours per day as compared to 17.1% of Masters graduates. This result may reflect the ease of use provided by the convenience of better desktop access (as recorded in Table 6.B6) rather than greater need.

### 6.2.3 Reason for accessing Internet services?

Respondents were asked to indicate from a list of seven reasons that might commonly be given for using the Internet for research or scholarly activities, those that applied to them. They were invited to indicate as many responses as appropriate. Table 6.B9 presents these seven responses in sequence from the most common to the least common.

**Table 6.B9: What purpose best describes why you use the Internet?**

Values	Masters	PhD.	Total %
1. Seek information related to my research	197 88.7%	124 87.3%	321 <b>88.2</b>
2. Send and receive personal email	181 81.5%	120 84.5%	301 <b>82.7</b>
3. Access full text periodicals and library databases	154 69.3%	99 69.7%	253 <b>69.5</b>
4. Monitor academic bulletin boards and discussion lists	52 23.4%	52 36.6%	104 <b>28.6</b>
5. Initiate contact with fellow researchers	49 22%	40 28.1%	89 <b>24.5</b>
6. Contact publishers	30 13.5%	27 19%	57 <b>15.7</b>
7. Publish my research findings	16 7.2%	29 20.4%	45 <b>12.4</b>

The most common reason provided (n=321, 88.2%) was that respondents use the Internet to seek information related to their research. This result can be compared to a similar study conducted by Heterick (2002), which reported that all academics surveyed in the United States at that time were using the Internet to search for information related to their research. The less than ‘saturation’ use of the Internet for research purposes at Yarmouk University is likely to be related to the lesser emphasis that is placed on research by academic staff in Jordanian Universities. This is also likely to be the case in other developing Arabic countries, as evidenced by recent research conducted at Kuwait University reporting that 89% of academic respondents use the Internet to find information related with to their research (Al-Ansari, 2006).

Email is also heavily used, with 301 (82.7%) of the respondents indicating that they use the Internet for this purpose. This result compares with the findings of another study conducted in a developing country (Bin-Alsabti, 2003), reporting that 65% of responding academics at the Mentouri University of Costantine in Algeria used email. In addition, as indicated in the literature review, this data is broadly consistent with results from similar studies conducted in Arab countries showing that email was heavily used in the academic environment (for example, Abdulaziz, 2005; Al-Ansari, 2006; Hamshari & Bu-Azzah, 2001; Jirjees and Nashir, 1999; Lightfoot, 2006; Mamtora, 2004). The result can also be compared with that obtained at Curtin

University (Genoni, Merrick & Willson, 2006), which reported that 98.8% of respondents use email.

The third most frequently used Internet service was access to full text periodicals and library databases, with 69.5% of the respondents using the Internet for this purpose. This result can again be compared to the Curtin University study (Genoni, Merrick & Willson, 2006), which reported that 88.6% of responding researchers use the 'electronic databases'. There is therefore again a marked variation for the result between Yarmouk University and that of a library serving a more developed higher education system.

The next most frequently indicated reasons for using the Internet were monitoring academic bulletin boards and discussion lists (n=104, 28.6%). This result can again be compared to that obtained by Genoni, Merrick & Willson (2006), who reported that 68% of Curtin University researchers 'read' bulletin boards, and 40.2% post to them.

The respondents also indicated using the Internet to 'initiate contact with fellow researchers', (n=89, 24.5%). Of the respondents, 22% of Masters graduates and 28.1% of PhDs graduates reported this type of use. These figures can be compared with the much higher percentage of users from the Curtin University survey, which reported that 62.3% of postgraduate students, and 72.3% of academic staff, use the Internet to initiate contact with researchers on an occasional or frequent basis (Genoni, Merrick & Willson 2005). This substantial discrepancy between the results from the two universities may indicate different stages of maturity in terms of research communication, with the Curtin University respondents being far more proactive in their use of the Internet to build networks with fellow researchers.

Other reasons given for Internet use that were not as significant were in the areas of contacting publishers and for publishing research findings, with 57 (15.7 %) and 45 (12.4%) respectively indicating these as reasons for using the Internet. For both of these categories the PhD graduates respondents recorded a substantially higher response rate. This is quite as expected given their anticipated higher degree of involvement in academic publishing activities.

The responses to this question indicate that PhDs graduates (senior staff) generally use the Internet for a wider range of purposes than do the Masters graduates, with the PhDs recording a higher rate of use in six of the seven categories of response, although by a very small margin for several of the categories. This may be partly explained again by the greater ease of Internet access, although for some categories of response (for example, 'Contact publishers' and 'Publish my research findings') it is apparent that PhDs graduates are more likely to be engaged in these activities than Masters graduates. Interestingly the one category where the Masters graduates recorded a higher response (although by a very narrow margin) was 'Seek information related to my research'. It is self-evident that all postgraduate (PhD) students must be actively engaged in research, whereas some academic staff may be working in a teaching capacity only and not undertaking current research.

#### **6.2.4 Attitudes towards using the Internet**

Respondents were asked to indicate their attitudes towards the Internet with regard to a number of matters relating to Internet use and the changes to their research practices. They were provided with a series of relevant statements and asked to indicate the degree to which they agreed with these statements using a five point *Likert* Scale, with responses ranging from 'Strongly disagree' to 'Strongly agree'.

In reporting the responses to this section of the questionnaire, and for later sections where a Likert Scale has been employed, a mean response has been calculated for each element. This mean has been calculated by allocating to each response a 'value' ranging from 1 ('Strongly disagree') to 5 ('Strongly agree'). The values allocated to each response are then summed and divided by the total number of respondents. The higher the mean score, the greater the respondents' level of agreement with the proposition to which they are responding.

**Table 6.B10: Attitudes towards using the Internet.**

Statements	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
1. I am interested in learning more about using the Internet	18 4.9%	46 12.6%	21 5.8%	161 44.2%	118 32.4%	<b>3.86</b>
2. I am aware of the potential benefits of using the Internet	13 3.6%	10 2.7%	18 4.9%	138 37.9%	185 50.8%	<b>4.29</b>
3. Finding information on the Internet is easier than using traditional sources	17 4.7%	17 4.7%	24 6.6%	185 50.8%	121 33.2%	<b>4.03</b>
4. The Internet contains information relevant to my research	6 1.6%	12 3.3%	33 9.1%	190 52.2%	123 33.8%	<b>4.13</b>
5. The Internet has become the most important information source for my study and research	9 2.5%	47 12.9%	55 15.1%	132 36.3%	121 33.2%	<b>3.85</b>
6. Since I began using the Internet, I have spent less time using printed information resources	12 3.3%	100 27.5%	56 15.4%	143 39.3%	53 14.6%	<b>3.34</b>

The results in table 6.B10 indicate that Yarmouk University academics and postgraduate students have a generally positive attitude to the use of the Internet for research and academic work at the time of the survey.

323 respondents (88.7%) indicated that they either ‘Strongly agree’ or ‘Agree’ with the statement that they are aware of the potential benefits of the Internet. It is also apparent that the substantial majority of the respondents see these benefits as being in the area of research, with 313 (86%) reporting that they either ‘Strongly agree’ or ‘Agree’ with the statement that ‘The Internet contains information relevant to my research’. These results can be compared to the result reported above (Table 6.B9) indicating that 88.2% of respondents use the Internet for research purposes.

Respondents were also apparently convinced of the ease of use of the Internet, with 83% (n=306) indicating they either ‘Strongly agree’ or ‘Agree’ with the proposition

that 'Finding information on the Internet is easier than using traditional sources'. This belief in the ease of use of the Internet appears to be having a negative impact on the use of more traditional information sources, with 53.9% (n=196) indicating that they have reduced the amount of time using 'printed information sources' since having access to the Internet. It is notable, however, that some 30.8% respondents (n=112) reported no such decline in the use of printed sources. It would seem for these respondents it is likely that the Internet has become a supplement to the use of printed sources, rather than a replacement. This result can be compared with an earlier study from a developing country in the Gulf Region. In a study of Algerian academics Bin-Alsabti (2003) reported that 40% of respondents indicated that information from the Internet or other digital sources was more important than printed sources.

Nonetheless, in response to a further question, some (69.5%) (n=253) of the respondents reported that they either 'Strongly agree' or 'Agree' with the statement that 'The Internet has become the most important information source for my study and research', with only 56 (15.4%) disagreeing to some extent with this proposition, and 55 (15.1%) neutral. This result points to the apparent, and likely growing, importance of the Internet to this group of researchers.

The evidence from the survey is therefore strongly indicative of respondents appreciating the benefits of the Internet, in terms of both the research-related content it provides plus the ease of use, to the extent that it has become for the majority their most important research tool. For a not insignificant minority, however, their use of printed resources has not declined as a consequence of their use of the Internet.

The results from the present study can also be compared with the results of research which looks at patterns of adoption between disciplines as an indicator of need. A 1997 study conducted in Israel by Lazinger, Bar-Ilan, & Peritz indicated that users from the Faculty of Science were using the Internet more than users from Social Sciences and Humanities Faculties. Applebee et al (1998) reported that scientists were earlier adopters of Internet based communications, with 94% of members of a Science Faculty using the e-mail service, as compared to 88% of the members of

Social Science including Management, Administration and Commerce Faculty, and 83% of the Humanities scholars.

**Table 6.B11: The Internet contains information relevant to my research.**

<b>Faculties</b>	<b>Strongly Disagree 1</b>	<b>Disagree 2</b>	<b>Neutral 3</b>	<b>Agree 4</b>	<b>Strongly Agree 5</b>	<b>Total</b>	<b>Mean</b>
1. Social Sciences and Humanities (Arabic language)	2 1.2%	8 5.2%	9 5.8%	84 54.2%	52 33.5%	<b>155</b>	<b>4.14</b>
2. Education and Arts (Arabic language)	3 2.2%	3 2.2%	20 14.8%	66 48.9%	43 31.9%	<b>135</b>	<b>4.05</b>
3. Business and Economics (English language)	0 0.0%	0 0.0%	4 10.5%	19 50.0%	15 39.5%	<b>38</b>	<b>4.28</b>
4. Information Technology (English language)	1 5.0%	0 0.0%	0 0.0%	10 50.0%	9 45.0%	<b>20</b>	<b>4.30</b>
5. Engineering (English language)	0 0.0%	1 6.2%	0 0.0%	11 68.7%	4 25.0%	<b>16</b>	<b>4.12</b>

The results of cross-tabulation by faculty regarding the statement, ‘The Internet contains information relevant to my research’ indicate that respondents from all faculties reported that to a substantial extent that they either ‘Agree’ or ‘Strongly agree’ with the statement.

The two highest responses were from faculties teaching in English (Faculties of Business and Economics and Information Technology) but the low number of respondents from the latter and the generally favourable response from other faculties mean it is difficult to draw conclusion regarding the link between language and Internet-based research by relying on these results only.

**Table 6.B12: The Internet has become the most important information source for my study and research.**

Faculties	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Total	Mean
1. Social Sciences and Humanities (Arabic language)	3 1.9%	31 20%	20 12.9%	51 32.9%	50 32.2	<b>155</b>	<b>3.74</b>
2. Education and Arts (Arabic language)	5 3.70%	10 7.40%	32 23.7%	43 31.8%	45 33.3%	<b>135</b>	<b>3.84</b>
3. Business and Economics (English language)	0 0%	3 7.9%	2 5.2%	19 50%	14 36.8%	<b>38</b>	<b>4.16</b>
4. Information Technology (English language)	1 5%	2 10%	1 5%	9 45%	7 35%	<b>20</b>	<b>3.95</b>
5. Engineering (English language)	0 0%	1 6.2%	0 0%	10 62.5%	5 31.2%	<b>16</b>	<b>4.19</b>

The results in Table 6.B12 indicate that the three faculties teaching in English produced the three highest mean responses indicating agreement with the proposition that ‘The Internet has become the most important information source for my study and research’. Once again caution needs to be expressed due to the comparatively low number of respondents from these faculties, but these results at least suggest that language is a contributing factor in determining the value of Internet based scholarly information.

### 6.2.5 Barriers to use of the Internet

Respondents were asked to indicate the degree of impediment provided by a range of ‘barriers’ that might hamper access to, and use of, the Internet at Yarmouk University. Respondents were provided with statements describing seven possible barriers to Internet use, and required to indicate their level of agreement with these statements by using a five point *Likert Scale*.

**Table 6.B13: Barriers to Using the Internet (n= 364).**

Statements	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
1. I lack sufficient computer skills and knowledge to search the Internet	117 32.1%	99 27.2%	45 12.4%	94 25.8%	9 2.5%	<b>2.39</b>
2. There is a lack of access to the Internet at Yarmouk University	77 21.2%	134 36.8%	69 19.0%	69 19.0%	15 4.1%	<b>2.29</b>
3. I don't have the time to use the Internet	41 11.3%	150 41.2%	52 14.3%	102 28.0%	19 5.2%	<b>2.74</b>
4. I lack the desire to use the Internet	17 4.7%	33 9.1%	34 9.3%	190 52.2%	90 24.7%	<b>3.83</b>
5. There is a lack of support for using the Internet at Yarmouk University	55 15.1%	132 36.3%	90 24.7%	73 20.1%	14 3.8%	<b>2.60</b>
6. I don't have equipment and facilities to use the Internet	55 15.1%	141 38.7%	70 19.2%	81 22.3%	17 4.7%	<b>2.62</b>
7. Access to the Internet is interrupted by system errors or equipment failure	27 7.4%	122 33.5%	95 26.1%	97 26.6%	23 6.3%	<b>2.90</b>

The results reported in table 6.B13 indicate that more than 59.3% (n=216) of the respondents ‘Strongly disagree’ or ‘Disagree’ (12.4% neutral) that they ‘lack sufficient computer skills and knowledge to search the Internet’. In contrast 103 respondents (28.3%) reported some level of skill deficiency in using the Internet. Respondents are not always in the best position to assess their own skill level, but these results indicate that the majority are confident that they can search adequately. It might be of some concern, however, that over a quarter of the respondents feel some level of discomfort with their ability ‘to search the Internet’.

Of the respondents 58% (n=211) indicated some level of disagreement with the proposition that there are problems with access ‘at Yarmouk University’, while 23.1% indicated a level of agreement with the same proposition (19% neutral). It may have been expected that postgraduate students (Masters graduates) would experience a greater level of dissatisfaction with levels of access given that, as reported previously, staff have a much higher level of desktop access and use. This is only very marginally the case, however, with both groups reporting broadly

similar levels of disagreement (Masters, 53.5%; PhD, 54.2%) and agreement (Masters 28.3%; PhD 24.6%) with the proposition. It is likely that the responses from both groups measure in some degree their contrasting expectations as to the availability of Internet access.

There are two broad causes that might account for lack of Internet access in developing countries. These are inadequate access to facilities (hardware) frequently due to various shortfalls in infrastructure and funding, and poor connections due to inadequate telecommunications. Both of these possibilities were examined in further questions. In all 27% (n=98) strongly agreed or agreed with the proposition that there was a shortfall in 'equipment and facilities to use the Internet'; and 32.9% (n=120) agreed to some extent with the suggestion that access 'is interrupted by system errors or equipment failure'. For both questions there was comparatively high 'Neutral' response (19.2% and 26.1% respectively). The response to the latter question indicating a level of dissatisfaction with the continuity of access is most striking, indicating a degree of frustration with the reliability of the infrastructure supporting access. Problems with reliable Internet access have been reported from other research conducted at Arab universities. In a study conducted at Al-Kuwait University, Al-Ansari (2006) reported that 84% of responding academics indicated they suffer from the slow speed of Internet access. Similarly, in an earlier study, Bin-Alsabti (2003) reported that 42% of academics at Mentouri University of Constantine encountered various technical problems when using the Internet. Perhaps most relevant is another Jordanian based study, in which Sulaiman (2005) indicated that 26.5% of librarians at universities in Jordan reported suffering disruptions to Internet access. In a study conducted at Al-Isra'a University in Jordan (Abo Raya, n.d) the results referred to the a variety of technical and infrastructure obstacles facing academics in using the Internet, including slowness in accessing websites, the frequency of technical defects, and the lack of Internet service in the offices of academic staff. This issue is explored further in 6.2.6 below.

In response to the proposition 'I don't have time to use the Internet', 33.2% (n=121) of the respondents agreed or strongly agreed. This is a surprisingly high response given the quite significant rates of Internet usage reported elsewhere in this study, but it suggests that many respondents would make additional use of the Internet if

sufficient time were available. Perhaps contrary to expectations, the Masters graduates (37.7%; n=84) strongly agreed or agreed with this statement more than did the PhD graduates (26.0%; n= 37). It is possible, however, that this general response regarding lack of time would be similar irrespective of where (in developed or developing countries; in Arabic or non-Arabic countries) this research was conducted, given that lack of time for research activities is a common complaint of academics who have other responsibilities. Al-Ansari (2006), following research conducted with the academic staff at Al-Kuwait University, reported that 37% indicated that lack of time inhibited their use of the Internet, a problem also noted by Boumarafi (2001) at Al-Sharjah University.

The most striking response to this part of the questionnaire was received to the proposition that 'I lack the desire to use the Internet'. With a remarkably high 76.9% (n=280) of respondents indicating that they either 'Agree' or 'Strongly agree' with this statement and a mean response of 3.83, this 'lack of desire' was reported to be the greatest single barrier to Internet use. This result appears to contradict the level of use that is being made of the Internet for a variety of purposes (Table 6.B9 above) and the positive attitudes that are recorded in other results. See, for example, Table 6.B10 wherein 69.5% of respondents agreed with the proposition that the Internet is the 'most important information source for my study and research'.

### **6.2.6 Use of the Internet in Jordan compared to western countries**

An important area for investigation in digital divide research relates to the respondents' perceptions regarding their circumstances when compared to those of academics working in developed 'western' countries. The questionnaire therefore included questions asking respondents to indicate how they believed they stood in comparison to their western colleagues with regard to two critical issues that might impact upon academics in developing countries; 'technological advantage', and 'linguistic advantage'.

**Table 6.B14: Advantages and disadvantages of using the Internet in Jordan and western countries (n=364).**

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
1. Academics in western countries have a technological advantage in using the Internet	12 3.3%	54 14.8%	56 15.4%	134 36.8%	108 29.7%	<b>3.74</b>
2. Academics in western countries have a linguistic advantage in using the Internet	8 2.2%	38 10.4%	51 14.0%	155 42.6%	112 30.8%	<b>3.90</b>

It is notable that 66.5% (N=142) of the respondents indicated they either ‘Agree’ or ‘Strongly agree’ with the proposition that ‘Academics in western countries have a technological advantage in using the Internet’ (mean=3.74). Therefore while responses reported to various questions in 6.2.5 suggest that concern regarding the level of technical support and availability of the Internet at Yarmouk University is not high, a majority of respondents nonetheless believe they are disadvantaged in this regard when compared to researchers in western universities. This suggests that part of the respondents’ perception of the digital divide is that the divide is technology based. Only 18.1% (N=66) of respondents reported that they either ‘Disagree’ or ‘Strongly disagree’ with the proposition that their western counterparts have a technological advantage (15.4% neutral).

As discussed previously, another important aspect of the digital divide examined in this research is that related to language; or more precisely the possible under-representation of Arabic on the Internet when compared to English and other languages used for scholarly communication. In all 73.4% (n=267) of respondents indicated that they either agreed or strongly agreed that, ‘Academics in western countries have a linguistic advantage in using the Internet’ (mean=3.90). Therefore on the basis of these responses a slightly higher number of respondents believe that the linguistic disadvantage for Jordanian academics is more of an issue than their technological disadvantage. Only 12.6% (n=46) of respondents do not agree that western academics have an advantage with regard to language (14% neutral).

In order to examine the response regarding language more closely, the results were cross-tabulated in order to compare the response from a faculty which relies upon Arabic for teaching and research (the Faculty of Social Sciences and Humanities) with a faculty that relies upon English (the Faculty of Information Technology).

**Table 6.B15: Faculty of Social Sciences and Humanities (Arabic, n= 155).**

<b>Item</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
1. Academics in western countries have a linguistic advantage in using the Internet	3 1.9%	26 16.7%	18 11.6%	58 37.4%	50 32.2%	<b>3.81</b>

**Table 6.B16: Faculty of Information Technology (English, n= 20).**

<b>Item</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Mean</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
1. Academics in western countries have a linguistic advantage in using the Internet	0 0%	0 0%	2 10%	13 65%	5 25%	<b>4.15</b>

These results are made somewhat unreliable by the low number of responses received from the Faculty of Information Technology (n=20). Nevertheless they indicate that respondents from both faculties believe that they suffer a linguistic disadvantage in using the Internet when compared to their western counterparts.

A comparison of the results indicate that for respondents from the Faculty of Social Sciences and Humanities 69.6% either ‘Agree’ or ‘Strongly agree’ that researchers in western countries have a ‘linguistic advantage in using the Internet’ (mean=3.81), as compared to 90% from the Faculty of Information Technology (mean=4.15). And whereas 18.6% of the respondents from the Faculty of Social Sciences and Humanities were in disagreement with this proposition, there was 0% disagreement from respondents from the Faculty of Information Technology. These figures suggest that the matter of linguistic disadvantage is felt more keenly by those whose primary

academic language is English. This result is likely to be explained by the fact that researchers working in English are more likely to be sensitive to their level of disadvantage than those who research and teach in disciplines that rely solely or heavily upon Arabic.

### **6.2.7 Benefits of using the Internet in academic work**

Respondents were given the opportunity to provide an open ended response to a question asking them to identify the benefits that the Internet could provide for their teaching, research and other academic work. The responses were then grouped according to a series of key ‘themes’ in order to discern the frequency by which each theme was mentioned in responses.

1. Find scholarly works and information relevant to a discipline (81).
2. Find general (non-scholarly) works and information relevant to a discipline. (75).
3. A means of learning or improving English language skills (47).
4. Easy to use and quick access to information (43).
5. Facilitates communication (21).
6. Locate suitable and/or highly ranked journals for publishing (6).

As reported above in Table 6.B10, 86% of respondents reported that the Internet contains information relevant to their research. This result is reflected in these open-ended responses, with numerous comments being made regarding the value of the Internet in providing scholarly information to support research and teaching activities by providing access to scholarly information. Some of the typical comments included:

- *I perceive it as very useful for my research effectiveness. I can find everything about my field of study.*
- *I can retrieve academic information about any research topic.*
- *Very important because via a terminal can I get most literature related to my topic.*
- *Opens to me different fields for my research.*

Respondents frequently pointed out that the benefits of Internet use include getting access to the most current information, topics and knowledge, not only from scholarly sources but also information of a more general nature. One respondent referred to Internet use as ‘*electronic learning*’.

A number of respondents also pointed to some of the issues related to language on the Internet. To these respondents the Internet can be seen as a method of not only retrieving information in languages other than Arabic but also a means to learning those other languages.

- *I can know and learn several languages.*
- *Access articles in English language and translate them to Arabic.*
- *Browsing in any word in English language then get large amount of information on the Internet in western languages such as English, German, French etc.*

As reported previously, one of the major perceived benefits of Internet use was the ease of collecting data and information as compared to ‘traditional’ sources. It is therefore not surprising that respondents also used the open ended question to again highlight these advantages. Comments included:

- *Save effort, time and money.*
- *Easy to use.*
- *It helps me to get more information in a short time.*
- *Reduces my time and efforts.*

Some respondents also noted that the Internet assist in not only the gathering of information or data that assists their research, but that it is also a vehicle that aids them in various ways to distribute their research outputs.

- *Very positive to developing my research and makes it easy to publish.*
- *I can publish my articles in journals that have a high ranking.*

### **6.2.8 Barriers to the effective use of the Internet**

Respondents were also asked to provide, using an open ended response, additional information about the barriers they face when using the Internet for academic tasks. Previous studies in Arab Countries indicated that the common barriers regarding the effective use of the internet at universities included lack of convenient access; lack of training programs; slow response times and other technical problems; lack of time to use it; lack of English language skills, and the lack of relevant information in Arabic (Abdullah, 1999; Jirjees & Nashir, 1999; Boumarafi, 2001; Hamshari and Bu-Azzah, 2001; Al-Farah, 2004; Bin-Alsabti, 2003; Rwaqah, 2003; Zeyadat and Kair, 2003; Abdulaziz, 2005; Al-Omari, 2005; Sulaiman, 2005; Younis, 2005; Al-Ansari, 2006). A number of respondents provided comments that express their views about the obstacles that inhibit effective use of the Internet in academic activities. Responses were again grouped according to their key themes and ranked accordingly.

1. Lack of scholarly content in Arabic (78).
2. Difficulty in reading foreign (non-Arabic) languages (73).
3. Internet content not suitable due to religious or socio-cultural reasons (59).
4. The high cost of Internet use makes it unsuitable for home access (55).
5. Too much information, or information unrelated to the topic, is retrieved (36).
6. Lack of skill in using the Internet (28).
7. Lack of supporting infrastructure (27).
8. Lack of quality translating (23).

The most common response indicated by respondents was that the Arabic language is insufficiently represented on the Internet. While as described above some respondents use the internet to learn other languages, for others the lack of Arabic and the prevalence of information in other languages is a major barrier to use. Some of the responses to the open-ended question included:

- *Lack of Arabic information on the Internet.*
- *Lack of scholarly information in Arabic language.*

- *Limited of access to Arabic online services.*
- *Lack of interest from the public to use Arabic.*
- *Lack of support from policy makers in providing information or services in Arabic.*
- *Not all students have ability to understand English language.*
- *Not all users can communicate in foreign language on the levels of reading, writing, or listening.*
- *The use of western languages depends on the level of education.*

A number of respondents (28) pointed to their own lack of skill in using the Internet as a major barrier to its use. As the following sample of these responses indicates, some of these participants linked their skill shortage to the lack of suitable training opportunities.

- *Lack of training is the most important barrier.*
- *I have lack of knowledge how to use it [the Internet] in the correct way.*
- *There are insufficient workshops to teach student and academic staff at Yarmouk University.*

Others believe that the Internet has benefits but the ‘barriers’ arise because the large amount of information that is retrieved can be a disincentive to use.

- *When using Google or Yahoo engine research, I find an enormous number of items and most of them not related with my topic.*
- *With the amount of information on the Internet you need to spend a long time to find what you want.*

Respondents also reported the commonly frustrating problem of information being lost or deleted from the Internet.

- *You will lose the information after a period if you don’t save it the first time.*

There were also comments that expressed the frustration felt by Internet users who find that some sites are blocked due to Internet filtering resulting from government sensitivities regarding inappropriate content and websites.

- *The social life and attitudes [of Jordan] is a big issue. The people still are not allowed to connect with some of the Internet.*
- *Slowing down of Internet traffic due to government filtering.*

It was clear from the answers of participants at academic environment the most barriers related with training, lack of Arabic information, and overall amount of information. However, many respondents referred to the major problems with infrastructure.

- *The Internet services in general.*
- *Slow Internet speed.*
- *Lack of connection to the Internet.*
- *Lack of Internet Service Providers.*
- *Lack of reliable access.*
- *Poor hardware and software at Yarmouk University.*
- *Lack of funding from the government to develop the use of the Internet,*

In addition to listing these various ‘barriers’ above, a number of respondents (n=66) used this open-ended question to indicate that they experienced no particular barriers or problems in using the Internet at Yarmouk University. Responses included:

- *In the academic environment there are no barriers.*
- *I can read English and Arabic then I have no barriers.*
- *I am studying at the university so I can use the Internet without any problems.*

### **6.3 Use of Library information (Part C)**

As one of the goals of the research was to investigate the potential for digital library services to address issues related to the digital divide, it was necessary to ask respondents several questions relating to their patterns and habits of library use.

### 6.3.1 Frequency of visits to the university library

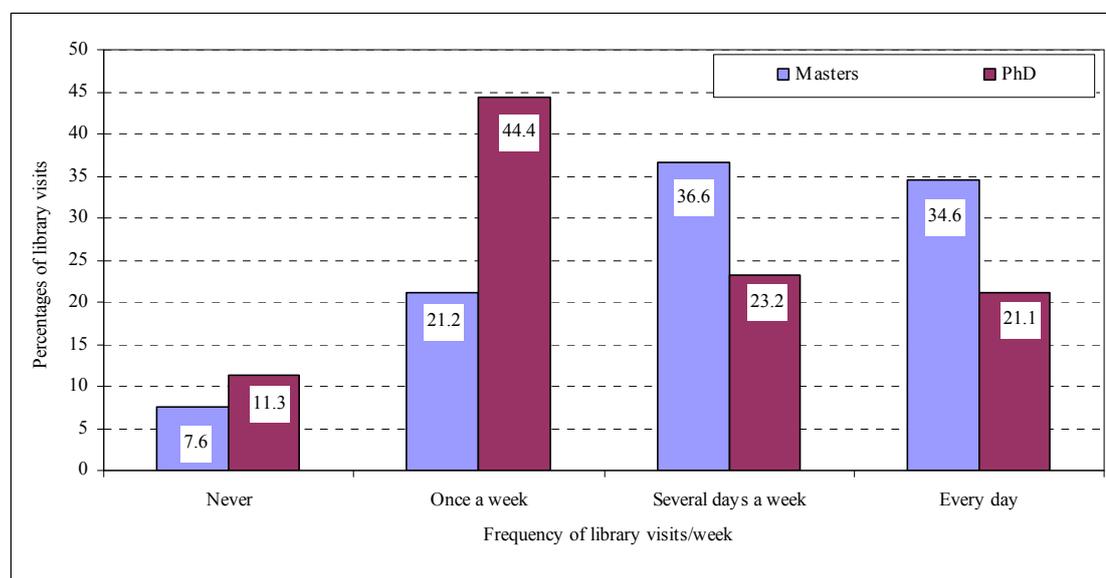
Respondents were asked to indicate how often they visit the university library in person.

**Table 6.C17: Frequency of library visits.**

Valid	Respondents	%
1. Never	33	9.1
2. Once a week	110	30.2
3. Several days a week	114	31.3
4. Every day	107	29.4
<b>Total</b>	<b>364</b>	<b>100.0</b>

In excess of 30% (n=110) of respondents indicated that they visited the library once a week; more than 31% (n=114) reportedly visited the library several days a week and 29.4% (n=107) of respondents visit the library on a daily basis. The results also indicate that 9% (n=33) of the respondents never visited the university library. This data was cross-tabulated according to the qualifications of the respondents.

**Figure 6.C3: Frequency of physical visits the Yarmouk Library (comparison of Masters, n=222 and PhD, n= 142).**



The result of this cross-tabulation indicates that—not unexpectedly—the Masters graduates (and in many cases therefore current PhD students) are more frequent users of the library than are the PhDs graduates (academic staff). Of the Masters

respondents only 7.6% indicated that they never used the library, as compared with 11.2% of the PhDs graduate respondents. At the other end of the scale 34.6% of Masters respondents indicated visiting the library 'Every day', whereas this was true of only 21% of those who have already completed a PhD.

### **6.3.2 Library visits after access was made available through the Internet.**

A further question asked respondents to indicate if the frequency of their visits to the university library had changed since they had access to the Internet.

**Table 6.C18: How have your visits to the library changed after being able to access it via the Internet?**

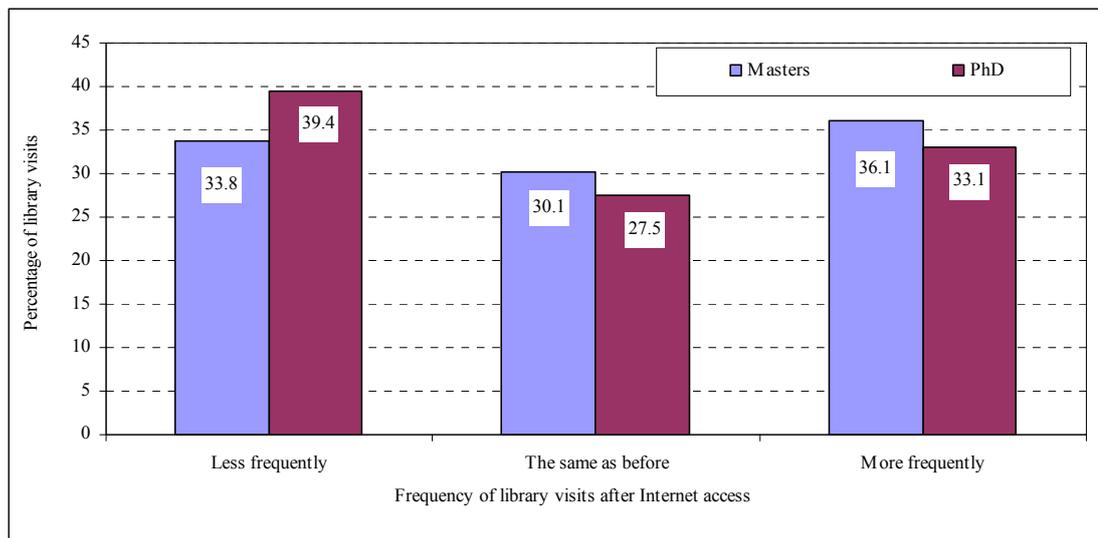
<b>Items</b>	<b>Respondents</b>	<b>%</b>
Less frequently	131	36.0
The same as before	106	29.1
More frequently	127	34.9
<b>Total</b>	<b>364</b>	<b>100.0</b>

Of all respondents 36% (n=131) reported that they visited the library at Yarmouk University less frequently after Internet access became available. On the other hand, 29% (n=106) of respondents continued to visit the library as often as before Internet access became available, and 31.3% (n=127) of respondents indicated that their visits to the library have become more frequent since access became available.

It is therefore the case that the rate of personal library use has remained almost static, with nearly as many respondents reporting an increase as a decrease. These results are somewhat different from those reported from other studies. Research conducted at Curtin University indicates that 52.2% of those surveyed indicated that their number of visits to the Library had declined since they have Internet access (Genoni, Merrick & Willson, 2006). In a study conducted in the United States, 50% of the 106 respondents at the Jacksonville State University reported they no longer visited the library in person after having access to library services via the Internet (Barnett-Ellis & Griffin, 2003).

One possible explanation for the results obtained from Yarmouk University is that respondents visit the Library in order to have Internet access. As reported above (6.2.2.1) 30.4% of all respondents access the Internet from the Library, and it is highly likely that for a number of these (particularly those not on the academic staff) this is their primary source of campus based access. It might therefore be hypothesised that if Internet use was the primary reason for visiting the library in person that postgraduate students would record a higher rate of increased library usage than academics. Responses to this question were therefore cross tabulated according to academic status.

**Figure 6.C4: How has your actual visit to the library become after being able to access it via the Internet? (Masters, n=222; PhD, n= 142).**



The results for increased personal library usage were broadly similar for Masters graduates (mostly current PhD students) (36%) and PhD graduates (academic staff) (33%). This strongly suggests that Internet access alone is unlikely to be the reason for the increase in personal visits to the Library.

### 6.3.3 Awareness of electronic resources subscribed to by the university library

On the basis that respondents' assessment of the University Library collections and services would in part be determined by their level of 'awareness' of these

collections and services, they were asked to indicate whether they were familiar with the electronic resources provided by the Library.

**Table 6.C19: Are you aware of the content of electronic resources that the university library subscribes to?**

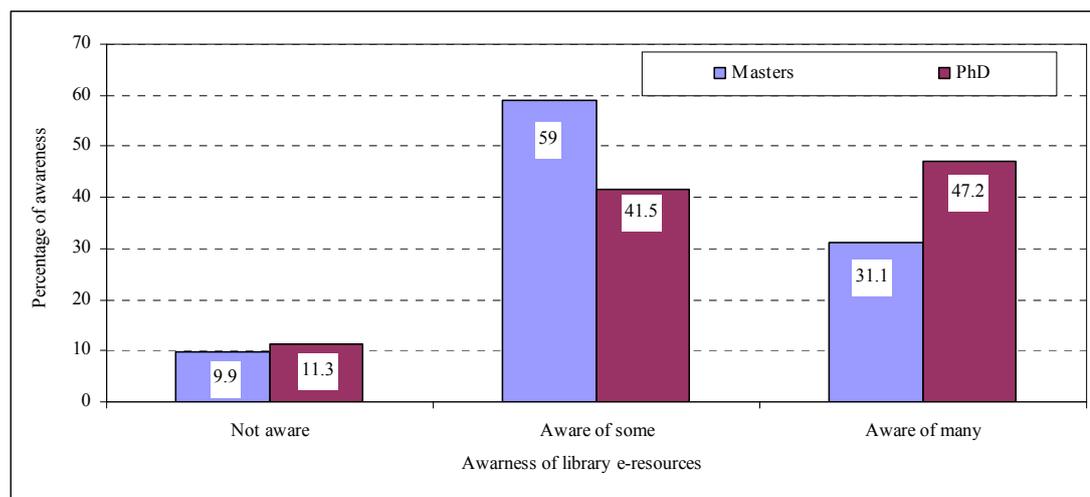
<b>Items</b>	<b>Frequency</b>	<b>%</b>
1. I am not aware	38	10.4
2. I am aware of some of them	190	52.2
3. I am aware of many of them	136	37.4
<b>Total</b>	<b>364</b>	<b>100.0</b>

The majority of the respondents reported that they are aware of the electronic resources that the University Library currently provides, with 52.2% (n=190) indicating that they were aware of ‘some’ electronic resources, and an additional 37.4% (n=136) indicating that they were aware of ‘many’ of the Library’s electronic resources. Only 10.4% (n=38) indicated that they were ‘not aware’ of the electronic resources available at Yarmouk University Library.

Respondents may not be in the best position to identify the extent of their awareness given that they ‘don’t know what they don’t know’. Even so, the reported lack of awareness (62.6% being either ‘not aware’ or ‘aware of some’) may indicate a need for the library to put in place measures which aim to increase knowledge of the electronic resources available.

The results regarding the level of awareness of respondents were cross tabulated in order to reveal differences between Masters and PhD graduates.

**Figure 6.C5: Are you aware of the content of electronic resources that the university library subscribes to? (Comparison of Masters, n=222; PhD, n= 142).**



The result of this cross-tabulation indicates that PhDs graduates (senior staff) believe they have a higher level of awareness of library resources than do the Masters graduates (comprised mainly of current postgraduate students), with 47% of PhD and 31% of Masters reporting that they are aware of ‘many’ of these resources.

### 6.3.4 Access to library services via the Internet.

The range of library services and facilities accessible via the Internet were identified and listed for the respondents to indicate those which they use for study and research purposes. Respondents were able to select from six choices as shown below in Table 6.C20.

**Table 6.C20: Use of library services accessed via the Internet.**

Item	N	%
1. Catalogues	222	61.0
2. Electronic resources	220	60.4
3. Online reference works	120	33.0
4. Electronic books	107	29.4
5. Full text databases	91	25.0
6. Electronic reserve	0	0

The results indicate that the most commonly used library services accessed online by respondents are the catalogues (61%, n=222) and electronic resources (60.4%,

n=220). These results report lower levels of usage than similar studies undertaken in developed countries. For example, a study conducted by Barnett-Ellis & Griffin (2003) reported that 87% of academic staff at Jacksonville State University in the United States use the library catalogues via the Internet, and the study at Curtin University reported that 90.6% of respondents used the Internet catalogue on at least an occasional basis (Genoni, Merrick & Willson 2006).

The use of 'electronic resources' at Yarmouk University was also lower than reported in comparable studies from western education systems. The result of 60.4% compares to a result of 88% for use of 'electronic databases' reported by the respondents to the Curtin University study (Genoni, Merrick & Willson 2006). The terminology used in these two studies is inconsistent, however, and the Curtin University result can also be compared to the 25% of respondents to the present study who reported use of 'full text databases'. In either case it is clear that levels of usage are considerably lower at Yarmouk University.

'Online reference works' (33%, n=120) were the next most frequently accessed service followed by access to 'electronic books' (29.4%, n=107); and 'full text databases' (25%, n=91). A study conducted by Bar-Ilan, Peritz and Wolman (2003) in Israel (situated amid a number of Arab countries) indicated a substantial divide between Israel and Jordan. The respondents to this Israeli study reported comparatively heavy use of databases (73%) and electronic journals (60%). This may be due to the respondents in the Israeli study having access to an extensive array of full-text resources in English. At Yarmouk University the range of electronic full-text databases is comparatively limited. As discussed previously, two major sources (EBSCO and Science Direct) are in English, but their use is therefore largely limited to the Faculties of Sciences; Economics and Administrative Sciences, and Engineering or Information Technology.

An interesting result was that all respondents indicated that they did not use the electronic reserve available through the Yarmouk University Library. While reserve collections are primarily created for the use of undergraduate students rather than academic staff and postgraduate research students, it is nonetheless surprising that at least some use was not recorded, particularly by staff responsible for selecting

material for inclusion in the reserve collection. The Curtin University study reported use of the Library's electronic reserve by 71.3% of responding academic staff and research students (Genoni, Merrick & Willson, 2006).

### **6.3.5 Role of libraries and librarians in bridging of the digital divide**

The role of the library collections and services, and the professional and personal roles played by academic librarians, are factors that are likely to be critical in the success of a university in supporting high quality teaching, learning and research. Libraries and librarians potentially play a major role in bridging the digital divide by selecting and providing access to a range of digital resources, and by supporting access to these resources by designing discipline or subject based portals. Additionally, librarians also play a major role by improving users' technology skills by providing training in the use of newly implemented ICTs and digital collections. Aqili & Moghaddam (2008) reported that librarians and information professionals in developing countries are playing a major role in bridging the digital divide by effectively managing information resources and developing the technology systems and infrastructure that are critical to delivering information.

Academic staff and students are also dependent on the institution to provide necessary technological infrastructure for the library, and also to put in place the policies and that encourage adoption and use of library and information technologies.

The questionnaire therefore included a section designed to give the respondents the opportunity to express their opinions regarding the role played by the library and librarians at Yarmouk University.

This section relied upon respondents indicating their level of agreement with provided statements using a five point *Likert* Scale. These statements focused specifically on investigating the attitudes towards services of libraries and librarians at Yarmouk University, with a particular focus on:

- Those aspects of the collections and services which could be said to constitute a 'digital library',

- The extent to which respondents viewed library staff as ‘partners’ in the academic and research work.

**Table 6.C21: Role of the library and librarians in bridging the digital divide (n=364).**

<b>Item</b>	<b>Strongly Disagree 1</b>	<b>Disagree 2</b>	<b>Neutral 3</b>	<b>Agree 4</b>	<b>Strongly Agree 5</b>	<b>Mean</b>
1. The library provides adequate access to electronic resources.	8 2.2%	51 14.0%	68 18.7%	174 47.8%	63 17.3%	<b>3.64</b>
2. The information acquired from the library’s electronic resources is high quality	6 1.6%	68 18.7%	129 35.4%	117 32.1%	44 12.1%	<b>3.34</b>
3. The librarians offer adequate bibliographic instructions and assistance to enable me to use the electronic resources effectively.	24 6.6%	52 14.3%	97 26.6%	139 38.2%	52 14.3%	<b>3.39</b>
4. The typical access time when using electronic resources for research is satisfactory	15 4.1%	49 13.5%	62 17.0%	185 50.8%	53 14.6%	<b>3.58</b>
5. The cost of some electronic databases is too expensive for Yarmouk Library subscription	9 2.5%	37 10.2%	179 49.2%	109 29.9%	30 8.2%	<b>3.18</b>

Table 6.C21 records that 65.1% (n=237) of the respondents ‘Agree’ or ‘Strongly agree’ with the proposition that the library ‘provides adequate access to electronic resources’. However, 18.7% (n=68) of the respondents were ‘Neutral’ on this matter, while more than 16% either disagreed or strongly disagreed.

A cross-tabulated result examining the responses for Masters graduates and PhD graduates was undertaken.

**Table 6.C22: The Library provides adequate access to electronic resources? (Masters, n= 222; PhD. n=142).**

Highest Qualifications	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
Masters	5 2.2%	26 11.7%	39 17.5%	116 52.2%	36 16.2%	<b>3.68</b>
PhD	3 2.11%	25 17.6%	29 20.4%	58 40.8%	27 19%	<b>3.57</b>

The results of the cross-tabulation revealed little difference between the two groups. Masters graduates were generally more inclined to agree (31.5% as compared to 23.3% for PhDs) with the proposition that the Library provides adequate access to electronic resources, but both groups demonstrated similar levels of disagreement with the statement. The mean scores for the two groups were consistent (Masters graduates = 3.68; and PhDs graduates = 3.57).

While some respondents were generally unaware or dissatisfied with the electronic resources available from the Library, they were more positive when asked to respond to a statement regarding the role of the librarians. A majority of respondents (52.5%; n=191) agreed or strongly agreed that librarians offer adequate bibliographic instructions or assistance and thereby help the respondent to use electronic resources effectively. A number of respondents were, however, less impressed with the libraries efforts in this regard, with 20.9% (n=76) reporting some dissatisfaction, and 26.6% (n=97) of respondents returning a neutral response. This large neutral response may well indicate that many of the respondents were simply unaware of the Library's efforts in this regard and therefore declined to provide an opinion.

Another important aspect in the provision of a digital library services, relates to the quality of electronic resources made available. In relation to this question, the respondents reported a high level of either ambivalence or uncertainty regarding the quality of electronic resources. Less than half of the respondents (44.2%; n=161) either agreed or strongly agreed that the information acquired from the Library's electronic resources is of a high quality, with another 20.3% (n=74) of respondents either disagreeing or strongly disagreeing with the statement. A further 35.5%

(n=129) provided a neutral response. This higher neutral response may again indicate that respondents felt unable to express an opinion, possibly because many are unaware of the information resources provided by the library, or because they aren't in a position to compare these resources with those available elsewhere.

The data showed a general satisfaction regarding the time taken to access electronic resources provided by the library, with more than 65.4% (n=238) of respondents reacting positively to the statement that 'The typical access time when using electronic resources for research is satisfactory'. However, some 17.6% (n=64) of respondents either disagreed or strongly disagreed with the statement, and 17% (n=62) of respondents were neutral in their response (mean=3.58). These responses can be compared with responses to other questions (for example in 6.2.5) which indicated a degree of frustration with the amount of disruption to Internet access.

A remarkably high 49.2% (n=179) of the respondents provided a 'Neutral' response to the statement, 'The cost of some electronic databases is too expensive for Yarmouk Library subscription'. This is likely to be due to participants not being aware of the costs associated with subscriptions and therefore feeling unable to provide a response to this question. Almost 38.1% (n=139) of respondents, however, indicated that they either 'Agree' or 'Strongly agree' that the cost of some databases is too expensive for Yarmouk University. It is difficult to be certain if these respondents have some knowledge of decisions made by the Library with regard to the cost of databases, or they have responded based on a general perception about the high cost of scholarly information and publishing.

### **6.3.6 Perception of access to full text databases in western countries compared with Arab countries**

Additional questions were asked in order to have respondents reflect on differences for researchers in a developing Arab country as compared with their western colleagues.

**Table 6.C23: Western countries provide more full text electronic databases than Arab countries.**

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
Western countries provide more full text electronic databases than Arab countries	9 2.5%	9 2.5%	81 22.3%	125 34.3%	140 38.5%	<b>4.03</b>

Perhaps the most obvious and used element of digital library content in many western countries are the full text electronic databases of journal literature. As indicated in Table 6.C20 only 25% of respondents indicated that they use these databases at Yarmouk University. It is interesting to note therefore, that when respondents were asked to indicate whether western countries provide more full text electronic databases than Arab countries, the majority (72.8%; n=265) agreed or strongly agreed, while only 5% disagreed or strongly disagreed (22.3% neutral). This strongly indicates that academics and postgraduate students from Yarmouk University believe that they are disadvantaged when compared to their colleagues in western universities—at least in so far as it might impact upon their capacity to conduct localised scholarship. More information is provided in the following table which cross tabulates this result by faculty:

**Table 6.C24: Western countries provide more full text electronic databases than Arab countries.**

Faculties	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Total	Mean
Social Sciences and Humanities (Arabic Language)	0 0%	6 3.8%	33 21.2%	52 33.5%	64 41.2%	<b>155</b>	<b>4.12</b>
Education and Arts (Arabic Language)	7 5%	3 2.2%	33 24.4%	37 27.4%	55 40.7%	<b>135</b>	<b>3.96</b>
Business and Economics (English Language)	1 2.6%	0 0%	13 34.2%	15 39.4%	9 23.6%	<b>38</b>	<b>3.82</b>
Information Technology (English Language)	1 5%	0 0%	1 5%	10 50%	8 40%	<b>20</b>	<b>4.20</b>
Engineering (English Language)	0 0%	0 0%	1 6.25%	11 68.7%	4 25%	<b>16</b>	<b>4.19</b>

Respondents from all faculties reported high levels of agreement with the proposition that there are more full text databases available for researchers in western countries

rather than Arab countries. It is noticeable that on the evidence that this disadvantage is felt most keenly in those faculties serving the science and technology researchers teaching in English, with the highest mean responses coming from Information Technology (4.20) and Engineering (4.19). Again, however, the comparatively low number of respondents from these two faculties should be noted.

### **6.3.7 Impact of the digital library on academic research and other activities**

Respondents were also given the opportunity to add additional information by responding to an open-ended question regarding the impact of digital library collections and services on their research and related activities. The respondents were generous in replying to this question, with 300 providing at least some degree of response.

In order to investigate these responses they were again grouped according to their general nature in order to allow the key points that were reiterated by respondents to be identified and patterns to be discerned.

Predictably a common theme of the responses was the capacity of digital library services to provide improvements in research capacity in both qualitative and quantitative terms. Some comments included the following:

1. Improved quality of research output (25).
2. Improved quantity of research output (13).
3. Save time, effort, library space and/or money (10).

Some respondents indicated in very general terms the capacity of digital libraries to support research and/or teaching and learning. A number of the other respondents were more specific regarding the advantages of digital libraries, specifying the nature of the benefits they have experienced. The most common response themes included the following:

1. Retrieving full-text resources and other scholarly information (60).
2. Retrieving up-to-date information (56).

3. Facilitates or enables self-learning (31).

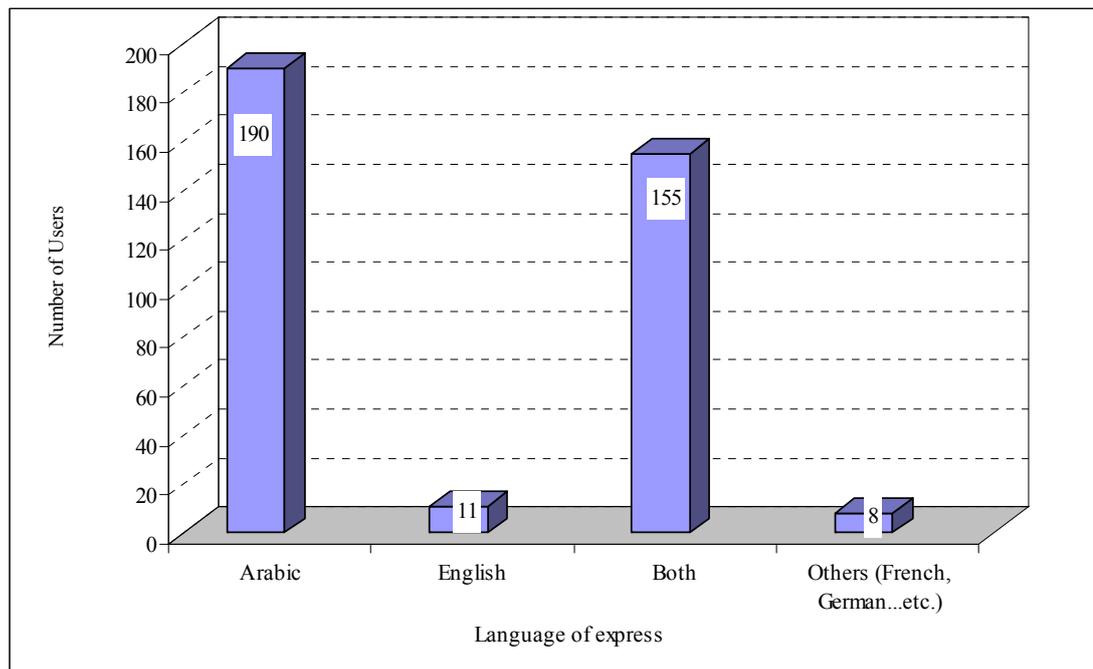
Another set of responses (n=49) were those that drew comparisons between the ‘traditional’ library content and services and those offered by digital libraries. Most of these responses highlighted the advantages or benefits associated with digital library services, and a number of them specified the improvements instituted at Yarmouk University by the development and implementation of digital library services. There were, however, also those respondents (n=19) who were negative regarding the concept of the digital library and expressed some type or degree of preference for more traditional library services, or for material sourced from the free Internet rather than library databases.

1. Prefer to read and conduct research using print material (12).
2. Lack of digital library services in Arab countries (4).
3. Depend on information from the Internet rather than digital library content (3).

#### **6.4 Language and scholarly communications (Part D)**

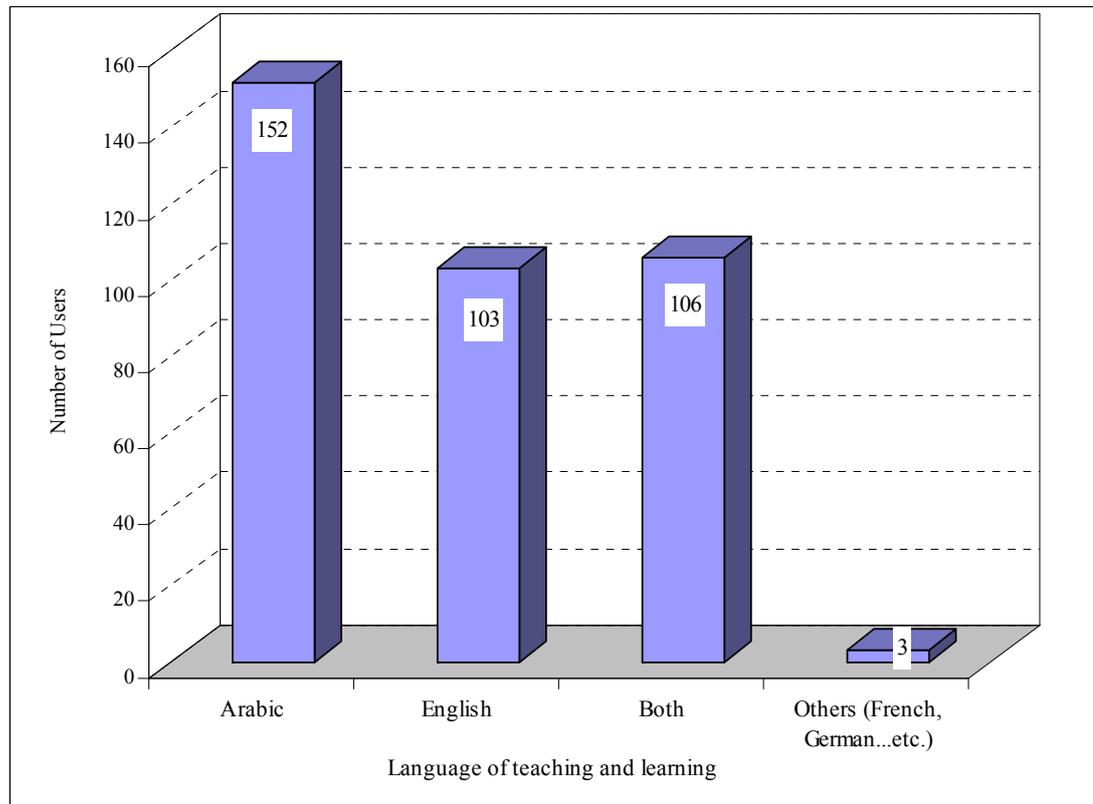
As noted in earlier chapters the Arabic language has been reported as being in a state of crisis regarding its future as a medium for scholarly communication. Questionnaire respondents were therefore presented with questions regarding their use of Arabic and their perception of its future value for the purpose of research and scholarship.

Figure 6.D6: What language do you express yourself in more effectively?



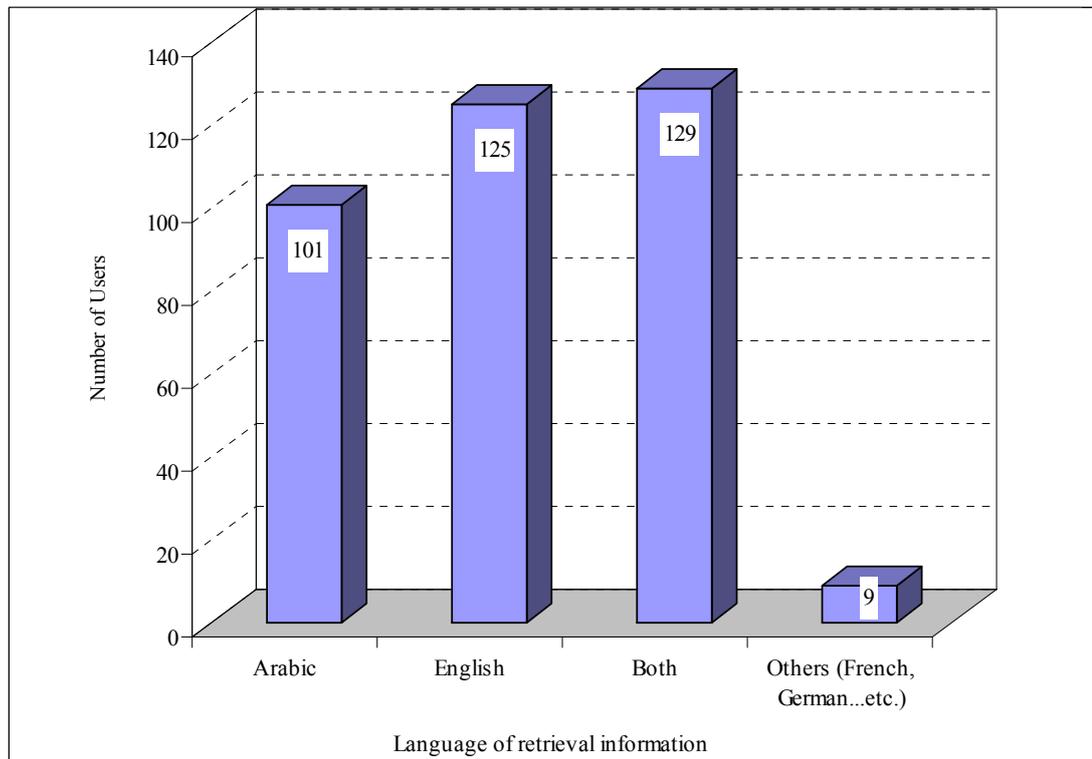
Respondents were asked to indicate which language or languages they use most effectively. The results indicate that respondents use Arabic as a ‘first language’ more than other languages. Out of the 364 respondents, 52.2% (n=190) indicated that they were able to express themselves more effectively in Arabic rather than other languages, while only 3% (n=11) of the respondents indicated that they had a preference for English, and 2.2% (n=8) have a preference for another non-Arabic language. The multi-lingual aspect of Yarmouk University is also apparent, however, in that 42.6% (n=155) of the respondents indicated that they express themselves equally effectively in Arabic and English. As indicated previously, the Faculties of Social Sciences, Humanities, and Education use Arabic for teaching, but the Faculties of Engineering, Information Technology and Business and Economics use English language for teaching, research, and publishing scholarly information. It is highly likely that many of the former group graduated from universities and faculties that teach in Arabic, while the latter graduated from western universities teaching in English, French or German.

Figure 6.D7: What is the teaching or learning language in your department?



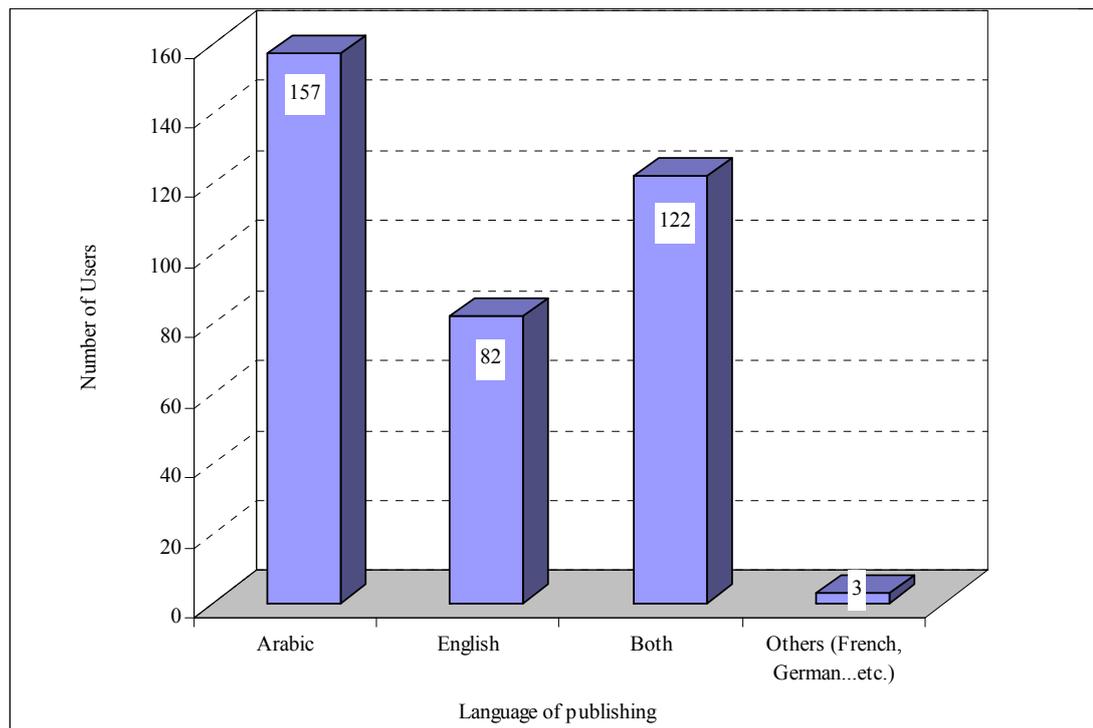
Respondents were requested to indicate which language they used for teaching and learning purposes at Yarmouk University. The data indicates that Arabic is still the language used most commonly by respondents, with 41.8% (n=152) indicating this is the language in which they conduct their teaching, as compared to 28.3% (n=103) nominating English. As indicated by the response to the previous question, however, there is a strong element of bilingualism in the teaching at Yarmouk University, with 106 respondents (29.1%) indicating that they use both Arabic and English for teaching and learning purposes. This indicates that for those Faculties that nominally teach in either English or Arabic that a degree of bilingualism is in fact the norm.

**Figure 6.D8: What language do you prefer to use for the purpose of information retrieval?**



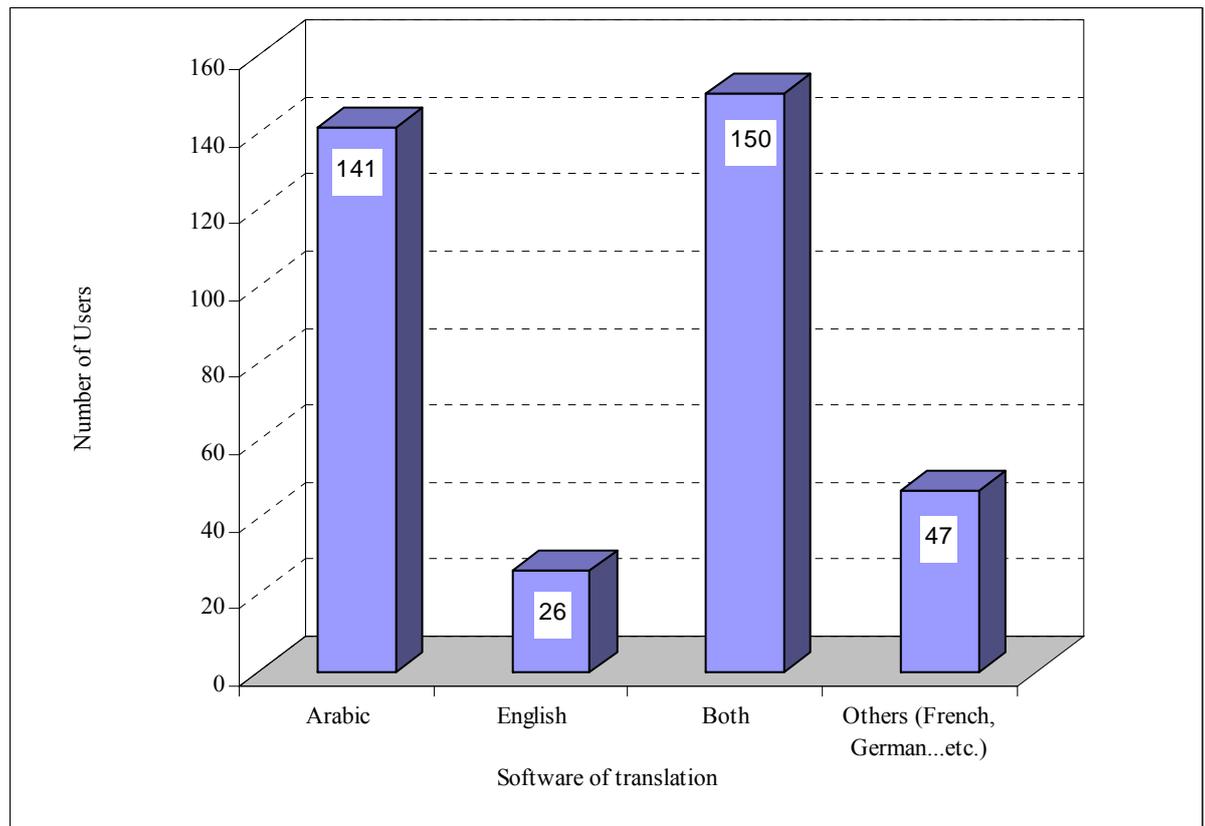
Respondents were asked to indicate their language of choice for the retrieval and access of information. Not unexpectedly, the strong element of bilingualism is again indicated, with 35.4% (n=129) of respondents indicating that they use both Arabic and English. Interestingly, however, of those who indicated they use either English or Arabic, there was in this case a preference for English (34.4%, n=125) over Arabic (27.7%, n=101). This reliance on English is very likely due to the greater availability of scholarly information—including electronically stored and accessed information—in English rather than Arabic.

Figure 6.D9: What language do you prefer to use for scholarly publishing?



When respondents were requested to indicate their choice of language for publishing their research output, the preference for Arabic (43.1%, n=157) was nearly double that for English (22.5%, n=82). In addition 122 (33.5%) indicated they published in both languages. It is unclear on this evidence as to why more respondents have a preference for Arabic rather than English. It may be because they have a greater fluency in writing in Arabic than English; a desire to communicate results to an Arab readership; or it may be that Arab journals are more accessible in terms of achieving publication. It is also the case, however, that a number of respondents who use English as a second language nonetheless see English as their first choice when it comes to publication. Although only eleven respondents reported that English is the language in which they express themselves more fluently (Figure 6.D6), 82 (22.5%) respondents indicated that it is their preferred language for publishing.

Figure 6.D10: What translation software do you use?



Of the respondents, 38.7% (n=141) reported that they use software to translate from English to Arabic only. In contrast, only 7.1% (n=26) indicated that they use software to translate scholarly information from Arabic to English only. Some 150 (41.2%) of the respondents indicated that they use translation software to translate from and to both Arabic and English.

#### 6.4.1 Arabic and English in the Arab academic environment

The threats to Arabic as an academic language come not only from its use (or lack thereof) in university environments, but also due to its gradually declining pre-eminence for daily communication in some Arab countries. Since the advent of English language instruction in the schools of many Arab countries and the onset of globalized communications, many younger people in Arabic speaking countries no longer use the language as their foremost means of daily communications.

As English has also penetrated the university education system as the first choice for teaching and learning in many disciplines, universities are facing choices as to the extent to which they will continue to support Arabic. That is, there may be additional costs involved, as well as academic choices to be made, in supporting a bilingual education system, and universities may need to decide if they will teach exclusively in English.

In general Yarmouk University supports using English for teaching and research activities, particularly in the Faculties of Business and Economics, Information Technology and Computer Science, and Hijjawi for Engineering Technology. English is considered favourably for teaching purposes by many universities in Jordan. Courses are increasingly taught in English, and a prerequisite for enrolling in a Masters or PhD degree is the successful completion of a TOEFL (Test of English as a Foreign Language) test.

Respondents were provided with eleven statements designed to allow them to express their attitudes regarding the comparative place of Arabic and English in higher education by using a five point *Likert* scale measuring from, (1) ‘Strongly disagree’, to (5) ‘Strongly agree’.

**Table 6.D25: Importance of Arabic and English for research in Arab academic environment (n= 364).**

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
1. Yarmouk University supports the use of English for scholarly communication	5 1.4%	20 5.5%	97 26.6%	199 54.7%	43 11.8%	<b>3.70</b>
2. Information in Arabic is important to your research	23 6.3%	86 23.6%	38 10.4%	137 37.6%	80 22.0%	<b>3.45</b>

More than 65% of the respondents indicated that they ‘Agree’ or ‘Strongly agree’ that ‘Yarmouk University supports the use of English for scholarly communication’, with 26.6% of respondents returning a neutral response (mean=3.7). This appears to

indicate that respondents are well aware of the universities efforts to promote English language instruction and research across many areas of the University.

At the same time a majority of the respondents (59.6%) also ‘Agree’ or ‘Strongly agree’ that Arabic language material is important their research (10.4% neutral; mean=3.45). This result is consistent with responses to Figure 6.8 above which indicated the continuing reliance on Arabic material for research.

It is evident that the respondents’ perceptions regarding the lack of Arabic scholarly information does little to encourage conducting and publishing research in Arabic. This current situation would appear to risk perpetuating a system of non-support for Arabic based scholarly publishing. It would also indicate that Arab scholars may suffer a considerable disadvantage when compared with their English speaking counterparts—at least until such time as Arab speaking scholars are equally adept in the use of English.

These results therefore encapsulate the difficulty faced by scholars working at Yarmouk University, in that the University is seen to be encouraging the use of English for teaching at the same time as postgraduates and researchers are still finding the need to use Arabic sources for their research requirements.

#### **6.4.2 Role or (status) of English language in Arab countries**

The respondents’ attitudes towards English were explored further in additional questions. These questions were specifically designed to test respondents’ attitudes regarding socio-cultural factors that might lead a respondent to prefer the use of one language in preference to the other.

**Table 6.D26: Use of English language for research in Arab academic environment (n=364).**

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
1. Using English language indicates prestige and civilization	62 17.0%	110 30.2%	109 29.9%	59 16.2%	24 6.6%	<b>2.65</b>
2. Using English for scholarly communications takes place at the expense of Arabic	16 4.4%	55 15.1%	55 15.1%	168 46.2%	70 19.2%	<b>3.60</b>
3. Using English in our institution indicates cultural colonization by Non-Arab countries	30 8.2%	136 37.4%	97 26.6%	50 13.7%	51 14.0%	<b>2.90</b>

An indication of the extent of the threat to Arabic-based scholarship resulting from the domination by English for scholarly uses is that the majority of the respondents (65.4%; n=238) ‘Agree’ or ‘Strongly agree’ that the use of the English language for scholarly communications takes place at the expense of Arabic language. The implication being that while respondents choose to research, write and publish in English, the one of the affects of doing so is to reduce the profile of Arabic for uses related to scholarly communication.

Responses were less emphatic to the two propositions dealing with what might be described as the cultural impact of English. Almost half (47.2%; n=172) of the respondents disagreed or strongly disagreed that the use of English language is a strong indicator of prestige and civilization, a proposition to which there was also a large neutral response (29.9%). Responses also demonstrated some ambivalence regarding the proposition that using English for educational purposes in Jordan is a form of ‘cultural colonisation’, a proposition to which 27.7% (n=101) agreed or strongly agreed, and 45.6% (n=166) registered some extent of disagreement. Noticeably, however, the neutral response was again quite substantial (26.6%).

Taken together, the results in Tables 6.D25 and 6.D26 seemingly indicate that while there is a strong desire towards the preservation of Arabic for scholarly communications, it doesn’t necessarily indicate an underlying bias against English speaking or Non-Arab countries, as indicated by 45% of respondents disagreeing

with the statement regarding the role of English as a form of cultural colonization (26.6% neutral). Nevertheless 27.7% (n=101) of respondents also agreed or strongly agreed with this proposition, indicating that there is some concern about the use of English at Yarmouk University and its role as an agent of socio-cultural change. But while respondents are apparently sensitive to the decline or lack of prominence of Arabic in their academic environment, they also appear to show an acceptance that English will continue to dominate that environment for a range of reasons. For many of them it may be simply a practical acceptance of the reality of the role English plays in global scholarly communication, and recognition that despite misgivings in some cases they appreciate that their own career will be advantaged by the use of English for research and publishing.

### **6.4.3 Advantages of the Internet for research communities**

Respondents were also presented with two propositions intended to test their attitudes towards the use of the Internet and English in building networks or communities of scholars.

**Table 6.D27: Building scholarly communities (n= 364).**

<b>Item</b>	<b>Strongly Disagree 1</b>	<b>Disagree 2</b>	<b>Neutral 3</b>	<b>Agree 4</b>	<b>Strongly Agree 5</b>	<b>Mean</b>
1. The Internet is useful for linking research communities in Arab countries	6 1.6%	11 3.0%	45 12.4%	197 54.1%	105 28.8%	<b>4.05</b>
2. Using English facilitates communication with international institutions and researchers	10 2.7%	15 4.1%	34 9.3%	206 56.6%	99 27.2%	<b>4.01</b>

Perhaps the most striking result is that a majority of respondents (83.8%) either 'Agree' or 'Strongly agree' that the use of English facilitates communication with international institutions and researchers, with only 9.3% of respondents returning a neutral response (mean=4.01). For scholars with a focus on internationalising their research and building global research communities this is a clear indicator of the perceived place of English as the international language of scholarship.

In one of the most emphatic responses received to the questionnaire, a very substantial majority of respondents (82.9%; n=301) able to see the benefit of the Internet for facilitating research communities in Arab countries. There is therefore a strong perception that the Internet can support Arab scholarship—in the same way that it generally supports scholarship within and between other national, ethnic or language groups—by building and maintaining research networks based on shared disciplinary interests.

#### **6.4.4 Barriers to the use of Arabic on the Internet**

As reported previously some of the issues regarding the ongoing development and use of Arabic as a scholarly language relate to problems in adapting the language to the digital environment. Questions were therefore included that asked respondents to address issues related to both the facility of using Arabic on the Internet, and the related problem of the adequacy (or otherwise) of Arabic information sourced from the Internet.

**Table 6.D28: Barriers to the use of Arabic language on the Internet (n= 364).**

<b>Item</b>	<b>Strongly Disagree 1</b>	<b>Disagree 2</b>	<b>Neutral 3</b>	<b>Agree 4</b>	<b>Strongly Agree 5</b>	<b>Mean</b>
1. I cannot read some of the Arabic information on the Internet due to unrecognised characters	23 6.3%	97 26.6%	86 23.6%	138 37.9%	20 5.5%	<b>3.10</b>
2. There is inadequate scholarly information in Arabic on the Internet	13 3.6%	27 7.4%	88 24.2%	177 48.6%	59 16.2%	<b>3.66</b>
3. Arabic versions of some sites are not understandable	6 1.6%	60 16.5%	108 29.7%	173 47.5%	17 4.7%	<b>3.37</b>
4. Many sources in Arabic lack authenticity and accuracy	13 3.6%	30 8.2%	118 32.4%	161 44.2%	42 11.5%	<b>3.52</b>

The nominated ‘barrier’ to the use of Arabic for scholarly communication which attracted the most pronounced degree of support (mean=3.66) was the proposition that ‘There is inadequate scholarly information in Arabic on the Internet’. There is strong argument (as put in the *Arab Human Development Report 2003*) that Arabic

scholarship will make little contribution to human development unless the language has greater presence in the online environment. This result suggests that while respondents, as expressed elsewhere in responses to the questionnaire, accept the importance of English for their research and publishing, they are nonetheless sensitive to the issue regarding the future of Arabic as a scholarly language. This view is likely to be supported by the fear that the under representation of Arabic in the online environment may have far-reaching implications for Arab cultures beyond the decline of the language for scholarly uses.

Perceptions about the authority and accuracy of Arabic sources of information are also seen as an issue. More than half (55.6%; n=203) of respondents either agreed or strongly agreed with the statement, that ‘Many sources in Arabic lack authenticity and accuracy’, while 32.4% of the respondents returned a ‘Neutral’ response. Although no comparable question was asked regarding English, this result suggests that a lack of authenticity and accuracy of Arabic sources may not only encourage respondents to use English for their own research and scholarly communication, but may also impact negatively on research productivity for those who may require access to Arabic information in their research. It is certainly possible, based on this response, that some researchers will seek English information based on a perception that it has greater accuracy or reliability.

Some of the ‘technical’ problems with the use of Arabic in a digital context were also evident, with 43.4% (n=158) of respondents agreeing or strongly agreeing that they were unable to read some of the Arabic information on the Internet due to ‘unrecognised characters’, compared with 32.9% (n=120) who either strongly disagreed or disagreed with the same statement. There was, as elsewhere in this section of the survey, a fairly substantial ‘Neutral’ response of 23.6%.

More than half of the respondents (52.2%; n=190) also indicated that the find Arabic information on some web sites is ‘not understandable’, while 29.7% remained neutral on the same statement. This result suggests that despite the continued improvement of the technology and software required to make Arabic easily read in a digital environment, that some users continue to experience problems in this regard. It is also likely that it is a reflection of the use of non-standard Arabic on many websites.

Although the general nature of these results is troubling for those who believe that the future of Arabic as a scholarly language is important for Arab learning and knowledge and the well being of Arab societies, it is also apparent that there is a degree of ambivalence on a number of issues raised. This is shown by both the contradictory results and the consistently high number of neutral responses. This ambivalence may be explained in part because of respondents' personal attachment to their native language and culture, and is very likely an acknowledgement that despite the English proficiency of many respondents they still find it easier to conduct research and write fluently in Arabic. Balanced against these factors is the pressure to work within traditions of modern western scholarly communication that strongly advantages an English language background; a government and university that support the use of English as a key component in the development of the country and the marketability of the institution; and a technological environment that furthers the global domination of English at the expense of most other languages.

#### **6.4.5 Role of universities in promoting the use of Arabic language on the Internet for the purpose of scholarly communications**

Warschauer (2001) discussed the role of the language as a critical issue on the Internet. Importantly he sees language as being an identity marker for the nation in the age of information, claiming that 'In language there is life, in language there is death'. Respondents' attitudes towards the use of Arabic in scholarly communication were tested by the use of an open ended question; 'In your opinion, is it important for universities in Arab countries to promote the use of Arabic for the purpose of scholarly communication'. Respondents made comments which have been grouped according to their emphasis.

Most responses were supportive of the need for universities to continue to promote the use of Arabic for scholarship. Interestingly, while many responses referred to the continued importance of Arabic for teaching and research, the most commonly received responses referred to the cultural importance of the language as a marker of Arab ethnic and religious identity. This is another indication that a threat to Arabic in

the scholarly environment (and likely other sectors) is seen as a danger to Arab culture.

1. Arabic is the language of the Arab people, of religion (the holy Qur'an) and/or national identity (122).
2. Arabic is important for research and teaching for some faculties and disciplines (97).
3. Some students cannot communicate effectively in non-Arabic languages (62).

Other respondents, however, were less keen to defend the use of Arabic and responded to the question in the negative. Typically, they referred to the established domination of English as a reason for Arab universities to longer provide active support of Arabic.

1. Most research is published in English (or other non-Arabic languages) and Arabic information lacks authority (38)
2. Students can use languages other than Arabic, and translate if required. (27).

#### **6.4.6 Promoting the use of Arabic on the Internet in the academic environment**

Finally the respondents were asked the following open-ended question: 'In your opinion, what could your university do to promote the effective use of the Arabic language in the academic environment?' The responses were grouped as follows.

1. Digitise Arabic content (98).
2. Create Arabic databases and websites (73).
3. Enhance translation (including summaries) of non-Arabic texts (51).
4. Train faculty members (to access the Internet, and design instructional websites in Arabic) (30).
5. Support the publication and acquisition of research in Arabic (26).

The first two responses are clearly closely related, and taken together indicate that 171 respondents provided comments that pointed to the need to enhance the

availability and presence of digitised Arabic scholarship. There was also an indication from respondents that individual academics feel they could contribute to the task if they received the necessary training in creating websites in Arabic.

In addition a number of respondents (n=8) indicated that they did not believe it was necessary to support Arabic at Yarmouk University as the majority of scholarship and research was not published in the language.

### **6.5 Summary**

The questionnaire responses provided a wealth of information related to the research question and objectives set for this project. As indicated in the above presentation of the results, however, the data collected from the questionnaire included elements that were apparently ambivalent and even contradictory, and about which conclusions could only be drawn in a tentative manner. This is possibly a reflection of the different discipline background of respondents, and where possible this has been further explored through the use of cross-tabulations. It is also possible, however, that it is simply a reflection of different personal experiences coupled with issues relating to the limits of quantitative data collection. The further, qualitative examination of some of these apparently contradictory elements of the questionnaire results was the purpose of the interviews, which are reported in Chapter 7.

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## Chapter 7 Interview Results

### 7.1 Introduction

The literature indicates that using both quantitative and qualitative research methods allows the researcher to strengthen study results, and is particularly suitable when entering a relatively unknown social system. Carefully selected qualitative methods also allow the researcher to conduct the study in a natural setting that is comfortable for subjects (Creswell, 1998, p.15; Richard & Grinnell, 1998, p.195). For the qualitative element of this research nineteen semi-structured interviews were conducted with academics representing five faculties at Yarmouk University. The interview format and questions were built upon the results of the questionnaire survey and were intended to seek qualitative data regarding the attitudes of participants on key issues related to the research. There was therefore an emphasis in the interview design on questions dealing with the digital divide and role of academic institutions, digital libraries and government policy in bridging the divide.

All interviews were recorded with the permission of the interviewee, and a consent form was signed by each interviewee. The interviews were later transcribed by a professional transcriber. Notes of each interview were also taken and kept. All interview transcripts were e-mailed to the interviewees for their review. In all cases interviewees returned the transcripts without amendment.

The transcribed interviews were also coded according to various 'themes'. These themes were derived from the literature review and the research objectives of this study. Additional themes emerge based on recurrent responses received in the course of the interviews. The process of labelling or coding themes was undertaken physically, with labels or codes being placed next to each point in the transcript where matching themes occurred. These were then typed and categorised using Microsoft Word. Coding allowed the researcher to locate

relevant excerpts from all the interview transcripts. The researcher coded the interviews from 1-19, each code identified by page number, number of interview, then number of line; for example, (A2:2-18) represents (A2) academic interviewee number, (2) page number and (18) line number.

## **7.2 Demographic information**

The follow-up semi-structured interviews were conducted with 19 questionnaire respondents who had expressed their willingness to participate, and provided their names and contact details. These participants were from three different areas of Yarmouk University. More information about the demographic characteristics of the follow-up respondents can be found on Tables 7.1, 7.2, and 7.3. The semi-structured interviews were conducted following completion of the document availability test and return of the questionnaires. Eight main questions were asked of all participants, with some additional, spontaneous questions when warranted.

Ten out of the nineteen interviewees were academic staff who had participated in the questionnaire survey. In addition, five of the nineteen interviewees were senior librarians and four were policy makers, and none of these nine interviewees (librarians and policy makers) had participated in the questionnaire. All nineteen interviewees have Arabic as their first language. Of the academic interviewees, nine received their most recent degree from English speaking countries while the postgraduate student received his from Jordan. Ten of the interviewees hold PhD degrees.

Two of the nineteen interviews were conducted in Arabic as the interviewees expressed a preference for using Arabic rather than English. Conducting the interviews in a second language in most cases resulted in some occasional 'clumsiness' in the form of expression. This was adjusted by editorial amendment when necessary to ensure clarity of meaning, but wherever possible the original expression has been retained. This results in some slight peculiarity of phrasing at some points of the interviews. The transcribed interviews were

returned to participants for checking. The two interviews conducted in Arabic were also translated into English before being returned to the relevant interviewees for checking.

### **7.2.1. Interviews with academic staff**

All ten of the academic interviewees have worked at Yarmouk University for at least five years. Four hold an academic rank of Professor; two are Associate Professors, two are Assistant Professors, one is a Lecturer, and one is a postgraduate student.

Interviewees were selected in order to provide coverage of the various faculties included in the questionnaire. Three were drawn from the Faculty of Education; two each from the Faculty of Arts; Economics; and Information Technology, and one from the Faculty of Engineering Technology. The Postgraduate student is from the Faculty of Linguistics. Key demographic information regarding academic participants is presented in Table 7.1.

**Table 7.1: Academic interview participants.**

<b>Participant Number</b>	<b>Faculty</b>	<b>Rank</b>	<b>Age</b>	<b>Last Degree Earned</b>	<b>Language of Interview</b>
<b>A1</b>	Education	Professor	43	PhD	English
<b>A2</b>	Arts	Postgraduate Student	28	Masters	English
<b>A3</b>	Economics	Lecturer	30	PhD	English
<b>A4</b>	Economics	Professor	35	PhD	English
<b>A5</b>	Education	Assistant Professor	35	PhD	English
<b>A6</b>	Engineering Technology	Assistant Professor	32	PhD	English
<b>A7</b>	Education	Professor	40	PhD	Arabic
<b>A8</b>	Information Technology	Professor	45	PhD	English
<b>A9</b>	Arts	Associate Professor	42	PhD	Arabic
<b>A10</b>	Information Technology	Associate Professor	33	PhD	English

### 7.3. Semi-structured interview results

Throughout the analysis of the interviews in this chapter and elsewhere, the interviewees will be referred to by the numbers used in Tables 7.1, 7.2, and 7.3. Readers are therefore referred to these tables in order to verify additional information about particular interviewees. Responses to the main eight semi-structured interview questions are presented below, in the same sequence as the questions were asked.

#### 7.3.1 Interviews with academic participants

**Question One: How do you perceive the impact of the Internet on your academic and professional activities?**

The interview participants from the academic staff were firstly asked to evaluate how they perceived the impact of the Internet on their academic and professional activities. The participants indicated the Internet provided many benefits related to their research, study, and teaching at Yarmouk University. In particular, they found that it is easy to browse and locate relevant information in their field. Respondents praised the use of the Internet for the benefits it provided to the higher education system, academic teaching and the learning process in general.

Almost all of the interviewees highlighted the benefits the Internet has had on their research, pointing to the ease with which current and authoritative information from a wide range of international sources can be retrieved. One typical response indicated; *It [the Internet] gives me the opportunity to be familiar with many contemporary issues concerning my field of study, psycholinguistics. (A2: 1-2)* Another academic concluded: *Nowadays no researcher can do research without the Internet. (A1: 1-15)*

Another academic interview believed that the impact of the Internet on research included the advantage of being able to save time and effort in duplicating existing research:

*In term of research, you can go and find literature reviews, find so many articles and excellent papers from the Internet. Before the Internet I used to go to the library for some journals, some books, and most of it was outdated . . . also you might face another problem after you finish research and spend all this huge effort, you find that someone somewhere did the same topic and came up with similar results. Now days with Internet services, you can search (and survey) for literature and find out if someone already did what you are planning to do. This way it saves a lot of effort, a lot of time and also you can go to some better opportunities in doing your search for other colleagues. (A4: 2-19)*

A number of academic interviewees also stressed the way in which the Internet enhances research productivity by supporting email and thereby enabling more effective communication between researchers.

*I think the Internet is the most advanced method to get information and to share information with other academic personnel . . . Of course, the Internet is an important tool for communications. You know that e-mail is the number one method in all academic institutions to send and receive messages. So I think the Internet plays a vital role to academics in general. (A10: 4-24)*

In so far as problems were perceived, interviewees indicated that the issue is more likely to be in the abundance of information and the difficulty in assessing its quality.

*The Internet has affected all parts of academic life. The problems sometimes seem to [be in] know[ing] which kind of information you take or not. All information on the Internet is available, you can't [always] rely on all information, so; if you get any information from [the] Internet you have to select carefully before you rely on them. (A1: 1-6)*

Several of the interviewees reported that the Internet can be of benefit to not only their research but also their teaching. Some of the responses explained some of these benefits to their teaching:

*I can benefit from the Internet in my courses, in teaching classes, in all my research activities. The Internet is a major factor in the academic environment in general. So there is no doubt that the Internet is very important to any instructor in my field and in academic work generally. (A5: 3-13)*

*I think the Internet is very important. It has improved my abilities, my academic abilities, my professional abilities . . . [For] many of my lectures I use the Internet, actually in the classroom. It is a very, very rich resource with regard to information and I can use the Internet to find many websites that are very useful to students, and I can benefit students from what I can provide them from the Internet. (A6: 3-20)*

In responding to the first question, several of the interviewees also touched upon the issue of the divide that may exist between developing and developed countries. For one interviewee, the emergence of the Internet was an important element in bridging this divide.

*The Internet has a massive effect when used to transfer scientific, academic, or professional activities. It is also used to transfer knowledge so every information exchange achieved now electronically decreases the digital divide among [between] high-tech countries and others. This lets the third world countries gain an improvement in an easy way. The Internet has become a major asset in the ability of any level of academic institution to use it in publishing, gaining knowledge, and retrieving research, books and articles. (A7: 3-29)*

*[At] my university, Yarmouk University, before if you want[ed] to do some research you had to make a long correspondence to get an article for example from international journals. Now . . .*

*you can easily, in some seconds, get all the research especially in the western world and in all languages . . . In the past if you are conducting research, you have to settle just for local and Arabian journals, now the matter is different. (A3: 2-14)*

Another interviewee was more specific about the role of language and the availability or usefulness of non-Arabic research, suggesting that having the vast information resources of the Internet available placed an added requirement on academics to be at least capable in the use of English.

*Interviewer: Do you think it has improved the researcher in the Arab world?*

*Interviewee: It depends on the researchers themselves. . . The problem here you know is that it has been seen that only 1% of the information on the Internet is in Arabic. So the Arabic researcher has to know how to deal with the English resources, articles written in the English . . . The English language is the most important barrier that will prevent the students to go back to [the] Internet. (A1: 1-17)*

Overall, academic interviewees reported that the Internet affects all major parts of academic life, and has become an important part of their research activities. Importantly, there was also some indication in their responses to this first question that respondents were keen to discuss two issues that were to be raised in later questions. Firstly, the role of the Internet in enabling academics working at Yarmouk University to overcome some of their limitations in accessing information compared to their counterparts in western universities; and secondly, the issue of language and the under representation of Arabic in the digital environment.

**Question Two: In your opinion what could your government do to promote the effective use of the Internet?**

Interviewees were asked to identify the means by which they believe that government policy could promote effective use of the Internet. A number of the responses were quite generalised claiming that the government should simply be doing more to promote Internet availability and access, while others indicated that particular public organisations, including educational facilities, should be targeted for priority attention.

*Schools, public libraries and cultural institutions must be connected to the Internet to allow for the majority of people to benefit from this information source. (A2: 1-3)*

*Assist faculty members and students by facilitating [their] logistical needs: [by providing] computers, networks and hardware or software. (A5: 1-9)*

Other responses registered concerns about more specific aspects of ICT infrastructure that they believe currently impede the uptake of the Internet in Jordan.

*The government can establish or help in establishing Local National Networks. (A5: 1-15)*

*[Issues exist in terms of] developing the Internet infrastructure, the infrastructure of supplying information, and the capacity of the communication lines. (A6: 1-13)*

Some participants were able to make comparisons with developed countries where they had worked and studied, and commented on the disadvantages experienced in Jordan. One participant noted that he was ‘proud’ of the improved infrastructure in Jordan, but was also aware of the ongoing disadvantages when compared to countries like the United States.

*Compared with the USA where I resided for five years, the fees for Internet connection and also broadband connection is still*

*high. Fast-speed Internet is still very limited; In general, it is only for pay cabins, universities and government offices, it is not available yet for the public. I think the government can help people to have broadband Internet connection at a reasonable price. (A10: 1-12)*

Another academic interviewee stressed the difference in research culture and productivity between Arab countries and developed western countries as being critical. He believed that the Internet is important as it helps to overcome this difference by providing access to quality research information.

*Qualitative and analytical research is needed in this area [Jordan]. We need to . . . get the information and the knowledge and the grey material in a short time and at a fast speed in order to accelerate the efforts of scientific research. I want to explain the following. If you look at any Arab university, or here in Jordan, how many research faculty members do [research] and you can compare this figure with faculty members in [the] USA or UK. So we have to accelerate the efforts in scientific research through using a simple and fast means, which is the Internet. So far the main factor is the need for real academic research. (A3: 2-9)*

Cost was also seen as a crucial factor by another academic who advocated for increased government intervention to reduce cost and enhance the level of participation.

*I believe that one of the greatest barriers to using the Internet and bridging the digital gap is the cost of Internet or computer use. Still computers are relatively expensive in Jordan compared to income. The use of the Internet is expensive too. Take for example you need to pay close to \$50 monthly to have an Internet service at your home and this is . . . a large amount if you take [into account] the average income in Jordan. The government can in my opinion assign certain funds, certain help, to provide people with computers, or subsidies the price*

*of computers and price of Internet services. . . . I believe that will increase the number of participants in Internet services and by increasing the number, the average cost of providing the service will be less. (A4: 2-23)*

Although the issue of reducing cost was mentioned by a number of interviewees, few were specific as to how this might be achieved. One interviewee, however, suggested that it could be achieved through government financial policy which aimed to underwrite private sector investment in this area.

*[The] Government must decrease taxes imposed on communication companies. This will lead the latter institutions to decrease tariffs for connecting to the Internet at home (A2: 1-9).*

Although the issue of cost was raised frequently, one interviewee took a different approach by highlighting the falling price of Internet access in Jordan and the advantage the country has when compared to its regional neighbours.

*Another thing which is important is that the privatisation of the telecommunication sector in Jordan did a favour for [the] Jordanian people in terms of price of [the] Internet and telecommunication[s]. Now you can easily have [an] Internet service at home in dial-up or ADSL at a reasonable price which is not available in several countries around Jordan. (A3: 2-18)*

Jordan's regional advantage was also raised by another participant who emphasised the improvement in Jordanian ICT infrastructure compared to other Arab countries, while also noting that Jordan continued to lag behind developed countries.

*Jordan [has undertaken] many steps in consolidating the infrastructure in terms of IT and telecommunications since 1990, and now I think it is classified in the Arab region in first or second or third in terms of telecommunications infrastructure and in IT services. This doesn't mean at all that*

*we can compare with [the] Western world but we can in my university. Here each five students have on average their own PC, [a] new PC. Yarmouk University, I think has more than 3000 new PCs which is plenty . . . You can compare this to countries like Sudan or like Syria. I think we have stepped in advance of these countries. (A1: 1-13)*

The issue of language, and in particular the importance of English, was also raised in the context of the question regarding government policy. One participant put forward the view that universities should take the initiative in this regard and create academic resources in Arabic.

*I think if you change your question to be about universities, because you know our universities are independent. So each university can put its put own policy. I think our . . . government should advise our universities in Jordan to work together to establish Arabic databases, so all the articles, all the information to benefit our students could be on this database. (A1: 1-8)*

In relation to this issue, another interviewee provided an example of some work being done in developing Arabic-based technologies for Internet searching, but noted that the enterprise was not a government initiative.

*[For] The Arab countries [the] availability [of Arabic language resources] on the Internet is poor. Just the Arab language in this field is limited . . . There exists just one institute in this field established by a young Arab from Kuwait that is in Egypt and it employs more than 200 scientists working on developing Arabic language search engines to retrieve information written in Arabic. This is a personal institute. (A2: 2-9)*

One academic interviewee suggested that the government could move their services to the Internet as a strategy to promote and encourage greater Internet usage amongst the wider community.

*The government can [put in place] certain policies moving toward digital government or e-government. If [they] provide government services through the Internet you are forcing people to use the Internet and by using it more and more you let people get accustomed to this way. You can bridge the gap and help people using and utilising Internet services effectively.*  
(A4: 3-20)

Overall, academic responses to Question Two indicated concerns about the level of Internet use and a general belief that the Government should be intervening to promote and encourage greater access. In terms of limitations to Internet use, cost, infrastructure and language were identified as key areas, but there were few suggestions which specifically explained how Government policy might be used to resolve these various issues.

**Question Three: What are the most important factors that promote the effective use of the Internet in academic research?**

Interview participants were asked to identify the most important factors that promote the effective use of the Internet in their research activities. The answers varied, with some of the matters regarding cost and infrastructure that were raised in relation to Question Two re-mentioned. In particular, in order to reap the potential benefits of the Internet for research and teaching, several participants emphasised that the ensuring a good speed of Internet access would allow the utilisation of many Internet features, especially videos, substantial blocks of texts, and large files of data.

*In regard the effective use of [the] Internet, one of the main factors is infrastructure, the Internet infrastructure, the infrastructure of supplying information, the capacity of the communication lines. . . . it takes time to download information, it is very slow, and it has very low capacity. We can provide a better infrastructure with regards . . . [to] communication lines between the local area network and the*

*world. [In terms of] The local area network it means within the University or in Jordan. (A6: 3-10)*

Several participants identified the need to obtain access to the major scholarly databases, indicating that if the Internet is to fulfil its potential for research and teaching, then it needs to serve as a platform for the delivery of subscription databases and not just a source of 'free' information.

*I think we have to actually subscribe to the main databases that provide information on vital subjects. We have to either translate or find literature related to all academic people. In general, this is the main thing, to subscribe to the very best databases in world. (A6: 1-18)*

*Encourage them [academics] to use electronic information by making the world's best sites in academic research available to them, such as those under control of reputable publishers such as ISI [Institute of Scientific Information], also the elaborated [full-text] journals. (A7: 3-23)*

As several participants argued, however, the databases need to be accessible to academic users at any time of the day if their value is to be maximised.

*Any faculty member should have the ability to access the Internet from his office, in the Library or outside the University. I'm not going to [the] Library from 8 am to 5 o'clock in the evening. I would like to go to the Internet or search the Internet at any time, at midnight. I have to have access or authorisation to access databases from outside [the] University, from outside the Library; especially from home . . . I think access to the Internet from inside or outside [the] University, 24 hours is a key issue in this regard. (A5:2-22)*

*The academic researcher . . . must have permission to use the University network from home. Everyone must have [a] PC in*

*their office, and the cost of using the Internet decreased to them. (A73-17)*

Academic interviewees also linked the availability of databases to the need to promote their availability and provide adequate training in their use. The role of the Library was specifically mentioned in this context as being the key promoter of the value and use of new information services to others.

*Librarians in academic life or in particular at [the] University they are not spending enough effort to spread the education [idea] of digital libraries. For example I expect someone from the Library to visit the Faculty here every semester and to talk about new things in the Library and how people can utilise the Library. Bring some examples, open [up the] Internet, have some presentations to convince academics to use the digital library. Many people [do] not know how to use the digital library . . . Especially at the beginning you have to make more effort to spend more time talking to people at the University, to faculty members, to researchers, to convince them to utilize the library and to learn the skills to use the digital library. . . If I don't know how to use the digital library, I don't think I will promote it or I will say it is good. So you let people, you let researchers know how [they could] to benefit from the digital library. (A4: 2-1)*

*Connect to digital databases around the world and tutor students on how they could benefit from the Internet in developing their writing skills and balancing between different opinions (A2: 1-13)*

In regard to searching databases, one academic explained that an understanding of the English language was an essential skill to ensure that searches were both effective and fruitful.

*We have to actually develop academics' ability with regards to [the] English language, so as to deal with information better on*

*the Internet . . . [Academics need] to develop their English language skills, you know, to search better databases, for more subject specific databases [information]. (A6: 3-5)*

As with Question Two, the issue of research culture was also raised, with one interviewee expressing the opinion that there is a general lack of motivation to use the Internet and researchers need to be shown how and encouraged to use the Internet for research based activities.

*I think the main factor is the people themselves, if the person is motivated and concerned to find a hot topic, a unique topic. We have to motivate people to find something unique, something [so] they can get benefit from this kind of research. (A1: 1-7)*

In addition to general matters of cost and infrastructure, once again, the key issues raised regarding the effective use of the Internet in an academic environment related to the availability and accessibility of databases with some users describing these as being more than simply ‘technical’ issues, and that language is an important component of ‘accessibility’.

**Question Four: If you are familiar with the term digital divide, what does it mean to you?**

Academic interview participants were asked to explain their understanding of the term ‘digital divide’. It was important that interviewees had the opportunity to express both their understanding and familiarity with the concept.

Several participants discussed the meaning of the term in the context of its reference to the several types of ‘divides’ that can separate groups of people who have access to digital technologies and those that don’t. One academic interviewee, for example, believed that the digital divide was a form of generational difference.

*Also the digital divide can be from a generational point of view—old generation and new generation of people. Firstly, the new generation individuals are more accustomed to the*

*Internet and more accustomed to the characteristics and properties of the Internet and how can they use it more effectively than older people. It is because the new generations learn in the area of the Internet and [other] technology, not because they are more intelligent . . . (A6: 3-16).*

Another academic interviewee saw the digital divide in terms of differences in individual aptitude in terms of grasping new technologies, an issue which is not limited to the Jordanian context.

*It is the gap between those who know how to use a PC and the Internet and those who don't know. It exists among all societies and at family level (A9: 4-5).*

While one academic identified the technological gaps that could exist within a country or society depending upon socio-economic circumstances, he also introduced the term 'global digital divide' to explain the gap that separates countries on the basis of their access to digital technologies.

*The digital divide refers to differences in technology access between groups; groups generally discussed in the context of a digital divide are socioeconomic (rich/poor), racial (white/minority), or geographical (urban/rural). The term 'global digital divide' [more accurately] refers to differences in technology access between countries (A8: 1-18).*

Most academic interview participants explored to some extent the meaning of the term 'digital divide' in this 'global' context, with a small number including reference to other forms of digital or technological divides that might exist within a particular society. Significantly, a number of interviewees spoke about the bigger picture when considering disparities in technological development between countries by relating the concept of the digital divide to the idea of 'development' more broadly. A number of responses discussed the digital divide as being just one symptom of broader technology and knowledge gaps that exists between developed and developing countries.

*Digital divide is a result . . . of the huge difference between the resources and the capacities between states. For example, you can't compare between Chad and Germany in terms of technology. There is a technical gap between the third world, the south and the first world, the north. (A3: 2-12)*

*To me the digital divide means the difference between people in developing countries and people in advanced countries in terms of utilising computers . . . by comparing the number of computers, number of ADSL per capita . . . the huge gap is a product of the level of development and advancement between countries. I think, in my opinion, that the digital divide is part of the divide between developing countries and advanced countries. (A4: 2-28)*

*The digital divide we have firstly in terms of infrastructure. [A] Digital divide can mean [the] difference in infrastructure, particularly infrastructure in providing information through the Internet and available infrastructure that provides more information, more data and information, and is faster at providing information. (A6: 3-13)*

In a similar vein, another academic interviewee described the digital divide as a 'vague term', suggesting that it embraces not only the Internet but other forms of widely accessible communication technologies.

*My understanding of the digital divide is the difference between, or the gap between, western countries . . . and less advanced countries in terms of technology. The Internet is the issue and using IT in general, telephones for example, even TV is also another issue. TV, telephone, [the] Internet are the major factors in the digital divide . . . there is a big difference or big gap between western countries and the less developed countries. (A5:3-9)*

Yet another academic participant conceptualised the digital divide even more broadly, referring to it as the ‘civilisation’ gap which separates western countries from developing nations. In this response, ICT’s were viewed as just one component of a broader gulf that results from disparities in expenditure on education and research within a country.

*Digital divide means the gap in knowledge and civilisation among [between] western countries and third world countries. The number of PCs; [the] ratio of intellectuals and book production in the population compared to an international sample; number of scientific magazines; [the] number of academic researchers; [the] ratio of universities to the population; [the] control and freedom of publishing; [the] number of scientific conferences; . . . [the] ratio of how much the country spends on scientific research, and the number of experimental labs in universities and schools. . . . (A7: 3-26)*

A similar, but slightly different response came from another of the academics who suggested that the digital divide resulted from a rudimentary understanding of Internet communications and their capacity to transform societies.

*I think it means the illiteracy about information technology amongst a certain society. There is a gap between our modest knowledge about Internet technology with what we really have to know about its use and significance. (A2: 1-20)*

This response is indicative of a belief that the digital divide as it is experienced in Jordan results not from a lack of availability of the technological infrastructure, but rather a cultural gulf for a society that has not yet fully integrated the ICTs into the higher education and research sectors.

It is also worth noting that one participant appeared to be entirely unfamiliar with the concept, responding to the question by saying; ‘*Digital divide, digital gap, I have no clue*’. (A10: 4-8)

Overall, the responses indicate that almost all participants are able to articulate a description or definition of the digital divide of some kind. For most respondents, access to ICT infrastructure is considered an important component of the digital divide, but there were other aspects whereby the digital divide was seen as being part of development or infrastructure gaps that separate developed from developing countries. In several responses this led to comments regarding the differences in educational and research productivity between developed and developing countries and the extent to which ICT's are accepted as part of the higher education system in Jordan.

**Question Five: Do you believe that a digital divide exists between western countries and Arab countries?**

Having established what interviewees believe is meant by the term 'digital divide', they were then provided with a follow up question asking whether such a divide exists between western countries and the Arab world. Most of the interview participants agreed that a digital divide exists between western countries and Arab countries with a number of them indicating their view that the main gap lay in the area of Internet technology infrastructure (i.e. software, hardware and professionals).

Two characteristic responses indicated that the reason for the gap between the services available in western countries and in Arab countries is largely related to a general lack of application or implementation of information technology in services more broadly across Arab society.

*There is a big difference between the services there and the services here. . . . It is not only in the libraries or academic institutions . . . Unfortunately, there is less use of information technology services in our country and most of the reason is the shortage in applying or implementing information technology in our services in general. (A5: 2-21)*

*You talk about to what extent you are using computers and ADSL and Internet services because you might provide*

*academics with computers, ADSL lines, etc. but they are not using it efficiently. But in the west they are using it in a better way. Part of the reason is because they started using computers before us. (A4: 3-16)*

This second respondent (A4) also pointed out that the delayed implementation of computing and networking technology had been the case in the universities which were still addressing the technology lag.

*Computers are recent to researchers or faculty members. Not all faculty members are getting computers in their offices and some of them they just got it a few months [ago] or last year. So it takes time to spread and they don't have that much training in using computer facilities. (A4: 3-23)*

Another respondent pointed to the extent of the digital divide by drawing upon his experience with a university in the United States.

*I feel there is a huge gap between what is available, you know, in terms of gaining access, in terms of [the] development of digital Internet connections or digital information. . . I think so, yes. For example I can see a huge gap between the university that I studied in and I worked in the USA and this university. They are doing their best here but still there is a gap. (A10: 1-41)*

This participant also noted, however, that not all developing countries are equal in their experience of the digital divide, noting that:

*In general, I think Jordan is better than other developing countries in this field but still we are behind the developed countries. (A10: 1-37)*

The issue of the different ‘degrees’ of digital divide was expressed by several interviewees. One participant felt that the extent of the digital divide differs significantly between Arab countries, with the gap between Jordan and western

countries being far less than the gap which might exist between other Arab countries and the developed west.

*The Arab countries are heterogeneous sites. So you find if we talk [about] Arab countries, Jordan is different from our neighbours such as Iraq for example or in Syria. So, [by referring to] Arab country, I mean Arabic area and it is different from one place to another place. We can't talk about it as a [the] same [thing]. (A1: 4-14)*

Interestingly, two participants maintained that Jordan does not suffer from a digital divide at all, as it already has access to the Internet and associated information and communication technologies.

*If you talk about Jordan I think in Jordan no, we did not have digital gap [divide] in Jordan, I think here we have so many things even better than some other places, even the United States of America (USA). (A1: 4-20)*

*I think between Western and Arab countries there is not a digital divide as such. In Western countries what is available to them is what is available to us. We use computers, we use the Internet, and we use all electronic media that they actually use in their countries. (A6: 2-3)*

Two participants raised the issue of language as being a component of the digital divide that separated western and Arab countries. They maintained that the divide exists partly because English is the most common language used for scholarly communication and for the many scholarly forums, web sites and discussion lists found on the Internet. In many cases, this use of English language means that it is difficult for Arabian scholars to utilise the Internet as much as their peers in the West.

*Language is an important barrier to using Internet services. In western Countries most people can communicate in English, French, German etc. On the Internet, you know better than me, more than 80% at least of the Internet services on the sites are*

*in English. So if your language is Arabic you will not benefit from Internet services or from even the digital library. (A4: 3-18)*

*Yes I do, this [the digital divide] is reflected by comparing the amount of Arabic web pages and web sites of a scholarly nature with its English, or other European languages, counterparts. (A2: 1-30)*

Another participant explained the digital divide in terms of the exclusion of Arab scholars as a result of their use of Arabic. He believes that the divide is not primarily based on a technology gap ('*there is no difference in technology, we use the same technology*') but rather is a product of the language divide. According to this argument Arab scholars find it difficult to publish their work in their own language if they want to compete in a globalised research marketplace.

*Documents are not written in Arabic, in our language. Yes, from this point-of-view there is a digital divide. Most of what we write and research is not published in our language. They [developed western countries] do not publish it at all and they have no interest in publishing what we write, while in western countries they publish everything. Most of the things they publish on the Internet. (A6: 2-15)*

There is an implication in this interviewee's comments that the digital divide is based not only on language differences but on a lack of respect for the current state of research from Arab countries. He highlights in the course of his interview the '*difference in culture between Arabic and western countries*', arguing that '*we are not that much developed in terms of academic research and the areas of research. We are focused on certain areas, but we must research all areas of interest*'. This participant also suggested that Arab research was often rejected by western scholarly journals because they '*misunderstand the context in which we write*'. These comments are a further indication that technology

access is but one aspect of a divide that has deep roots in the disparities in language and the different cultures of higher education and research.

**Question six: What do you believe are the causes of this digital divide and how does it disadvantage Arab scholars?**

Participants were asked what they believed were the main causes of the digital divide in Arab countries. A number of the issues raised in responding to this question had previously been covered in the answers to Questions 4 and 5, but they are nonetheless also presented briefly here as appropriate.

A number of participants cited economic and financial resources as the key reason for a digital divide. One academic expressed the opinion that the high cost of technological development was a factor that had resulted in;

*A general delay in the introduction of computers and access to the Internet to these [Arab] countries despite computers and Internet being available for a considerable time. (A9: 2-2)*

Even though such technological developments have been underway in Arab countries for some time now, one participant indicated that provision of such facilities alone may not be enough to close the digital divide.

*The main reason is that people are not online, more technology and Internet access will not close the multifaceted digital divide that may exist in developing countries around the world if people do not utilise the services available to them. (A8: 1-29)*

One of the academic participants indicated that while cost was certainly an issue, there are also problems with a lack of leadership and skilled personnel to support long term development.

*I think you need personnel who value the importance of the Internet or digital communication methods in general. You need the financial capabilities. But you also need people who direct the efforts in order to better develop in this field. (A10: 2-9)*

Language was raised again in answer to this question, with several participants indicating that language barriers are a contributing factor to the digital divide. One interviewee put a somewhat different slant on this issue by arguing that many Jordanian researchers did not value foreign languages, and as the majority of web based resources are available in non-Arabic languages this presents a definite disadvantage to these Arab speaking scholars.

*Most webpages are written in a non-Arabic language, and many people believe, wrongly, that it's not important to know any foreign language to be a good researcher. And this of course means our researchers are incapable of dealing with current research, inventions or developments in any field of study and unable also to deliver their findings to a foreign audience. (A2: 1-18)*

Another respondent, who had previously denied the existence of a digital divide, conceded that if such a divide did exist it was foremost an issue of language—along with the work habits of the Arab world. In this case, however, he was referring to the use of English as the dominant language used for hardware and supporting services rather than the language used for digital content.

*If there is a gap it would be the language, because the original language was English. All the technology was created in English, so it is easier to deal in the original language than to translate it to Arabic. This is I think the only barrier. If there is another barrier it would be people themselves, people in other parts of this world they work harder I think than our people in our country or in Arab countries. (A1: 1-8)*

One participant suggested that the divide was fostered for political reasons by more powerful countries who seek to maintain the economic gap between developed and developing countries.

*We can't put all the reasons [down to] IT. I think politics in this regard is playing a very important role. Sometimes the major powers in the world, the eight great powers in the world, are*

*playing a very negative role in this regard. They are trying to keep this gap between these countries and others, the under developed countries. So the economics is a major issue in this regard beside politics . . . (A5: 1-23)*

Socio-political factors were also an issue for another respondent who pointed to a link between Middle-Eastern politics and a ‘brain drain’ to more developed countries.

*Yes, there is a massive gap in spite of the availability of the Internet and Arab petroleum economics and freedom of information networks. The gap increases daily for reasons such as the low salary of [Arab] academics and the ethnic, racial and religious differentiation, and occupation of some Arab countries by the USA and Zionists which leads to Arab scientists' emigration to the west. (A7: 1-29)*

**Question Seven: In your opinion how could your libraries help your institutions to bridge the digital divide?**

Academic interview participants were also asked to suggest possible ways their libraries could help academic institutions to bridge the digital divide.

One interviewee felt that the library already provided adequate access to resources.

*I think our library is up to the standards, international standards. If you go back to our library you will find so many periodicals, so many databases and subscriptions. So I think our university, or our library, is on a par with libraries in developed countries. (A1: 5-12)*

Most interviewees, however, suggested that their library needed to focus on providing more or better information sources. For one participant this was no more ambitious than providing reliable Internet access.

*[We] need a method fast enough and also available at anytime, to get access to information. There is no method better than the Internet, which is now available daily for many people. You can log on anytime to a website and get the information you need, plus the Internet is efficient, authorised, and good. (A10: 2-16)*

Other respondents, however, had a broader view of the range of scholarly resources to which the library should provide access. One respondent noted several areas for improvement, emphasizing the importance of inter library lending to university libraries in developing countries.

*Our library can do so many things; firstly by subscribing to all necessary databases needed by faculty members; secondly facilitating Internet use inside and outside the library; thirdly, implementing an integrated library system where faculty members can use inter library loans. It is not only the use of our collections in our library but the use of other collections inside the country or outside the country. The inter library loan is a big issue in an underdeveloped country. I know that in Jordan a University hears a lot of 'can I get it, can I get it?' There are so many things that a library can do to facilitate service and keep faculty members advised of any new information, new books or journals available inside the country or outside the country. (A5: 2-23)*

In a similar vein, another participant noted the limited access to materials due to cost and suggested that the implementation of some form of regional consortia so that libraries can afford to acquire the more expensive items. Interestingly for this academic interviewee the solution to the digital divide was the creation of an Arab digital library.

*There are databases that are so expensive that no one university library in Jordan could afford them on their own. So there must be shared participation between Arab or Jordanian libraries. These libraries can decrease the gap by funding a*

*digital library. Availability of such centres would facilitate researchers in their use of the Internet and participation in presenting research findings. (A7: 5-13)*

This interviewee went on to express the view that academic libraries in Jordan need to develop their services ‘*from a knowledge warehouse to be[ing] an open gate to scientific research*’.

Another interviewee also suggested that libraries need to be proactive in the research process by managing the creation of databases that can be widely shared. Language was again an issue in this context with the interviewee stressing that the database should offer translated content using both English and Arabic.

*Actually all libraries have to encourage academic research. They have to set up special databases that belong to our university that will be accessed by anyone, from anywhere, at any time, not only by academics but by all. This research has to be written in the English language. Also, the same document, the same research can be written in both Arabic and English, so, it can be understood by our society. . . It would be accessible by English language speakers and Arabic language speakers. (A6: 2-28)*

Another issue raised by several interviewees was the need for training. Participants felt that it is important for libraries to put a priority on educating users in the types of electronic resources and services and providing training in the effective use of these resources.

*They have to reach people, even at the same university. They might have a small division of the library; whose people’s mission is to market the services of digital libraries. This must be an organised effort, to go to each faculty member at the university and have more than one meeting to explain to them how they can utilise the facilities of the digital library. (A4: 3-27)*

*By giving the students an opportunity to be familiar with these modern technologies and how we should benefit from it positively. (A2: 2-12)*

*How to enable people who are outside the university to access the information, through giving them, for example, user identification and passwords free of charge or a low cost to get, as I said, the benefits of accessing the Library of Congress or Oxford Library or EBSCO database. (A3: 6-2)*

Finally, one respondent indicated the breadth of the issues to be addressed by stressing that the digital divide would only be overcome by responses that addressed more than just the ‘nuts and bolts’ of information services.

*Actions taken to bridge this gap must not only be concerned with the provision of technical [services] and IT equipment but also with the development of social, cultural and cognitive resources. (A8: 4-2)*

Unfortunately he did not specify exactly what ‘social, cultural and cognitive resources’ he was referring to, and what (if any) role the library should play in this.

**Question Eight: If you were giving some advice to librarians or policy makers about digital libraries what would the advice be?**

As a final question, academic interviewees were asked what advice they might give to librarians and university administrators (policy makers) to help reduce the digital divide. In response, several interviewees pointed to the need for Jordanian academic libraries to look to similar libraries in developed countries as a model for their own improvement and implementation of digital collections and services. These participants generally believe that a technology gap contributes to the digital divide, but that this gap is compounded by differing levels of knowledge and skills amongst library staff.

*If you are asking about the libraries for example in our country, well I think they have to seek help from other institutions. Other libraries have developed such methods for developing the digitisation of information. I think we need help in terms of expertise, we need to send people overseas to developed countries to learn how to do things and we need to think how to make funds available for development. (A10: 2-24)*

*They shouldn't fear computerising, automating and improving computer systems in libraries to be easy, quick and accurate in retrieving and storing. They should raise their knowledge of library science and convey the developments electronically. Librarians should know what happens in scientific conferences from Western countries, especially those available on the Internet, to know the directions of library work. (A7: 6-3)*

For one academic the issue was not only about keeping up with developments in international librarianship, but also maintaining international networks which would help to identify the best sources of information which could be provided to users of Jordanian academic libraries.

*My advice to librarians is to know what is going on in the world . . . There is a huge amount of information. People, especially librarians should know all of these things and should keep in touch with publishers, with the learned societies around the world and see what is going on there and try to get the most useful things and make them available to faculty members and students. (A5: 3-17)*

Similarly, other respondents were quick to suggest the need for the additional development of digital services, without specifically referring to the concept of a technology gap or divide between developed and developing countries.

*First, in terms of infrastructure, they have to provide a better infrastructure in order to reduce the time required for downloading information from the Internet. Secondly, setting*

*up our databases. Thirdly, selling our libraries on new digital media, digital equipment and how to provide a better information and service to academics as professionals. (A6: 3-2)*

Another academic viewed the issue of ‘development’ in terms of the limited resources that were available in Jordan for the acquisition of digital content, arguing that users would avoid the library if it cannot provide access to the level of content they expect or need.

*Policy makers need to keep an eye on the cost of services because the cost and price of service is the major barrier to getting this service. So, many things you can't buy because their price is high and the same thing is true for digital libraries. If [the costs] of approaching and getting these services are high, you will find so many people stay away from utilising your service, your Internet services and your digital library. (A4: 4-13)*

For one participant the issue is one of recognition for the status and role of the Library and librarians within the University stressing that librarians should be recognised as active partners in the academic life and future development of the University.

*That is a big question, because awareness of library services or the importance of library services in our country is still unfortunately not much. Even some decision makers at the universities do not know how important the role of the library is and they deal with the library as if it is just one of the units in the university. Libraries are the most attached units to the faculties and academic departments in the university, and that is the thing everybody in university or every decision makers should know. It is not an administrative service. It has to do with academic plans and all academic activities; so people should stop looking at libraries as if they are just places with books on the shelves . . . (A5: 3-17).*

Other participants returned to issues related to training and promotion, and discussed the need for librarians to become more actively engaged in advocating on behalf of the library and its services to students or research staff.

*In each degree of study there must be a specific course that teaches students how to use these new technologies in addition to the traditional ones and our experiment at Yarmouk University library must be extended and adopted by other public libraries. (A2: 2-17)*

*Maybe I can suggest that librarians get closer to researchers at universities, to insist on spending enough effort to train these people, to give them a chance to see what the digital library can provide them with. (A4: 4-13)*

*To advertise and promote any achievements that they develop [and] to market their libraries and information. Libraries should promote the use of information technology as an integral part of library services in meeting [the] changing information needs of the community. (A8: 2-14)*

*Firstly, by helping anyone who needs to use this information technology. Secondly, hold workshops and conferences on how the libraries and electronic resources are going now and define the ways to develop them. Thirdly, design and implement courses on how to use it [the library]. (A9: 4-3)*

The issue of language was also seen by one academic interviewee to be a critical element of the role that librarians could play in bridging the digital divide. In particular this respondent believes that English language skills are not only important to assist Jordanian librarians in selecting material for academic library collections, but that librarians also have a role to play in translating documents for the benefit of Arabic speaking users.

*Librarians have to develop their English language skills; actually, this is important, to see most documents in all sciences written in English. So, if you want to prepare effective librarians, they have to understand topics written in English. We have to develop the English language first, otherwise we fail. We have to develop English language; they have to be able to translate the documents they have found on the Internet to Arabic language, to benefit academics, our societies, and to benefit from western research. Modifying a search that is written in English, suits our values and our context in Jordan. (A6: 3-9)*

Overall, academic interviewees provided a range of suggestions for librarians and policy makers that they believed would assist in bridging the digital divide. In their responses, they demonstrated that they are aware of the issues regarding cost, resources and technological infrastructure that may contribute to the existence of the digital divide in Jordan and other Middle East countries. Academics also believe that it is up to libraries to take the initiative and develop a more pro-active approach to the adoption and marketing of the digital libraries as a way forward. To some extent, it seemed that a number of academics are critical of the approach taken by librarians to date.

In contrast, a number of academics felt that librarians do their job well in terms of electronic publishing and in making it so easy for people to utilise the libraries and its facilities. They stressed that the ability of librarians to cater for students and academics depends on the resources being available to them. These respondents are likely to believe that the problem is more with the infrastructure including software, hardware and professional personnel that should be available and updated along with the platforms and databases used for digital libraries.

### 7.3.2 Interviews with policy maker participants

A second set of interviews were undertaken with four influential government policy makers. None of these participants had participated in the questionnaire. Of these interviewees, three had received their most recent degrees from English speaking countries and one from Jordan. Two hold PhD degrees, one a Master's degree, and one a Bachelor's degree. Three of the interviews were conducted in English and one interview was conducted in Arabic as the interviewee expressed a preference for using Arabic. In this case, as with the academic interviewees, the researcher translated the interviews into English for confirmation by the interviewees. The following table provides the key demographic information regarding these interviewees.

**Table 7.2: Policy maker interview participants.**

<b>Participant Number</b>	<b>Place of Work</b>	<b>Position</b>	<b>Age</b>	<b>Last Degree Earned</b>	<b>Language of Interview</b>
<b>P1</b>	Jordan Technology Incubator	Director	33	Master	English
<b>P2</b>	National Information Technology Center	Assistant Director	35	Bachelor	Arabic
<b>P3</b>	Center of Information Technology	Director	47	PhD	English
<b>P4</b>	Ministry of Information and Communications Technology	Advisor	35	PhD	English

The workplaces of the first three of these interviewees function under the auspices of the Higher Council for Science and Technology (HCST) within the Ministry of Information and Communications Technology. Each of these interviewees holds a senior position of authority regarding issues related to the improvements in information technology policy and practice.

**Question One: As a policy maker how do you see the impact of Internet on academic and professional activities?**

In responding to this question the participants expressed a consistent opinion that the Internet crosses various borders and provides significant benefits to the wider community. The policy makers spoke of how the emergence of the Internet has made the world a 'village' in terms of social communication, economic transactions and political negotiations.

In terms of the academic arena, participants expressed the view that the Internet facilitates and provides valuable tools for the delivery of education, including access to online learning systems and the forms of informal scholarly communication that underpin learning and research.

*No doubting that the Internet doesn't adhere to geographical borders. The place and time do not affect the exchange of information especially in activities of the teachers and students. This leads to improving generally the level of knowledge and teaching. It [the Internet] also connects with other universities in the world for exchanging opinions, research, virtual lectures, and conferences. This helps users to gain new knowledge and skills. (P2: 5-5)*

It was also noted that the Internet facilitates research related information gathering in a variety of ways, such as simplifying literature reviews; browsing for current and past research; enabling digital collaboration, and providing easy, desk-top access to a vast array of general information.

*It gives you access to information from all over the world and as well it makes it easy for you to organise your information, to keep information and to get to access to information when required. This will improve the quality of research. (P3: 5-7)*

Another participant noted that the globalising impact of the Internet allowed for comparisons between countries in terms of knowledge generation, while also having the effect of lowering the cost of conducting research.

*The impact of the Internet . . . is that you are accessing the latest technology, the latest know how. It improves your outcomes, and you can benchmark now against the knowledge of other countries, and learn from experiences of many researchers, academics, etc., . . . What it also provides is to lower the cost of doing academic research, because you can share information, you can actually do a lot of work offshore, which was not available before, but now it is customary. (P4:5-8)*

**Question Two: In your opinion what could your government do to promote the effective use of Internet?**

All of the policy makers interviewed believe that the government could promote the effective use of the Internet in two main, interconnected, ways. That is, to make the Internet available for everybody, and the way in which this could be achieved is by reducing the cost of Internet use. Several of the participants noted the existing government initiatives in terms of promoting Internet access and training.

*The main roles for me as an advisor to the university here is to really promote the diffusion and the use of the Internet in the Kingdom [Jordan] . . . we have what we call the Jordan Education Initiative, where we promote the use of the Internet in the public schools and private schools as well. We have a strategy also to promote Internet usage at university level, and as well the government has invested in infrastructure. We have built a broadband network of fibre optics. It is very sophisticated and all the public universities are connected to the network. Eventually, by 2008, we will have 3000 public schools connected to the network. (P4: 5-19)*

Generally, however, they were critical of the expense for ordinary citizens and linked this to the low rates of uptake when compared to more developed countries.

*The role of governments should be using IT generally and especially the Internet as a mediator to accelerate and support changes in society by letting all members of society gain access to computers and the Internet at the cheapest cost. (P2: 7-21)*

*The government needs to make the rates of subscription cheaper, because still the Internet is quite expensive. (P3: 7-29)*

To optimise the use of the Internet while at the same time reducing the cost, one interviewee suggested that the government needed to build a reliable Internet infrastructure in terms of hardware, software and professional personnel.

*The most obvious is hardware. We obviously need a connection first between computers or any devices that connect to the Internet. So, you know, before you can promote people to use it, you have to allow them the opportunity to have access to hardware for that use. This is on two levels. First of all the cost and it may be that people in far areas of Jordan need to have money and resources to be able get Internet connection. (P1: 5-25)*

Another interviewee, with a focus on the education environment, declared that the government should work to develop an e-curriculum so that students at schools or universities will be able to access their education online. He noted that the model for this development was found in initiatives to promote Internet usage in the business sector through an e-commerce strategy.

*We need to develop the e-curriculum, so that students at university level or at school level will be online. We do have initiatives to promote Internet usage in the business sector. We are currently working on an e-commerce strategy, we are working on a number of initiatives . . . we thinking also using now in process developing in models how to use schools as access prompts for Internet, for community. (P4: 8-10)*

None of the policy makers interviewed disputed the value or importance of the Internet to the future well being of Jordan, or argued that the government did not have a role to play in promoting and improving access, either by educational institutions or the wider citizenry.

**Question Three: What are the most important factors that promote the effective use of the Internet in academic research?**

Participants were asked their opinions regarding the factors which would optimise use of the Internet in the tertiary education sector. The issues related to cost and infrastructures (speed of access) were raised again. One participant suggested that increased cooperation between libraries was a means by which research data and literature could be made more affordable.

*On the other hand we need to make subscriptions to the international libraries or international journals, which are available through the Internet but we can't access the refereed articles or journals. . . . Many libraries still use the hard copy, because the electronic copy is expensive. But in universities, they can coordinate together, they can get better deals if they can coordinate with each other, rather than make these subscriptions themselves.(P3: 5-28)*

The policy makers pointed out other non-cost related factors which they believed could act to further academic use of the Internet. One participant was keen to talk about the possible benefits of information sharing that could result from an easily accessible database that provided information about other research and provide a forum for communication, not only with other researchers but also with potential industry partners.

*Ok, I think there is a tremendous number of a factor but I will talk about one that is important in Jordan. . . . What happens in academic research in Jordan is the duplication of research done by professors in different universities, and that is happening because you have funding for areas A, B and C, and so many professors want to do research in those areas because*

*it is funded. But they don't know what other professors in other universities are doing in that same area. It is not aligned. . . . There is no way to find what research has been done in the past, or utilize this search. So they duplicate it again. Also there is no way for professors to find partners in their research project. So if I'm from university X I can't be sure what professor in university Y has the same interest, So the university might publish for 5 years but that data by default is already outdated. So we need to create an online system with information and data relevant to professors, [where] they can find partners and it is also helpful to reduce duplication . . . And it is also helpful to allow various sectors, entities, industries, factories to enter here and find professors to help them to solve technical problems . . . So it is creating visibility, creating a means of communications, and also creating a warehouse of knowledge. (P1: 4-24)*

For another of the participants language was a key issue in promoting the use of the Internet, in particular the lack of Arabic for some disciplines. He distinguished between disciplines and their present fluency and familiarity with English as being important elements in determining how much value they currently derive from the Internet.

*One of the most important factors in Arabic countries we can say that is affecting use of the Internet is the lack of Arabic content. Especially in the research area we can't compete, as most of the resources currently being used are in English, and the origin of the research is the USA. . . . we believe that especially in non scientific areas to have Arabic content and research in Arabic online will expedite the use of the Internet in academic research. Especially in areas like law and psychology, where it is been taught in Arabic and where most people are not extremely good at [reading] English in these area. As for scientific fields English it is not a problem,*

*because it has been taught in English in universities and most professors read very well in English. (P4: 5-6)*

**Question Four: If you are familiar with the term digital divide, what does it mean for you?**

All of the policy makers interviewed expressed familiarity with the term digital divide. At its most basic this was an understanding similar to that expressed by several of the academic participants, where the divide is seen as a matter of who does or doesn't have access to the requisite ICT, and that it is a divide that can exist between or within countries.

*The digital divide is the information gap between who has computers and the Internet and who hasn't, and the gap not only between the states or peoples but also between the members of the same state. (P2: 5-28)*

Not surprisingly for participants working within government policy, the digital divide was also seen by these participants in terms of e-governance, or the relationship between government and citizens.

*Truly there are many definitions for the digital divide. It started with the introduction of [the] Internet, the factors from penetration rate of the number of users, who is using it. But also to what extent people are using the electronic facilities, communication facilities in all aspects on their life. Like dealing with the banks, transferring the application to government institutions, applications to do with passports, electronic payments. These things are the digital divide, especially when dealing with money and with the information needed from government. (P3: 5-35)*

One participant was keen to stress the extent to which Jordan was suffering from the digital divide, which he described in terms that were broader than a simple gap in the access to technology, but the way in which that technology was used in the creation and management of information.

*That [the digital divide] means for me, basically how different people access and understand the technology of computers, the technology of information. And let me say, those that don't have computers. [It is about]the creation of information, the transfer of information, and preserving information. Ultimately also the processing of information. In all of these levels we [Jordan] are lacking, we are lacking the capacity to go to search engines and looking up even simple things. (P1: 5-3)*

This participant argued that Jordan had been, *'slow to adopt this new technology, to understand the importance of this technology, the potential strength of this technology'*, and as result was *'behind on infrastructure'*. He was also keen to point out, however, that the government had put in place a number of policy initiatives which were leading to cheaper and more widespread availability of computing and Internet access. He concluded by saying that, *'I am very hopeful [that we will] continue to shrink this gap or divide'*.

The themes of government responsibility and intervention were taken up by another participant. He described the digital divide in terms of the capacity to *'use ICT as a tool . . . and how it becomes part of the life of the citizens of Jordan'*. He also noted that in this regard *'there is a difference of course between the USA or the Western world and developing countries'*, and was keen to stress the various government activities aimed at overcoming the technology gap with the west.

*It is one of the mandates of our ministry to bridge the digital divide in this country, and we have written a policy statement of national ICT; a policy statement for Jordan, and also we have taken initiatives to bridge the digital divide. This is mostly done through regulation and conducting a number of e-initiatives in the country. . . . Jordan has moved tremendously in the telecommunication sector due to the labour market and the entry of healthy competition, yet when it comes to Internet penetration and PC usage will still we have a long way to go, but we are working on it and we are speeding up the process.*

*We are thinking creatively. For example an initiative to have a laptop for every university students, and we have a fund for poor students. Also we think about many ways to make it [the Internet] accessible to citizens of Jordan. (P4: 5-17)*

**Question Five: Do you believe that a digital divide exists between Western countries and Arab countries?**

The policy makers were asked if they believed that a digital divide existed between western countries and Arab Countries. Several had already given their thoughts on this matter in responding to Question Four but they provided additional information in response to this specific question. None of the policy makers disputed the existence of a digital divide between western and Arab countries, although they also pointed out that this was not a simple issue. As one of the participants indicated not all Arab countries are equal in this respect, and Jordan is better placed than others.

*Yes, there definitely is a digital divide. I think it is very much so . . . I think within each Arab country there is a digital divide. It is shrinking but there is very much a large gap in some Arab countries. I think Jordan is very well off in that as I mentioned, the limitations are physical and cost related. As that comes down, we find new ways to allow for, let us say, quality and democracy with the use of the Internet across the country, from the capital to the smallest town in Jordan. (P1: 4-25)*

Not all of the policy makers were convinced, however, that the digital divide is being closed. One of the participants attempted to quantify the divide in such a way that it can be seen to be expanding.

*Yes, there is a digital divide as a matter of fact it is increasing, the gap is increasing. Now it is more than five years ago. . . . For example the Internet penetration in western countries is 80% or 85% while five years ago they used to be 40% or 45%. The Arab world used to be 5% to 6% so the gap was between 5% and 40%. But now it is the difference between 10% or 11%*

*and 80%. This means the gap is increasing, and it means we are not bridging the gap. (P3: 5-2)*

This participant went on to elaborate on the digital divide in terms of the penetration of technology in university teaching environments, noting the extent to which lecturers in Jordan were dependent on teaching with chalk at the expense of more technologically enabled options. He claimed that, *'in our universities less than 20% of teachers use data show in their lectures, they still use chalk'*.

Another of the policy maker participants expanded on the nature of the divide, arguing that the issue was not primarily one of knowledge about, or availability of, the technology, but rather one of a lag in terms of general acceptance and widespread accessibility. This participant also pointed out the distinction between Jordan and other developing countries.

*Yes, I lived in the USA for a while and I go back and forth a lot. . . . Yes there is a difference, and there is a different level of sophistication. What you will find in Jordan is there is a high level of education and they know the latest technology. It is not like it compares to places like some parts of Africa, it is not that far behind. We know the technology, we know what is going on, and we watch all the technological trends. We have the latest stuff in Jordan; however it is not accessible to everybody. (P4: 5-16)*

**Question Six: What do you believe are the causes of this digital divide and how does it disadvantage Arab scholars?**

Of the four policy makers who were interviewed, three identified cost in some way as being a problem. One stressed that at *'the top level in this country ICT is given the highest priority'*, but added that the apparently slow progress needed to be seen in terms of the many demands made upon higher education budgets.

*The implementation is slow and at the operational levels priorities are given to other things. At the Ministry Of*

*Education for example they are working in parallel to improve the environmental conditions at schools and to provide access to the Internet. . . . The Internet is not the only priority. There are others like schools, buildings, classes, health, etc. There are demands for so many other priorities. (P3: 3-16)*

One of the interviewees put the cost issue in a slightly different perspective by raising it in the context of income levels in Jordan. That is, the issue of cost was raised in the context of the need for an economy that provided greater reward to workers rather than the price of the technology. This participant also mentioned this in the context of the aging ICT infrastructure experienced in Jordan that is no longer able to meet the needs of content rich networking.

*Also, again income levels. People have low income levels as we mentioned. It is hard for them to get hardware. And the Internet today is becoming more and richer with content. As the content grows in size, the dialup is no longer efficient. It must be broadband . . . We don't like to stay having to get dialup. For all the content we need broadband. So the cost is definitely an issue. (P1: 2-30)*

Another participant suggested that Jordan suffers not only from a problem of affordability, but also a general lack of awareness of the capabilities of digital services and facilities coupled with a lack of skills in terms of putting the necessary infrastructure in place.

*[There is a] low awareness of the importance of information technologies, the high cost of using information technologies, shortage of training and infrastructure. (P2: 3-5)*

This same participant also addressed the impact of the resulting technology shortfall on research productivity, stressing the comparative lack of productivity of Arab scholars.

*The disadvantages [of the digital divide] are the lack of contact with researchers in high-tech countries. There is a gap between the knowledge production of researchers in high-tech countries*

*and Arab researchers. The role of Arab researchers is poor in tapping into IT. (P2: 3-13)*

Another of the policy makers broadened the discussion beyond higher education and discussed the digital divide as a reflection of the still developing nature of Jordanian society. While acknowledging that technology access remained an issue, he indicated other problems relate to the lack of cultural acceptance of such technologies.

*The digital divide is not only about scholars. [There are two issues], the first one is the availability of the technology to everyone in Jordan, plus cultural change. The culture is changing very quickly even in poor level areas. But we still have much to work on, so that it becomes part of people's life to use ICT. Now the disadvantage to the Arab scholars, the availability of the technology, I think it is a problem. I mean we just drafted the research and development strategy of Jordan for 2007-2010. The problem is not only the availability of technology. As I said, it is the motivation, the legislation, or as I said the system for promotion within the University. (P4: 3-32)*

The participant also noted that the problem of cultural acceptance of technology was being exacerbated as Jordan was providing a high level education which resulted in a 'brain drain' as graduates are recruited to neighboring countries. He sees it as an important matter of government policy to retain these skilled workers in Jordan.

*Many of the people working in the Gulf States are actually from Jordan. We graduate excellent engineering, excellent IT people, but we have a major problem of brain drain. Now what we have trying to do at the Ministry level is really to attract investment to Jordan so that we can maintain human resources in the country. (P4: 4-11)*

While acknowledging the lack of uptake of ICTs another participant did see some hope for a greater appreciation of their potential benefit as the general population learnt the value of ‘entry-level’ technologies.

*And lastly we need to understand the value . . . I think people will be encouraged to understand value, mainly potential value, by the introduction to mobiles. Not everybody is relaxed to use computers, or the Internet, but people have the motive to use mobile phones. Mobile phones allow transfer of knowledge beyond [the range of] the voice. So people learn that these devices can be a new channel of information, a new channel of knowledge. (P1: 3-3)*

**Question Seven: How could libraries help institutions to bridge the digital divide?**

These policy makers responded to this question with a range of opinions and ideas. One of the interviewees suggested improvements to the general availability of ICTs that had been recommended in responding to previous questions, but also suggested an ‘upskilling’ of librarians in order to better equip them to assist researchers.

*By adopting all applications of information technologies and improving the availability of information technology resources to researchers. And the levels of training to ensure librarians have the necessary skills to support researchers in accessing these electronic services and information. (P2: 4-3)*

Another of the policy makers argued that the libraries’ role may ‘*not necessarily be bridging the digital divide*’, although argued they needed to become leaders in promoting Arab culture by collecting and digitising Arabic content.

*Like I said, when I want to search for some Arab scholarly history, or some Arab character in history, I find information coming from western universities. That is on line, not from Arab libraries . . . Maybe the role [of libraries] is plugging the gap of actual knowledge and information produced in this*

*region and about this region, so that it is not just other peoples' perspectives . . . They should be responsible for putting that knowledge online for the world, and also allowing people to personally to go and access the Internet . . . and therefore have access to the world. (P1: 4-16)*

Participants also again drew attention to the benefits of academic libraries working towards offering shared services and access to collections.

*I recommend for all universities to coordinate together and establish a central library. What is called in the west, access for all. This will require a national effort, and involve universities at all levels, research institutions, planners, decision makers, so that the universities can provide access for all. To provide access and to facilitate it will of course cost a lot of money and will need a coordinated effort, rather than everyone acting on their own. You may well find that the public library is not so active in this area. (P3: 5-21)*

*The libraries have a role in promoting it [digital library services] and getting the latest know how and information online for academics. Now the development that I'm aware of in this area is to establish a system whereby all universities can share the same information in Jordan, I don't know how far the project is along. (P4: 4-17).*

All of the policy makers expressed a belief that Jordan required some form of digital library service, including an understanding that this sort of service was a way in which their libraries might be able to 'catch up' in a way that would not be possible for their more traditional libraries.

*I like my libraries, my books. But for access to knowledge and access to information, this doesn't necessarily need to be a traditional library. The library today may be a virtual library for somebody in Maa'n, 4 hours from the capital. So Jordan may not be able to afford having state of the art libraries, but*

*they might be able to afford to connect PC's to the Internet.  
(P1: 4-28)*

Once again the issue of Arab culture and the depth of its engagement with scholarship were raised. One participant believed that this question of culture is a serious issue in bridging the digital divide, with Arab societies lacking a history of recent exposure to reading and learning cultures which placed libraries in a difficult position.

*This morning for example I heard the news from the BBC. They reported that books in the Arab world are attracting only 7% of the people. And for every one million people in the Arab world there are only 30 books. This is too bad. They are attracted to other media like TV and other activities on the Internet. But still they don't read books and instead are reading from the Internet. I think you can reach articles using something like this, but if you want read in depth you have to go to [the] library and read books. (P3: 3-25)*

This participant went on to argue that libraries needed to attract interest in their services by becoming leaders in the promotion of scholarly activities.

*You find that people are not attracted to libraries. There must be a greater awareness. They [libraries] must be active in conferences, local conferences, and to invite international conferences here . . . So hosting international conferences, and encouraging people to publish in international journals, this will facilitate or increase the awareness of using libraries. (P3: 3-10)*

**Question Eight: If you were giving some advice to librarians or policy makers about digital libraries what would the advice be?**

The responses to this question asking the policy makers to reflect on the advice they would give to librarians were quite diverse. Perhaps the most straight forward was that from a participant who sees the role of libraries being to

promote the use of ICTs (including the Internet) as the future of information retrieval. He was, in effect, arguing for the development of digital libraries.

*They [libraries] should take serious steps and create plans to change traditional libraries to digital and automate all activities of libraries and link them to the Internet. They should encourage the users of libraries to use digital tools in searching and retrieving information. They should let users know how much it is important to use information technology in reaching and retrieving information. (P2: 4-17)*

Another participant provided a more focussed response by advocating for libraries to serve as access points for subscription databases. That he seemed not to be aware that this is indeed a role played by most academic libraries, may indicate something about the comparatively small number of such databases available to academic libraries in Jordan, and to the level of awareness of the databases which libraries do subscribe.

*On a more specific level, there are many subscriptions to journal that individuals can't afford, and somebody let us know access with university campus, has access to university, might still bought these access, so may be libraries can help with getting membership to certain journals, and databases that cost, subscription databases, where people can go for a small fee and have access to this information. . . . by having library membership, for a small monthly fee [they can] have access to these databases. (P1: 4-23)*

This same participant also expressed a view that libraries should create databases of material that is already in libraries but which is ‘*on the public domain that is not owned by anybody. And since . . . it is not owned by anybody, there is a wealth of writing that can be owned by every single individual*’. He believes that libraries should ‘*transfer this online, to help transfer these things on to the Internet. I think it would have tremendous value*’ (P1: 4-23). This was one of the few responses received in the interviews that advocated what might be thought of as an ‘open access’ response to bridging the digital divide.

Another policy maker participant responded to this question in terms of how the digital divide might be addressed; suggesting that, *'the proper targets of this question are the universities'* but adding that *'of course libraries have a normal goal in bridging the digital divide'*. He went on to discuss government initiatives that are being implemented in order to enhance access to European research data. He noted that:

*The libraries they have a role in promoting it and getting the latest know-how and information online for the academics. Now the system what I'm aware of is a system available to all universities in Jordan so they can share the same information. (P4: 6-12).*

Yet another participant spoke the role of the libraries as finding ways in which to support research and researchers. He emphasised the importance of university professors to engage with research and publishing. The need, he argued, is for libraries to support research by promoting the information that is available in their collections.

*For researchers I always advise them to concentrate on publication. I know most university researchers are overloaded with teaching, so they don't have so much time for research, and I think the universities must be aware that for professors to publish in international journals they must use encouragement and build incentives and motivations. . . . Libraries need to do a lot of awareness raising in addition to subscription of international journals and with international providers of information, so use to publish, as well to make people aware. They [academic staff] don't know what is available in libraries. So libraries have to publicise this using the media such as newspapers and the Internet to advertise what they have. (P3: 5-15)*

This participant also suggested that Jordanian university libraries should organize conferences in conjunction with other libraries in the region in order to promote cooperation between libraries serving Arab researchers.

*They [libraries] can organize conferences. There are some limited conferences for libraries for the exchange of information. This has to work on an Arab level, to work on inter-Arab activities. There are some activities that need to be organized in Jordan's universities, or Arab universities, as there are no borders for information. The Internet has converted the world to a small village, but still some regions can coordinate to make information easier and cheaper. The researcher must be supported. (P3: 5-25)*

**Question Nine: What is the role of your institution in action to overcome the digital divide?**

The policy makers were asked to outline any contributions their own organisation is making that will assist in overcoming the digital divide. The first policy maker interviewed (P1) works with the iPark, Jordan Technology Incubator, which was established by the Higher Council of Science and Technology in 2003. He explained that his institution was playing a major role in helping the business sector in Jordan to digitise services and incorporate information technologies, and by doing so is helping the broader regional development of ICTs.

*The iPARK is helping many young businesses in Jordan, businesses that are trying to use information technology. Now what happens is that most of these businesses are either working on the technical side by helping develop further technology, helping develop more localised technologies for people to be better utilise information technology. And of course the Internet is huge part of it. Also they work on content, so many of the things they are doing is content related or service related and it is of course also online and it is predominantly a free market in this region. So by supporting*

*these companies we are supporting companies that are either supporting the hardware infrastructure side of information technology in the Middle East, or they are supporting the services or content side of information technology in the Middle East. So there are people that plug into this network and help enrich it in one way or another. (P1: 1-9).*

The second policy maker interviewed (P2) is employed the National Information Technology Center (NTIC), which was also established in 2003. The NTIC was created in order to assist and advise government on matters related to the procurement and use of ICTs. This participant explained how the NTIC was trying to help Jordanians on all levels in bridging the digital divide through the establishment of ‘Knowledge Stations’ throughout the country. As the participant indicated these Centres have an important role to play in bridging the digital divide that exists between urban and remote areas of Jordan.

*The idea of developing the Knowledge Centres is from the vision of His Majesty King Abdullah to change [Jordan] to a digital and knowledge economy. By making the use of information technology and telecommunications available to the Jordanian people as an effective tool in serving local society and concentrated on faraway villages to the decrease the digital divide in Jordan. It will also improve the human resources by letting them gain the skills of the new economy and increasing their competency, and efficiency. These centers are the first step leading to electronic government applications to serve people where they are. These centres have a big role in decreasing the digital divide in villages because there is no other way to use information technology services there [in the villages]. (P2: 1-20)*

The third policy maker (P3), from the Center of Information Technology, outlined the organisation’s work in four major activities which all aimed to reduce the ‘digital divide’

*I think here we work in 3 main, major activities which are all for bridging the digital divide. Firstly, developing software for institutions to conduct and administer their financial affairs using computers. This includes most public institutions in Jordan, including [many government departments] We automate the work of these institutions and this will save time for citizens. Now he can make a passport within one hour, so we eliminate the waiting time. The second aspect is to provide consultation on how to utilise ICT solutions. We did that for many industries, show them how to introduce information technology solutions in their routine work, and how to utilise the Internet. The third aspect is through joining international projects like the European Union. We now have more than 13 projects, that include participants from the south with the north Countries, and with European countries. So we get experience and take new technology and transfer it to the local community. The fourth aspect, which is very important, is training. We have a regional training centre here which was established in 1991. We provide long term training support for all aspects of ICT . . . and every year we receive participants from Arab countries who spend 3 or 4 months. They receives training on how to develop systems. With these four areas we participate in bridging the digital divide in the Arab world, not only in Jordan. (P3:1-18)*

The fourth policy maker (P4) was an advisor from the Ministry of Information and Communications Technology. He outlined a number of e-initiatives regarding the digitisation of services to overcome the digital divide in the local community

*I told you earlier [about] the e-initiative; we have a number of e-initiatives that we implement throughout the Kingdom. We have the national broadband network which connects all the universities and public schools, [and we are] currently designing a model of use centres and providing [the] Internet.*

*We are working on initiatives to ensure that every citizen can have access to [a] PC and we started in the programme of delivering the laptops for all students at the Jordanian Universities on the level of first year. We try through our policies . . . to lower the cost of owning a PC and connectivity cost. . . . So it is a major role. We don't have the primary role in the education sector but we play a major role in it. As I said a number of times, we try to get investors [in] to [the] country, so that we can minimise the brain drain of academics, researchers, or just people, you know in the sciences,. (P4: 2-17)*

#### 7.4 Results of librarian participant interviews

A third set of interviews was undertaken with five senior librarians, none of whom had participated in the questionnaire. Two of these interviews did not produce any information that was considered of sufficient value to include in the following discussion, and they have therefore been eliminated. The following table presents the key demographic information regarding the three successful librarian interviewees.

**Table 7.3: Librarian interview participants**

<b>Participant Number</b>	<b>Name of the Library</b>	<b>Age</b>	<b>Last Degree Earned</b>	<b>Language of Interview</b>	<b>Position</b>
<b>L1</b>	Yarmouk University Library	48	PhD	English	Director
<b>L2</b>	Al-Hashemiah University Library	50	Master	English	Director
<b>L3</b>	Yarmouk University Library	45	Master	English	Director

One of the librarian interviewee holds a PhD, and two have a Master's qualification. The three interviews were conducted in English.

**Question One: How do you perceive the impact of the Internet on the academic environment and your professional activities?**

All of the librarians interviewed believe that the Internet has had a great impact on their professional activities. They were generally keen to draw attention to the positive impacts in terms of information access. For one participant these benefits were explained not only in terms of the information that was available but the enhanced accessibility that no longer required information retrieval to be limited to a campus or a library.

*First of all I feel that is an interesting topic . . . I feel that the Internet is one of the most significant tools in the academic and research world. The Internet is the link where you can find what ever information you need at the level of academic and general discipline topics. So it is the most significant resource available for each person at home, at universities, in cafés, everywhere. The Internet enables the students and researchers to achieve their goals and messages in all those situations. (L3: 6-37)*

A second librarian noted the Jordanian context in particular and also draws attention to the public interest in adopting various education and information technologies.

*I believe that generally speaking the impact of the Internet on academic and professional activities of libraries and information centers in Jordan, and in the Arab world in general, is positive. We learnt this through our dealing directly with users, either students, staff members or public from outside the university or local community. . . . All of them will show positive response to the use of new technology. I mean online activities or the electronic sources including online, CD, or DVD, or any sources of information regardless of equipment. (L2: 6-29)*

For another librarian participant, however, the impact of the Internet wasn't all positive. While noting the substantial information benefits that could be offered through library based subscription databases, he also warned of the dangers of some of the information obtained from other Internet sites, particularly those with commercial motives.

*There are two impacts, one negative and one positive. The positive impact is that the Internet has given us the opportunity to have access to databases, e-journals, e-books, encyclopaedias, and like. Which means that it gives us, that is professors and students, opportunities to review or to search into a huge database we otherwise cannot have access to. And we are talking about refereed material and serious published material, so this is the positive impact. The negative impact is that, you know, they have a lot of rubbish on the Internet which is available to students and actually, most of our students rely on this rubbish when they look for material for their courses. You know that serious material cannot be provided for free. There is a journal or there is a database that cannot be provided for free . . . so we have to pay subscriptions to have access to research material. But for free material its mostly . . . rubbish that is available for students here. Sometimes there are cases of faking, where somebody gives himself the name of professor whatever, Professor X, and he publishes his material, and students believe this. The point here is to bring those students to certain sites for commercial purposes. When a lot of people visit certain sites, advertisers use it to advertise their material . . . So these are the two impacts of the Internet on us.*  
(L1: 6-11)

**Question Two: In your opinion what could your government do to promote the effective use of the Internet?**

The librarians were asked to indicate their opinions about the role of the government in promoting the effective use of the Internet in Jordan. All of these

participants indicated that the government plays a major role in the management of Internet access, although for somewhat different reasons.

One of the librarians returned to the issue of cost, arguing the government should intervene in order to reduce to price of Internet access. He coupled this with the need to promote the Internet to academic users as the foremost means of accessing scholarly literature and information.

*I think the main responsibility of government is to publicize the use of the Internet. [This can be achieved by] reducing the cost of having the Internet services. As you know the cost of using Internet services in Jordan . . . is still high. You are meant to pay for local calls in addition to subscription or cost for the provider of the Internet services, and a subscription to the Internet service itself. So you have to pay more than fees than others. So the main problem is the cost. The other problem is to publicize it. There should be some publicity and promotion activities in Jordan through mass media, teaching and academic institutions, specially higher education, secondary schools, different levels showing them how to use the Internet, how to apply it in their research. To make them very aware of the importance of the Internet as the main source of recent information . . . Most of the literature, the scientific literature, is now published through electronic sources. (L29-31)*

A second librarian participant took a somewhat different view, arguing that government should go beyond simply promoting Internet use and start playing a role in creating some sort of subject or disciplinary classification for web based information in order to make it easier to retrieve.

*The government plays a key role in the management of Internet access. I think that most of the sites available need to be arranged in a manner that facilitates access to the relevant resources for researchers whether they are students or teaching assistants or general researchers. The government plays a big role in managing the Internet and they can ascertain the kind of*

*discipline in order to enable users to access resources relevant to their use. So they can provide, for example, resources at a level of age, or a level of specialization. . . . So it is a part of government in Jordan to promote the use of the Internet and to manage it and to encourage people to use the Internet in order to access relevant information. (L3:10-8)*

The final librarian believes that the government has two roles to play in order to support Internet access and use in the universities. The first is ‘to block those dirty sites which take a lot of students’ time’. The second role, perhaps closer to his own professional concerns, is to support access to proper scholarly material by providing financial assistance so that the universities can afford to acquire digital content.

*And the other one is to help universities to provide serious material to university professors and students that otherwise the university cannot pay for. And here I’m talking about subscriptions to databases, e-journals, e-books and other sources like that. (L1: 1-22)*

**Question Three: In general what are the most important factors that promote the effective use of the Internet in academic research?**

The librarians were asked to identify the most important factors which would promote the effective use of the Internet in academic research. There was general agreement regarding need to make academic users aware of the potential benefits of using the Internet for their research and related activities.

*I think first of all, the awareness. We need to get everybody in the academic environment to be aware of the significance of the Internet. There should be a kind of promotion and teaching courses and workshops in order to tell the users the uses of the Internet. They should get in touch with the uses of the Internet. (L3: 7-16)*

Not surprisingly, however, participants were also keen to point out that developments of skills were also crucially important. There were several aspects to the required training. As one participant argued it should include not only the skills required to execute a basic search strategy, but it should also include providing knowledge about the different types of information available that could be accessed by the Internet and the different levels of authority they possess.

*I think we have to start from the beginning for the academic sector. For students starting from secondary schools, prepare to make them aware how to run a bibliographic search; and the differences between a bibliographic search and [searching] a full text or complete source . . . And the difference between academic sources and general sources or public sources of information that are not recognized as academic sources. They could be good for secondary school level, but for university you are in need of refereed journals or other refereed sources of information, an authorized source of information. (L2: 6-19)*

This participant went on to discuss the need to provide training that is targeted at different groups of users, so that they are made aware of the information that is particularly relevant to their needs.

*We should train the users at different levels, either the academic staff members, research students, and students at different levels. We have secondary school or high school student, we have BSc students, graduate students, either the DMC or MAs or BSc student. These different categories of student, or researchers should learn and know how to run a search. Firstly to find some kind of library literature or information. The basic skills to run a search, how to differentiate between different sources of information, to be aware of different sources of information. For example we have periodical sources, conference proceedings, databases of information, usually full text. Now-a-days most of the text books are published in electronic versions in addition to paper*

*version. And in addition to most text books . . . examinations and manuals are mostly published in electronic versions. (L2: 6-26)*

**Question Four: If you are familiar with term digital divide, what does this term it mean to you?**

The librarians interviewed identified the ‘digital divide’ as referring to differences in access to technology. The chief markers of these differences were seen as being geographic, and the crucial divide was between ‘western countries’ and the developing parts of the world, including Jordan.

*I think the digital gap means that there is, you know, a slight difference between some communities and others in terms of using technology. I mean IT. In our country, Jordan, I think when compared with western countries there is a real gap, that we are below these countries. They are advanced when compared to Jordan. So I think the concept is that there is a digital gap but we notice that our country is trying its best in order to overcome this problem. (L3: 8-22)*

A second librarian participant spoke of the divide in more slightly more complex geographic terms. He identified not only the divide between the west and the Arab world (which he described as the cause in the difference in research productivity between the two regions), but he also spoke of the divide within the Arab world. Interestingly, this internal Arab divide was attributed not necessarily to a gap in the levels of development, but rather spoken of in terms of a communication gap between different regions of the Arab world.

*We have it [the digital divide] in two levels here. One level is between the Arab world and the west, and the second one is between the eastern part of the Arab world and the western part of Arab world. Between the Arab world and the west, you know that we have this huge gap. They are well ahead of us with regard to the digital material that they have provided their universities with a lot of digital material that has need,*

*research, easy and possible for their professors. That is why they have a much higher rate of publications than professors in the Arabic world. . . . Now within the Arab world, we have a divide between, let us say, the eastern part of the Arab world, this is the Asian part, and the African part. That is, in Africa where we have, Libya, Nigeria, Sudan, even Egypt, but Egypt at a lesser level. So we don't know what they are doing there, and they don't know what we are doing here, so there is a lot of duplication in the Arab world. Sometimes even in the same country we have duplication of research, this is because of this huge gap between us. (L1: 6-4)*

This participant also spoke about further divisions' in the Arab world, noting that some countries in the Gulf region 'where they have a lot of money' might be better off than Jordan with regard to access to 'databases, e-journals, e-books and the lot', but he also noted that Jordan was better placed than most Arab countries.

The final librarian participant also pointed to geographic differences, pointing to both the late uptake of digital technology in Jordan and a seeming reluctance to embrace it fully.

*I think we have a gap between developed and developing countries for the use of digital libraries or electronic libraries. I think digital libraries are a new concept or phenomena to the library and information specialists in developing countries because most of them are still traditional libraries. They depend on traditional or print version of books, manuscripts and periodicals. The new version of information is still untried due to different factors. As I mentioned, many Arab countries are not familiar with new trends of information, because the electronic version is new technology. I think the concept of Internet in this area of world [started] at the beginning of the 21st century. So it is a new trend, new concept, and I think the people are traditional and accustomed to traditional or*

*classical sources of information. I mean the paper version. (L2: 6-22)*

This participant was also keen to point out the language gap. With most of the available databases using English it made extremely difficult to use for those disciplines (social sciences and humanities) where the education was still conducted in Arabic.

*Most of the students in the humanities and social sciences where the medium of teaching is the Arab language, students want to run. Because students will know that most databases are available are in English language. We have very, very limited number of databases in Arabic language. I think this is the main obstacle, the main problem for many researchers, is not to find any databases in Arabic language. (L2: 7-20)*

**Question Five: Do you believe that a digital divide exists among western countries and Arab countries?**

As indicated in reporting the responses to Question Four, the librarian participants had already spoken of the digital divide in terms of a geographic distinction between the west and developing countries, and articulated their thoughts on where Jordan and the Arab World were placed in this regard. When prompted again on the matter they reiterated the problems in technology acceptance and adoption which had been previously expressed.

*Yes, I think the western world is developed in most aspects when compared with the Arab world. You know in developing countries, there is a gap. You know the student since his in early age he learns how to use the Internet in the western world and he learns how to use the IT. While we are new in this game in our country. . . . Electronic publishing is an example. It is very strong in the western world, and very weak in our countries. So there is a gap, really there is a gap. (L3: 7-4)*

One of the participants also used the opportunity to develop the discussion of the digital divide in the academic and research contexts, and in particular focused on the issue of language. He argued that most Arab scholars are forced by circumstances to publish in English, and he discussed three reasons why this is the case. Firstly, he pointed out the difficulties in undertaking scholarly communication in languages other than English, when it is English that dominates the current scholarly exchange. He drew distinctions between science and other disciplines, but argued that even in the non-science disciplines the pressure to use English is substantial

*The other main problem is that most references will be in English language, most of the texts and references he will use he will depend on publications in English. The most recent information is published in English language, so the English language is the language of science and sometimes also of humanities and social sciences. The medium of teaching is in Arabic, but the texts and examinations at the university level, specially at graduate studies level, is mainly in English language. So the student has no choice but to depend mainly on English language. Also most databases published as information sources, they are available in English language. So the texts are in English, the medium of teaching is in English, the written publications are in English. So they have to prefer to publish in English, for these reasons. (L2: 7-1)*

Secondly, the participant pointed to another issue related to language. That is, that scholarly discourse has developed in English and there are occasions on which there is no equivalent that can be precisely expressed in Arabic.

*Sometimes there is the problem of pronunciation [i.e. meaning], of how to transfer or translate some words or phrase from Arabic to English. So they prefer to use it in English, which is to give an exact meaning, instead of looking for an equivalent for an English phenomena or word, to find the equivalent for that in the Arabic language. (L2: 7-10)*

Thirdly, the same participant pointed to the practicalities of building a career in an environment that heavily privileges the use of English.

*I think most of Arab scholars publish their research in English language for promotional reasons. . . . Because if he published it in Arabic periodicals it is not recognized as authorized publishing. . . . For accreditation, the basic thing is recognition by the deans of research. If it [an article] is not published in English language and [is] distributed locally, then they consider that journal under level [substandard]. So they will not consider it for promotional purposes at the university. (L1: 6-27)*

**Question Six: What do you believe are the causes of the digital divide and how does it disadvantage Arab scholars?**

The Librarian participants also identified cost as being an issue in the digital divide, although not surprisingly the items identified tended to be associated with library services. One participant was keen to point out the expense of full text databases.

*The main reason for the digital divide between western and developing countries or USA and other western countries and Arab countries or developing countries, is for financial reasons. . . . Electronic sources in these [Arab] countries are not available widely because of cost. The cost, generally speaking, of any database. Some of them cost about a million or two or three million like Science Direct or other databases, for this reason it is out of the reach of most of the students or most of the institutions. So with the availability of limited sources they prefer using the traditional ones. . . . Most of the developing countries still depend on traditional or classical sources, not for their interest in these, but the unavailability of new trends, new technology and information. (L2: 4-30)*

Several of the librarians were keenly aware of the issue of technology lag, with two pointing out the delayed adoption of ICTs as symptomatic of a slow acceptance of technology generally in the Arab world.

*The causes of the digital divide, or this gap you talk about between Arabic world and the west is that technology started in the west, and they have utilized technology in a better way than the Arabs. We follow them on everything. . . . So they have utilized this technology well ahead of us. (L1: 4-21)*

*You know the western world is developed and has a long history in development in comparison with the Arab world. For example we have been recent in this development. Everything in the western world depends upon IT; you know accessing the Internet and electronic publishing etc. While you know in our world there is slight under development in these aspects. (L3: 5-24)*

One of these librarians, probably aware of the educational role played by academic libraries in the west, pointed to the lack of training given to Jordanian students in the use of new ICTs as a cause of the digital divide. He also noted the detrimental impact this has on their learning

*And when they utilize this technology there, I think they provide their students, and this could be also in Japan maybe, that they educate their students on how to use the Internet. Now our students are not educated how to use the Internet. I don't recall whether at school or at university that we teach our students how to make use of the best of the Internet. The students surf the Internet in their own way, and you know, there are lot of attractions, that are not usually good for academic reasons. (L1: 4-26)*

One of the librarian interviewees used the question regarding the cause of the digital divide to again raise the issue of language. This is a different librarian participant from the one who spoke on the subject of language in response to

Question Five. Very likely aware of the comparatively limited amount of scholarly publishing available in Arabic he pointed to the ‘gap’ that resulted when Arab researchers were unable to read English publications or distribute their own research in English.

*Also, the Arabic language I think it needs more care in the Internet arena. We need to focus on the Arabic language and we need to use it in its standard form. So we need to work a lot in order to get access to documents in Arabic over the Internet.*  
(L3: 5-28)

**Question Seven: In your opinion how could your library help your institution to bridge the digital divide?**

The three librarians whose responses have been included gave very clearly focused and quite different responses to the question of how libraries might assist in overcoming the digital divide. One of them focused on the need for libraries in the region to cooperate in forming buying consortia in order to acquire the necessary scholarly content—in the form of databases of full text journals—on the best possible terms.

*They should try to have some kind of cooperation between most academic libraries in the country by establishing some kind of coordinated institution like a consortium or a federation between academic libraries or university libraries. For many reasons, it is some kind of resources sharing to make cost reductions, especially subscription cost. You will have unified subscription instead of multi subscription, and at the same time they will share with each other the available resources. In addition to that they could have many more titles, and they could have the electronic versions and could be easily used by different users at the same time or multi users at the same time online. So I think we will have some kind of cooperation, some kind of consortium or federation between institutions, and try to have some kind of inter-library loan especially for electronic media. Also . . . making a connection or network between*

*universities libraries in Jordan could help in this regard, because at the same time we will have the resources of about 10 public universities in addition to about 14 private university libraries, all of them having some kind of network. Libraries in Jordan through this network could have . . . resource sharing between universities. (L2: 7-8)*

A second librarian also focused on the issue of databases, but in this case was very concerned about the need for libraries to be active in creating databases of local or regional content. This participant expressed the view that the significant international scholarly databases are available to anybody with sufficient funding and that the role for libraries was to focus on digitising the content that was essential to Arabic scholarship. He also pointed to current projects that serve as a model in this regard. His comments also indicated the differences between the science materials which are available from international content providers, and the non-science materials which required local support.

*Now with regard to libraries in the Arab world, we have databases that are made in the west, so if you have the money you can just buy the material. But with regard to Arabic material, until now, it is not available in a database. So it's our task here to provide this material in a digital format for our staff members and students. And I think there are two projects in Jordan that are going on, one at Yarmouk University and one in Jordan University . . . At Yarmouk University now we are digitizing journals, Arabic journals. In other words we are imitating the west, in providing Arabic material in a single database, with one search engine, for students as well as staff members. Jordan University is digitizing theses in a project there. I think we are working to bridging this gap, by providing Arabic material, which is very significant for Arabs, especially for studies in Arabic languages, Islamic studies, social studies, and the like. For pure sciences we have a lot of publishers in the west, just by subscribing. But regarding Arabic languages studies, Islamic studies, social studies, and like, we don't have*

*such a database, except for those pioneering projects at Yarmouk University and Jordan University. (L1: 6-25)*

This same participant also stressed that it was not the librarian's role to try to select the 'quality' materials for digitising, but to undertake the task in a comprehensive manner and leave the users to make assessments as to the worth of individual articles.

*Now we know that sometimes we have poor quality papers and [sometimes] we have high quality papers. But we are not the ones who say so. In the library we try to provide the entire issue, as much as possible, from cover to cover, and then we leave it to the researcher to determine the quality of the paper. (L1: 7-5)*

The third librarian participant emphasised the theme of training, arguing that a greater training effort was a necessary 'investment' in optimising the return from the money already spent in acquiring the resources.

*I think we need to have more and more workshops and training courses for the users, whether they are students or teaching staff or even library staff themselves. We need to teach them, we need to educate them; we need to have a certain type of human resources development in these aspects in order to enable the users to access these valuable resources. We pay a large amount of money for subscription to Internet resources, I mean the bibliographic databases or text or bibliographic citations, so we need to have our own investment in this field by teaching and educating the people to get the maximum from these resources. (L3: 8-9)*

**Question Eight: If you want advise the librarians (decision makers in libraries) what you say to them?**

The senior librarians' interviewed were also asked to reflect on the advise they would provide to other librarians and policy makers with regard to developing

services to academic communities in Jordan. The advice they would provide fell into two main categories. The first, advocated by all three librarian participants, related to the need to build the necessary collections of digital content by acquiring or building the local databases.

*My advice is that we need to have more and more use of electronic resources. We need to have a clear use for electronic resources, we need to have a clear use of Internet resources, and we need to have more subscriptions and use of these resources. (L3: 7-26)*

A second participant made a very similar point about the need to build content, and he stressed both the need to see the cost as an investment, and the close relationship between the quality information and library services and the quality of education.

*I would say to librarians and decision makers the following. One is that the west has started this [digital library services] sometime ago and we have lagged behind, and now we have to catch up. Now the material is available to buy. So I would like to give advice, specially to decision makers as well as librarians, is that now is the world of the digital library. Whether we go for it or not, it is the digital library world now. Most of the material is now provided in digital format, and this saves a lot of time, a lot of effort and a lot of money. So even though we pay some money for this, let's not forget that the money that we pay is necessary to provide our students and our staff members with vital information for their research and their knowledge, and if you would like to have quality students, you have to provide them [with] quality education, and the quality education includes quality libraries. (L1: 4-14)*

In also stressing the need to build content the final librarian participant insisted on distinguishing between the two main categories of users being served by academic libraries; the teaching and learning users, and the researchers.

*They should start by establishing what I can say is a digital library or electronic library, to go and build a good collection. [They should] start to build their collection in two tracks, one for students and learning purposes or teaching purposes for the undergraduate students and at the same time to establish what I can say are information sources and information databases for research purposes, for researchers, for graduate students and academic staff members. (L2: 7-5)*

The second major aspect of the ‘advice’ these librarians would provide related to issues of promotion, advocacy and training. There was an understanding the having the content was not in itself sufficient, and users needed to be both aware of what was available and know how to gain maximum benefit from its use.

*The best way is to have some kind of promotion about the use of electronic sources, how to use the available databases, providing some kind of training sessions or seminars about the use . . . Instead of spending a lot of days, weeks, or months they could have done that search . . . within half or two hours could finish their work, at the same time the availability of many of full text sources of information that will help the others. So I think the main things or the main recommendations for decision makers or librarians is to provide some kind of publicity or promotion activities about the use of electronic sources, to make people aware of it and how to use it through training sessions, to make some kind of cooperation with staff members to introduce the electronic version or databases to students.(L2: 7-10)*

Another participant also spoke of the roles of promotion and training, but he added a comment about the importance of academic staff teaching users to value the information sourced from library databases, and recognise its dependability in terms of quality as compared to information found on the free Internet.

*Now the other advice is that to encourage students to come to the library to [use] such material rather than just search the*

*Internet for anything. And here is also the duty of the professors to watch for the quality of the material that the students provide in their courses, that is to check whether it is something cheap provided anywhere on the Internet, or something that's quality, provided by the library (L1: 6-32)*

## **7.5 Summary**

The interviews proved to be a very effective means of collecting qualitative data related to the research questions. Although there were a number of key issues that concerned all three groups of interviewees (of which cost of ICTs and the under representation of Arabic were the most commonly raised), there were also—as anticipated—differences between the focus of the three groups that aligned with their professional interests.

There were also individual differences with regard to the level of optimism regarding Jordan's prospects for reducing or overcoming the digital divide. Whether they were optimistic or pessimistic, however, respondents generally expressed a belief that Jordan was in a better position than most of its Arab neighbours, and that government policy would continue to promote the adoption and use of ICTs as a core component of educational and social infrastructure and development.

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## Chapter 8 Discussion

### 8.1 Introduction

This chapter discusses the findings of the research that has been presented in Chapter Five (Document Availability Test), Chapter Six (Questionnaire) and Chapter Seven (Interviews). In particular, the chapter examines the findings in relation to the research question and objectives outlined at the commencement of the study.

The research question was: How can digital libraries assist a university in Jordan to bridge the digital divide?

The method of answering this question was to address a series of three objectives. These objectives were to:

1. measure the extent to which a digital divide exists in Jordan,
2. identify the components of any digital divide (i.e. technological, linguistic and cultural),
3. Assess the potential role of digital libraries in Jordanian universities in overcoming the digital divide.

Each of these objectives will be addressed separately in this chapter referring as necessary to the evidence gathered by the three research methods of the document availability test; the questionnaire, and the interviews. This will entail some repetition of results that have been presented previously, but this is necessary in order to triangulate the data from the three research methods.

The innovative nature of this research is important. Several related previous studies, the results of which have been published in Arabic, have been undertaken in Jordan. These have been quite narrowly focused, however, including studies examining the use of the Internet by libraries (Younis, 2002), or investigating the use of the Internet by academic staff and students (see for example Al-Omari, 2002).

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Many of the other studies conducted in Arab countries (for example, Abdullah, 1999; Musalam, 1999; Ghandour, 1999; Hamshari & Bu-Azzah, 2000; Allehabi, 2001; Al-Radhi, 2005; Khalifah, 2005; Sulaiman, 2005; Al-dojan, 2007) were also quite narrowly focused, typically looking at Internet use in particular Arab countries. Of Arab country authors only Aqili & Moghaddam (2008) have specifically discussed the role of librarians and information professionals in bridging the digital divide, but their survey article includes no original research and discusses developing countries in general rather than the Arab World in particular. Crucially, there have been no previous studies that have attempted to measure the digital divide; investigate in detail the components of the digital divide as experienced in Arab countries; or explore the role of digital library services in overcoming of the digital divide. For the present study it was therefore decided to investigate the role of library and information services in utilising ICTs to address the digital divide. The study was to be based on a study at Yarmouk University with results that could hopefully also be indicative of the situation in other developing Arab countries.

## **8.2 Objective 1: measure the extent of a digital divide in Jordan**

Although there is an extensive literature relating to the digital divide generally, there have been few attempts to actually assess the extent of the divide as it is experienced in a particular country. It is often taken for granted that such a divide exists, but for this study it was felt necessary to attempt to both measure the extent of the divide (if indeed it exists) and to try and determine its key characteristics, before proceeding to investigate the role that digital libraries might have in addressing this ‘gap’.

In order to assess the digital divide as experienced in Jordan it was considered necessary to conduct a comparison with a university in a developed country. The method of a document availability test (DAT) was selected as the means by which that assessment would take place, using the resources made available to users of Yarmouk University (Jordan) and Curtin University of Technology (Australia). A complicating factor was the different languages (Arabic and English) used for research purposes in the two countries. For while English is now used in Jordan for some academic uses, Arabic remains indispensable for some types of research and

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some disciplines. The DAT was therefore devised with this in mind, in order to ‘test’ and compare the availability of not only internationally published materials, but also of scholarly content generated within each country and largely designed for consumption by ‘local’ scholars. Results received from the DAT were used to inform the structure of the other research methods—the questionnaire and the interviews—which in turn allowed further evidence relating to the extent and nature of the digital divide to be gathered.

The first point to make regarding the results of the DAT is that it is apparent that an ‘information divide’ exists between the two countries. This is quite convincingly demonstrated by comparing the results of availability testing for the 500 ‘international items’. Of these 67.2% (n=336) were available at Curtin in print as compared to 46.8% (n=234) at Yarmouk. This clearly constitutes a significant advantage for Curtin Library users in terms of access to information.

When these figures are considered more closely, however, it can be seen that much of the advantage is provided by Curtin users’ greater access to print material, with 86 (17.2%) of the items being available in print only at Curtin as compared to only 18 (3.6%) being available in print only at Yarmouk. It is likely that this discrepancy has been even greater in the past, with Curtin possibly having discarded a number of print items (particularly journals) as they have been duplicated in electronic form.

The situation becomes less clear when the focus is shifted to the electronic items held by the two libraries. Despite the fact that Curtin Library provides access to a far greater number of subscription databases than does Yarmouk, the discrepancy in the number of items retrieved from these databases is less than might have been expected, with 42.4% (n=212) at Curtin and 32.2% (n=161) at Yarmouk. This result still indicates that Curtin Library users have a distinct advantage, but it is nonetheless represents an improvement for *both* groups over the situation that prevailed with print resources only, and in comparative terms the improvement is greater for the Yarmouk Library users. That the discrepancy between the two libraries is less in this regard than might be expected based on the number of databases they provide is likely explained by the large amount of duplicated content that exists between many of the databases available from the Curtin Library.

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It is also noticeable from the DAT results that access to freely available Internet content has a ‘smoothing’ effect on the differences in the capacity of the two libraries to provide users with required items. With both libraries having access to 112 of the cited items, there was (not unexpectedly) a greater overlap at Curtin Library with items that could be sourced from other parts of the Library’s print or electronic collections. Whereas Curtin Library users can find 31 (6.2%) items available on the Internet only (81 items duplicated); Yarmouk Library users will find 55 (11%) of items available from the Internet only, and 57 items duplicated in the Library’s collection. This strongly suggests that for ‘international’ scholarship the free Internet is of *comparatively* greater value as an information source to Yarmouk Library users than it is to Curtin Library users.

Based on this data alone it can be seen that there is a digital divide between the two libraries in that Curtin Library users have access to a greater number of electronic items than do the users of Yarmouk Library. It is also the case, however, that the discrepancy is less than might be expected, and that digital sources of content (both subscribed databases and the free Internet) have actually served to close the information gap that exists between scholars with access to these two libraries. Access to large scale databases of full text content has effectively enabled Yarmouk Library to begin to narrow the information gap in a manner that would likely have been extremely difficult if the core means of acquiring international scholarly content had remained the purchase or subscription of print material. In particular, the acquisition of substantial backsets of scholarly journals as a component of current database subscriptions has added a large amount of content that would otherwise have been unavailable.

The complexity of the situation with regard to electronic content, and the difficulty of making an easy judgments regarding the existence or extent of a digital divide, is indicated when the results from the DATs conducted on the samples of 250 ‘local’ items are considered. There are unexpected outcomes in these results, with ‘surprises’ for both the print items and the electronic items.

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The first outcome that may have been contrary to expectations, given the development status of the two countries, is that a greater number of the items were retrieved in print form at Yarmouk Library (n=103, 41.2%) than at Curtin Library (n=79, 31.6%). As discussed in Chapter 5 this is likely to be a reflection of the greater amount of scholarly publishing undertaken in Australia which is reflected in a comparatively smaller percentage being collected by any one library, plus Yarmouk Library's role as a deposit Library for Jordan which substantially augments their collecting of local print material. Due to this second reason in particular it is possible that this result might not be duplicated in other Jordanian university libraries.

The second unexpected result was achieved with the amount of material available from electronic databases. Whereas it might have been anticipated that Curtin Library users would have access to a greater number of items from this source, the opposite was the case with 13.2% (n=33) of items retrieved from databases at Yarmouk Library compared to 10% (n=25) at Curtin Library. This again may be representative of the differences in scholarly publishing activity in the two regions (and their respective languages), and is likely to also reflect the associated outcome which is a much smaller number of cited publications being available for the use of the Jordanian researchers. Nevertheless, on the basis of these two comparative DATs it can be concluded that researchers in Jordan have a higher probability of retrieving a 'local' item from a library subscribed database than do researchers in Australia. This is a matter that would require further investigation in order to establish the circumstances which are driving these results and to determine if they would be replicated with differently selected samples.

A third result from the comparative DATs for local items that was surprising—in terms of its extraordinarily stark difference if not in its general outcome—was that derived for items when their availability was tested on the free Internet. Whereas 40.4% (n=101) of the items tested at Curtin Library were available in this way, there were none of the items tested at Yarmouk Library that could be retrieved from the free Internet. This result represents a significant and important difference in the access to freely available content for these two groups of researchers.

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It might be easy to describe this result as evidence of the digital divide—this is after all a profound difference in the degree of access provided to electronic/digital content—but it also asks us to examine in more detail exactly what is behind this result and why it differs so markedly from other results. This issue will be addressed in the discussion on Objective 2.

On the evidence of the DATs alone can it be said that Jordan suffers from a digital divide? On a crude measure this might be said to be the case. Of the 750 items tested at Curtin Library 63.6% (n=477) were available electronically, and of the same number of items tested at Yarmouk Library 46.5% (n=349) were available electronically. In the competitive world of international research this indicates a considerable advantage to researchers at Curtin University. As we have already seen, however, the ‘patterns’ of difference between the availability of digital content from the two university libraries are far from consistent, suggesting that the explanation may be far more complex than a straightforward technology gap. As one interviewee noted; *‘I think between Western and Arab countries there is not a digital divide as such. In Western countries what is available to them is what is available to us. We use computers, we use the Internet, and we use all electronic media . . .’* (A6). This personal response of the interview participant is also supported by the questionnaire responses, which indicate that although the *ease* of access to hardware that is enjoyed in most western universities has not yet been duplicated at Yarmouk, the Yarmouk respondents nonetheless have almost universal access to the digital library services and the Internet. This issue will also be addressed further in the discussion of Objective 2.

What is apparent from the DAT when assessing the existence and extent of any digital divide is that the different samples led to very different results. As discussed above, the ‘international’ sample of 500 items tested at both Curtin and Yarmouk indicates that a difference exists in the availability of these materials at both universities, but that the biggest divide is with the material that is in print rather than digital form. With the two ‘local’ samples of 250 items undertaken at each university as appropriate, the results are very different in that they suggest a substantial divide in the availability of one category of items—those that are freely available on Internet websites. The free Internet is an ‘information space’ that appears to be

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barely used to make Arabic scholarly information available. This is a significant finding, because in terms of the international items sampled it is the free Internet sites that provide the greatest benefit to Yarmouk users in terms of narrowing the information gap that separates them from their colleagues in western countries.

With these results in mind it is perhaps safe to conclude at this point that there is a persistent ‘content divide’ between educational institutions in developed countries (as represented by Curtin University) and developing Arab countries (as represented by Yarmouk University). It can also be concluded that while there are indicators that the availability of digital content has benefitted users at Yarmouk University in terms of their comparative access to some categories of scholarly information, that for one important category—material generated by scholars based on the study of local phenomena and in the likelihood that the majority of its use will be localised—western scholars are at a significant advantage in terms of digital access.

This is clearly evidence of a ‘digital divide’, although it may not be exactly the form of divide that might have been envisaged. That is, the digital divide for users of the two university libraries with regard to the same international scholarship *does* exist, but its impact is ameliorated to some extent by the evidence suggesting that the availability of digital content (particularly in the form of free Internet based material) appears to be narrowing a previously existing information gap. The more significant digital divide made apparent by the results of the DAT is in the digital availability of items for use by scholars for research focused on local cultures and societies. There is ample evidence from the DAT to suggest that Jordanian scholars are currently disadvantaged by the lack of access to digital content sourced from Jordan and in Arabic, and that this shortfall is likely to impact most significantly on scholars working in the humanities and some areas of the social sciences.

Several other observations can be made about the data gathered from the DATs. The interpretation of the data collected from the DATs needs to be appreciated as a snapshot taken at a particular point in time. The development and implementation of electronic content is evolving at an extraordinary pace, and similar tests conducted now—or in several years time—might produce quite different results. Libraries themselves bring about rapid changes as they change the ‘mix’ of their subscriptions

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to electronic databases. New databases are added and existing databases deleted as libraries react to changes in user demand or database content and availability. The potential for change at Yarmouk Library is particularly great, as their low number of existing databases means that any new databases that are acquired can result in a rapid change to the amount of electronic content available.

Another area of rapid change is the evolving impact of the open access movement. This is felt in two ways. Firstly, scholars are increasingly placing published material in open access archives or repositories where it can be accessed freely by the Internet. It can be expected that in future more content will be acquired in this way, a phenomenon which has the potential to greatly benefit developing countries in their need to acquire scholarly content. Secondly, it is also highly likely that there will be a continued growth in the number of 'open access journals' publishing scholarly content directly to the free Internet. Once again, this will have benefits for developing countries who might not be able to afford access to similar journals through either subscriptions to single titles or as part of packaged databases.

Neither of the developments is unproblematic in terms of the digital divide. Having content available is important, but the quality of that content is also a substantial issue. Authors posting items to open access archives can frequently find that they are only permitted by copyright restrictions to post a pre-edited (and therefore pre-published) draft of a paper; and open access journals do not always carry the same level of peer review and therefore authority as do more traditionally published journals. Nevertheless, both of these developments have great potential to narrow the information divide between developed and developing countries.

### **8.3 Objective 2: Identify the components of any digital divide (i.e. technological, linguistic and cultural)**

Having used the evidence from the DAT to establish the existence of a digital divide and its general characteristics it was necessary to examine in more detail the various factors that created this divide. This is important in terms of enabling the

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development of strategies to address the digital divide and determining what role digital libraries might play in this.

This second objective suggested three likely ‘components’ of the digital divide—technological, linguistics and cultural—that were explored as part of the questionnaire and interviews. Each of these components is discussed separately in this section, although it will be argued that to a significant extent the three are inter-related. Use of the Internet and development of digital content (in any language and culture) depends upon a certain level of availability of key technologies which in turn requires policy commitment from government and support by key sectors of the society. The desire by government and other sectors to reach those levels of technology implementation will be determined by the perceived usefulness, which will be influenced by the adaptability of the digital environment to particular languages, and the flexibility within a culture to adjust to a transformative means of communication.

### **8.3.1 Technological**

It is often assumed that the primary cause of a digital divide is the differences that exist in access to technology. Certainly this can be the case for the forms of digital divide that exist both *within* and *between* societies, in that access to digital content clearly pre-supposes access to the technologies that deliver that content. These technologies can exist at several ‘levels’, including both the system wide communications technologies and infrastructure that are necessary to access the Internet, and the availability of the personal computers that are the universal means by which the Internet is made available to individuals. Self-evidently, Jordan and other developing Arab countries have the basic infrastructure to provide Internet access, and they also have personal computers available as a component of many workplace and domestic environments. In addition they have a government that has nominated the development of digital capacity as a core element in economic and educational development.

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This does not, however, mean that Jordan is necessarily on a ‘level playing field’ with western countries in terms of the implementation and use of ICTs. The basic infrastructure might be deficient in terms of its capacity to deliver reliable and high-speed broadband access; and the rate of takeup and use of personal computers might be impacted by matters such as affordability and reliability. These are both factors that would result in technological barriers that would impede efforts to close the digital divide.

The questionnaire results provide evidence that respondents regard technology disadvantage as a barrier to Internet use. Perhaps most strikingly, two-third of respondents (66.5%) agreed or strongly agreed with the proposition that ‘Academics in western countries have a technological advantage in using the Internet’. It should be remembered that many of the respondents have studied and/or worked in western universities and therefore have firsthand knowledge of the level of technology infrastructure and support enjoyed in these institutions.

When propositions expressing particular aspects of technology disadvantage were put to the respondents, their responses were somewhat less emphatic. For example, 27.0% (n=98) agreed or strongly agreed that ‘I don’t have equipment and facilities to use the Internet’; and 23.1% (n=84) agreed or strongly agreed that, ‘There is a lack of access to the Internet at Yarmouk University’. These responses are still notable, however, in that for both propositions approximately a quarter of respondents believe they are disadvantaged by the lack of access either generally, or more specifically, at the University. Although no directly comparable figures are available from recent studies in western universities, it would be difficult to imagine a similar level of agreement with these statements given the near-ubiquity of desktop access available to both staff and research students in these institutions. The contrary element of these responses therefore needs to be considered, in that a greater number of respondents (53.8% in the case of the former proposition; and 58.0% in the case of the latter) either disagree or strongly disagree with these statements. A majority of respondents therefore seem to be satisfied with the current level of their Internet access, although this might also of course reflect the low level of their expectations. As reported in Table 6.B6, 55.7% (n=203) of all respondents reported having Internet access from their work desk, a figure almost exactly equivalent to the numbers reporting satisfaction with their current access arrangements. Other respondents (most of

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whom are current research students) have to rely upon shared access from computer laboratories or the Library (Figure 6.B1).

The issue that is relevant with regard to technological barriers is the cost of Internet access in Jordan. Although the questionnaire did not specifically include a question related to cost, it was raised independently in the response to the open-ended question dealing with ‘barriers’ that inhibit use of the Internet, with some 55 open-ended responses raising the issue of cost, making it the fifth most frequently noted barrier in the open-ended responses. The issue was also raised in the interviews, with one academic respondent specifically linking the high-cost of both purchasing a computer and Internet connectivity to the digital divide. The evidence indicates that one of the greatest barriers to bridging the digital gap in Jordan remains the cost of computer use and Internet access.

As described and discussed in Chapter 7, the issue of the cost of most aspects of technology ownership and access was raised by several of the policy makers and the librarians, and consistently described as one of the major barriers to increased use of the Internet and digital information in Jordan. This issue is important to understanding Jordan’s circumstances as a particular ‘type’ of developing country and therefore its relationship to the digital divide. That is, Jordan does not suffer from a lack of availability of ICTs in the same way that might characterize less developed countries, but rather an issue of affordability that prevents the uptake and penetration of these technologies to the level enjoyed by more developed countries and desired by the Jordanian Government. One interview participant noted that this was true of the wider region, blaming high cost for the *‘general delay in the introduction of computers and access to the Internet to these [Arab] countries despite computers and Internet being available for a considerable time’* (A9).

Reliability of communications infrastructure is also seen as an issue by many respondents, with 32.9% (n=120) agreeing or strongly agreeing with the proposition that ‘Access to the Internet is interrupted by system errors or equipment failure’. Again it is difficult to imagine a similar result being reported from research conducted in a western university. This matter was also reported in responses to the open-ended questions, with respondents commenting on matters including the slow

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connection speeds; the disruption to service, and the inadequate number of Internet service providers.

The interviews provided further evidence of the lack of the high-quality infrastructure to support reliable, high-speed Internet access. Not surprisingly, it was an issue that seemed to particularly concern the academic participants

*In regard the effective use of [the] Internet, one of the main factors is infrastructure, the Internet infrastructure, the infrastructure of supplying information, the capacity of the communication lines. . . . [I]t takes time to download information, it is very slow, and it has very low capacity. We can provide a better infrastructure . . . (A6)*

The policy makers who were interviewed were keen to point to the various government-led initiatives to correct the infrastructure problems and thereby make available broadband access to digital content. Despite these recent (and planned) improvements it seems that some lingering problems remain which for some participants act as a discouragement to Internet use.

This mismatch between Government policy and user perception seems to be typical of the current state of ICT implementation in Jordan. There is an enthusiasm from within Government for the rapid development of a range of digital services that will benefit education, research and commerce will flow-on benefits for domestic use, and indications that various developments are resulting in improvements in the range and reliability of services. Despite these improvements there is also continued frustration amongst users, particularly those who have enjoyed exposure to the benefits of comparatively cheap, reliable and widespread Internet access that is available to users in developed western countries.

As discussed in Chapter 6 one of the very striking outcomes of the questionnaire was the response to the proposition that ‘I lack the desire to use the Internet’, with 76.9% (n=280) either agreeing or strongly agreeing. This ‘lack of desire’ emerged as the single biggest ‘barrier’ to Internet use when compared to a range of technological, human or organisational barriers (Table 6.B13). This result contradicts in part the

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benefits that most respondents reported they gain by using the Internet (Table 6.B10), whereby 69.5% (n=153) reported either agreeing or strongly agreeing that it has become ‘the most important information source for my study and research’.

This reported lack of desire to use the Internet is unlikely to be related simply to any technology issues. If the respondents can perceive the beneficial impact of the Internet on their research then it may well be that the lack of desire to use it relates to more pervasive factors. The two that appear to be the most likely are those related to the language and culture shared by most staff and students at Yarmouk University, and these factors were also investigated by the questionnaire and interviews.

### **8.3.2 Linguistic**

As has been noted at a number of points in the preceding chapters, one of the characteristics of global scholarly communication is the domination of English. The pre-eminence throughout the twentieth century of English speaking western countries in scientific research, scholarly publishing, and development of ICTs, have all been factors in the acceptance of English as the global language for scholarship.

This domination by English has required non-English speaking countries to develop a degree of English language proficiency in order to optimise both their capacity to retrieve and use research-based publishing, and in order to make their own research outcomes available to the wider community of scholars. This has been an easier task for those countries (many of them western European) that share both a written language based on the Latin alphabet, and a long history of university based education coupled with a highly managed system of scholarly communication. For these European countries (most of which have a Romance or Germanic language as their first language) English was comparatively easy to adopt as a second language for the business of government and scholarship, and the eventual domination of English as the global language of scholarship on the Internet has required little adjustment.

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The challenge facing other language groups has been far more substantial. Arabic speaking countries have faced some particular problems in adapting to the world of digital scholarship and communication. These problems include the various forms of Arabic that are spoken, some of which are mutually unintelligible; the Aramaic script which has been difficult to adapt to a standard keyboard; and the lack of an Arabic tradition of scholarly publishing as it is known in the west. In addition the Arab speaking countries of the Middle East have had—until quite recently—a much lower penetration of English as a second language that is the case in many other parts of the world.

That matters related to language, and in particular the lack of digitised Arabic content, could be an element in the digital divide had been strongly indicated by the *Arab Human Development Report 2003*, and it was therefore believed to be a critical part of this research.

The document availability test provided some initial evidence in this regard. As discussed previously, the total absence of free Internet content from the Arabic sample pointed to a failure to transfer Arab research (particularly in the in the social sciences and the humanities) to the Internet. This result contrasted considerably with that achieved for the English language ‘local’ items sourced from Australian journals, where 41.6% (n=104) were found to be available from free Internet websites. The result very strongly suggests that for some reason, be it either the difficulties faced in reproducing scholarly Arabic in the web environment, or the lack of an ethos supporting the open-access movement, that Arab scholars are not thus far using the extraordinary communication power of the Internet to optimise the distribution of their research results.

The questionnaire asked respondents to indicate their level of agreement with the proposition that ‘Academics in western countries have a linguistic advantage in using the Internet (Table 6.B15). Some 72.8% (n=267) of respondents either agreed or strongly agreed with this statement. The mean response of 3.90 indicates that as a group the respondents consider language related issues to be a more significant barrier to Internet use than the ‘technological advantage’ enjoyed by the west (mean=3.74).

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A series of question probed the issue of the place of Arabic on the Internet more closely (Table 6.D29). One of the propositions put to respondents interrogated their attitude towards the representation of Arabic on Internet sites and the extent to which this might inhibit comprehension. Of the respondents 43.4% (n=158) agreed to some extent with the proposition that ‘I cannot read Arabic information on the Internet due to unrecognised characters’, compared to 32.9% (n=120) who disagreed. This response indicates that many users find there are problems with the manner in which Arabic is reproduced by at least some Internet markup languages.

It also seems that the lack of standardised Arabic may be a problem, with 52.2% (n=190) agreeing or strongly agreeing with the statement ‘Arabic versions of some websites are not understandable’, compared to 18.1% (n=66) who disagreed to some extent. Therefore simply making scholarly information available in a single form of Arabic will not be sufficient to ensure that the research is effectively communicated with all other scholars who identify themselves as Arabic speakers.

This problem of varying forms of Arabic was referred to in the *Arab Human Development Report 2003*, which noted that problems in using Arabic for scholarly communication is ‘complicated by the duality of standard and colloquial Arabic’ (p. 123); and in the interviews when a librarian participant pointed out the need to use the ‘standard form’ of Arabic on the Internet to ensure that documents are able to be read as widely as possible.

*. . . the Arabic language I think it needs more care in the Internet arena. We need to focus on the Arabic language and we need to use it in its standard form. So we need to work a lot in order to get access to documents in Arabic over the Internet.*  
(L3)

Respondents were also asked questions that investigated the prevalence and authority of Arabic as a vehicle for scholarly communication on the Internet, and again the results indicate deficiency in these regards. In a key result of the questionnaire, a clear majority of respondents (64.8%, n=236) agreed or strongly agreed with the

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proposition that there is inadequate Arabic scholarly information on the Internet, and only 11.0% (n=40) disagreed to some extent (with 24.2% neutral; Table 6.D29).

This result regarding the lack of scholarly information in Arabic on the Internet was also strongly supported by the outcome of the question asking for open-ended responses on the issue of ‘barriers’ to using the Internet. The most common response was grouped as ‘Lack of local content in Arabic language particularly scholarly information’, with 78 responses being characterized in this way. The issue of language as a barrier to Internet use also featured in other ways in the responses to the open-ended question. The second most common response (n=73) pointed to the prevalence of non-Arabic language as a being a barrier to Internet use, indicating that many respondents lack the fluency in these non-Arabic languages to read articles or decipher information. In this environment the use of translating software that is widely available could possibly provide assistance, although some 23 respondents pointed to the ‘lack of quality translating’ as being a problem.

The issue of language, and particularly the dominance of English on the Internet, was raised in numerous contexts in the interviews, and again seemed to be the issue of most concern to the participants in discussing the digital divide. One participant described it as ‘the only barrier’ (A1). A typical description of the prevailing situation was provided by an academic participant.

*It [Arabic] is our native language and it is the language we speak. Unfortunately from what I know, the Arabic language used in research is still limited, especially when it comes to publication. So personally I'm not using Arabic in my research, and I don't use Arabic search engines to find information. We need more efforts to publicize our language on the Internet and to have [Arabic] software and to teach people how to use that. Honestly my computer does not have an Arabic keyboard, so when I make a search or when I use the Internet or my e-mail, I only use English language. This is how I learn it. (A10)*

And while interviewee A10 had adapted to using English on the Internet, for others that lack of Arabic remains a critical issue. As interview A4 noted:

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*Language is an important barrier to using Internet services. . . . [M]ore than 80% at least of the Internet services on the sites are in English. So if your language is Arabic you will not benefit from Internet services or from even the digital library. (A4)*

Yet another of the academic participants in supporting the view that the lack of Arabic was at the heart of the digital divide as experienced in Jordan, also pointed to two other related issues; the need for Arab scholars to master English if they wish to find a wide audience, and the use of the Internet to distribute many English language documents in an open-access mode.

*Documents are not written in Arabic, in our language. Yes, from this point-of-view there is a digital divide. Most of what we write and research is not published in our language. They [developed western countries] do not publish it at all and they have no interest in publishing what we write, while in western countries they publish everything. Most of the things they publish on the Internet. (A6)*

Indeed for many of the interview participants the way forward in terms of overcoming the language issue is for Arab scholars to develop their English language skills in order both to improve their capacity to conduct research and to ensure they could be published in more accessible outlets.

Most WebPages are written in a non-Arabic language, and many people believe, wrongly, that it's not important to know any foreign language to be a good researcher. And this of course means our researchers are incapable of dealing with current research, inventions or developments in any field of study and unable also to deliver their findings to a foreign audience. (A2)

*We have to actually develop academics' ability with regards to [the] English language, so as to deal with information better on the Internet . . . [Academics need] to develop their English language skills, you know, to search better databases . . . (A6)*

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For several of the participants at least there was an acceptance that this situation was inevitable—that the previously established domination of English as the preferred medium for scholarly communication was irresistibly transposed to the Internet.

*. . . the English language is the language of science and sometimes also of humanities and social sciences. The medium of teaching is in Arabic, but the texts and examinations at the university level . . . is mainly in English language. . . . Also most databases published as information sources, they are available in English language. So the texts are in English, the medium of teaching is in English, the written publications are in English. (L2)*

The reference to ‘databases’ in this response is also telling—a reminder that far from all digital content is available from free Internet websites, and that subscription databases are another crucial source of digital information that is dominated by English. There were several participants who argued therefore that another response to the issue of language as a component of the digital divide was to ensure that a greater amount of digital content in Arabic was made available to researchers via such databases. As one librarian noted:

*We have very, very limited number of databases in Arabic language. I think this is the main obstacle, the main problem for many researchers, is not to find any databases in Arabic language. (L2)*

Another participant (a policy maker) raised the issue of the need for more Arabic digital content in terms of the differences between disciplines,

*We believe that especially in non scientific areas to have Arabic content and research in Arabic online will expedite the use of the Internet in academic research. Especially in areas like law and psychology, where it is been taught in Arabic and where most people are not extremely good at [reading] English in these area. As for scientific fields English it is not a problem, because it has been taught in English in universities and most professors read very well in English. (P4)*

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The evidence collected from the research points to the linguistic issues as being the major component of the digital divide. Furthermore it indicates that a dual approach to ‘solving’ the language problem may be required; firstly, continuing improvement of English skills for some (mainly science) disciplines; and secondly, a need to increase Arabic digital content, particularly for some areas of the social sciences and the humanities. For a country such as Jordan where the Government has placed a heavy emphasis on eliminating the *technological* gaps that have resulted in a disadvantage in information flow and use when compared with western countries, this is a significant finding.

One other result from the survey is relevant at this point. Respondents were asked to respond to the statement that ‘Using English for scholarly communications takes place at the expense of Arabic’; a proposition which drew agreement or strong agreement from 65.7% (n=238), with only 19.5% (n=71) disagreeing to some extent (Table 6.D27). This is not a surprising result in view of other opinions reported in response to both the questionnaire and the interviews that indicate an acceptance of the domination of English and other non-Arabic languages. It indicates, however, more than a belief that scholars need to use English, but also that the use of English is detrimental to—or occurs at the ‘expense of’—Arabic.

The issue of the relationship between Arabic and other languages was taken up in the *Arab Human Development Report 2003*, with the Report addressing the role of language in education. The Report called for the Arabisation of university education, describing it not only as ‘simply a matter of nationalism’, but as ‘a prerequisite for developing the tools of thinking and the creative faculties of young minds and for assimilating the rising volume of knowledge’ (124).

The *Arab Human Development Report 2003* also stressed the close relationship between language and culture. It described Arabic language as ‘undoubtedly the most prominent feature of the Arab culture’ (122) and canvassed issues related to the Arab cultures and their ability to adapt to a demands of a ‘knowledge society’ while retaining Arabic as a cornerstone of their unique intellectual tradition. The Jordanian

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Government and governments of other developing Arab nations face a considerable challenge in incorporating English into their education and research systems, while at the same time supporting the ongoing viability of Arabic not only for social and domestic purposes, but as a language both necessary for, and capable of, sustaining scholarship that is vital to the wellbeing of Arab societies.

Finally, it might be argued that the results of the research contain something of a contradiction, in that although teaching at Yarmouk University (and other universities in the region) is increasingly conducted in English, that lack of English proficiency remains a barrier to use of the Internet and other sources of digital content. This is explained by the substantial difference in the degree of English proficiency required by these two tasks of learning and research. As Table 6.B14 indicates, respondents are acutely aware that being able to converse in English for the purpose of teaching and learning does not necessarily provide them with the degree of proficiency required for effective use of the Internet.

The nexus between language, culture and the knowledge/information society was also explored in elements of the current research, and is discussed below.

### **8.3.3 Cultural**

Cultural influences and factors in the sense they are discussed here can be defined as those characteristics of the Jordanian social and/or educational environment that distinguish it from comparable environments in developed western countries. As noted previously language is perhaps the most critical and pervasive element of culture, to the extent that it has been considered separately above and will also be discussed further under this heading as it relates to other elements of Jordanian culture.

One of these other elements is that of cultural sovereignty or pride in a certain cultural independence. These elements are relevant to the digital divide in that they might influence the extent to which a society welcomes intervention from other countries, particularly those that are perceived as functioning according to different

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cultural norms. With this in mind several questions dealing with language were framed in such a way that they asked respondents to reflect upon the way in which their attitude to the use of English might be impacted by the need to maintain a sense of identity distinct from that associated with English speaking nations.

In response to the proposition that ‘Using English language indicates prestige and civilization’, 22.8% (n=83) indicated either agreement or strong agreement (Table 6.D27). Although this is a minority of responses it is a not insignificant result in that nearly one quarter of the survey respondents associate some degree of ‘prestige and civilization’ with the use of English. This question also received an unusually high neutral response of 29.9% (n=109), with 47.2% therefore disagreeing or strongly disagreeing. From these responses, however, it appears that most respondents would not choose to not learn English simply on the basis that it conveys a sense of prestige associated with a foreign culture.

A further proposition put in the questionnaire is that ‘Using English in our institution indicates cultural colonization by non-Arab countries’ (Table 6.D27). The ‘Disagree’ or ‘Strongly disagree’ responses in this case totaled 45.6% (n=166), while 27.7% (n=101) indicated some level of agreement. The neutral response was again high at 26.6% (n=97). This result suggests that for nearly half of the respondents a decision to learn English is unlikely to be impacted by matters related to a fear that the language is implicated as some form of ‘stalking horse’ for non-Arab cultures. Once again though, ‘cultural colonization’ does appear to be an issue for over a quarter of the respondents, a sizeable minority who *might* therefore register at least some level of resistance to learning English, either themselves or on behalf of their students. It is also worth noting that this is an issue that appears to produce a strong opinion in those who agree with the proposition that using English is an indicator of ‘cultural colonization’, in that it is one of the few questions in the survey that produced a larger number of ‘Strongly agree’ (n=51) than ‘Agree’ (n=50) responses. Indeed the ‘Strongly agree’ responses were considerably greater in number than the ‘Strongly disagree’ (n=30).

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There are, however, elements of Jordanian cultural life other than languages that might impact upon the extent and nature of the digital divide and which need to be understood. As one of the academic interviewees noted;

*Actions taken to bridge this gap [the digital divide] must not only be concerned with the provision of technical [services] and IT equipment but also with the development of social, cultural and cognitive resources. (A8)*

This interviewee is one of several who indicated that they see the current state of development in Jordan, including the existence of the digital divide, as a reflection on Jordanian culture and wider Arab cultures. The comparison was seen in terms that reflected badly on the Arab World, with one academic interviewees defined the digital divide as ‘the gap in knowledge and civilisation’ (A7). He went on to describe the various forms of underdevelopment that typify the academic environments of developing countries, including small number of intellectuals, low book production, low spending on research, and restrictions on free speech. This interviewee further indicated that the ‘gap’ between Arab countries and the west ‘increased daily’ due to ongoing ‘ethnic, racial and religious differentiation’, and the occupation of Arab countries by ‘the USA and Zionists’. This was the most fully expressed view of what might be described as a ‘clash of civilisations’ view of the differences causing the digital divide, although there were indications of it in other interviews. Interviewee A5, for example, argued that the cultural differences are manifested in the desire to support the political and economic interests of the west and its allies (‘the eight great powers’), which are served by maintaining the existing gaps in global development.

Other interviewees were more muted in references to cultural differences, although they did so in ways that argued there is a generally less progressive and entrepreneurial spirit in Jordan and other Arab countries that is manifested in a reluctance to embrace technology and associated development to the extent that the west does. These responses included references to; the Arab propensity to simply follow the leads given by the west (L1); the failure of the ‘Arab World’ to embrace development over centuries with the same enthusiasm as the west (L3);

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low awareness of the importance of ICTs (P2); and the tendency to not work as hard in Arab countries as in the west (A1).

A number of the interviewees were also able to describe deficiencies in the academic and research cultures of Jordan and other Arab countries. This is not a simple matter to pinpoint because many of these ‘deficiencies’ are likely to be the result of the late development and ongoing underfunding of the higher education and research sectors rather than any specifically cultural differences. There was, however, a strong suggestion by some interviewees that there was less *value* placed on research in Arab countries. For example:

*As you know there is a problem of scientific research in the Arab World. About less than 1% of the total budget of in any state of the Arab World is allocated for scientific research, but in the north, the first world countries, this ratio jumps to more than 10%, and this is a significant problem. (A3)*

This interviewee went on to describe the resulting problems for research generation in Arab countries being manifested in both low quantity and poor quality.

One of the policy maker interviewees (P4) also addressed the lack of research productivity, which he described as a product of an academic culture that has been slow to adopt technology despite government encouragement and policy. He suggested that the key problem was more likely cultural (a lack of ‘motivation’) and suggested that it might be necessary to bring pressure to bear either through legislation or the incentives associated with academic promotion. Another of the policy makers (P3) pointed to a higher education culture in Jordan that places very heavy teaching requirements on academics and thereby leaves them with little time to undertake research.

With regard to differing research cultures between the west and Jordan, and particularly the issue of ‘motivation’ as raised by interviewee P4, it is relevant to highlight again the result from the questionnaire which pointed to the high number of respondents (76.9%) who indicated they ‘lack the desire to use the Internet (Table 6.B13). While the reasons behind this lack of desire remain somewhat

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obscure given other more positive attitudes recorded by the questionnaire, it is at least open to speculation that it is in part an indication of cultural differences with regard to the real value that users find in a technology that may still seem alien and unrewarding in the context of a developing Arab country.

The differences in culture between western and Arabic cultures can be manifested in unexpected ways. One academic interviewee explained that these differences resulted in making some Arab research unacceptable to western journals because editors and readers cannot understand the cultural circumstances in which the research is conducted.

*I mean there is a difference in culture between Arabic and western countries. This is a stumbling block that actually prevents us from publishing in western journals. The topics we research are different from what they research. Even in education we research certain areas they are not caring about. They don't know our culture and the context is different. So we are actually sending our research articles to their journals and they don't actually visualize or imagine our situations or context. . . So they have refused [to publish] it. (A6)*

While this interviewee referred specifically to education, it is likely that similar issues would arise in other social science and humanities disciplines.

Perhaps not surprisingly, one of the government-based policy makers believes that cultural change is necessary if ICTs are to be widely adopted and that this change can be achieved by government policy. He argues that the two key issues are ‘*the availability of the technology to everyone in Jordan, plus cultural change*’, but suggests that although ‘*we [the government] have much to work on*’, that the ‘*culture is changing very quickly even in poor level areas*’ (P4). This respondent is non-specific about the cultural changes to which he is referring, but it is likely to include the broad spectrum of shifts in socio-cultural, educational and economic expectations that will bring individuals to a greater acceptance of technology.

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Another of the policy makers (P1) was also optimistic about the capacity of Arab countries to adapt the Internet to the Arab environment, at the same time as Arab users are adapting to the Internet. He pointed, as an example, to the number of companies that were now working in the area of gaming to develop local content that is sympathetic to Arab culture.

*. . . they are working on localizing and modifying many things. We have companies, if you talk about gaming, if you talk about content in PCs for young people to play and enjoy themselves, they are developing Arabic content. But not just the language, they are developing themes not just in Arabic, but taking Arabic cultural aspects into consideration . . . [something] developed in New York is not the same thing in the Arab World, it may be offensive in the Arab World in some of the contents. So to make people understand the culture and to produce something that is friendly to the culture, that people can utilize and hopefully become familiar with technology, this is the work. (P1)*

#### **8.4 Objective 3: Assess the potential role of digital libraries in Jordanian universities in overcoming the digital divide.**

As discussed in Chapter 6 respondents to the questionnaire were generally positive with regard to their assessment of the current standard of library services at Yarmouk University (Table 6.C22). The positive attitudes were evidenced for a range of collection and service related functions of the library, including ‘access to electronic resources’; the ‘high quality’ of those resources; and the adequacy of ‘bibliographic instruction and assistance’.

Responses to the open-ended question regarding digital libraries were also positive, with respondents identifying the range of advantages and benefits that are almost universally associated with these types of libraries. These include access to plentiful, up-to-date information; the savings in terms of time and effort this produces; and also the flow on benefits in terms of enhanced research productivity.

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Some of these positive responses to library-related matters raised in the questionnaire might seem a little difficult to explain, however, when contrasted to what is known about aspects of the collections and services provided by Yarmouk Library. For example the finding (Table 6.C22) that 65.1% (n=237) of respondents either 'Agree' or 'Strongly agree' that, 'The library provides adequate access to electronic resources' is difficult to reconcile with the obviously low number of databases of full-text electronic journals that the Yarmouk Library provides in comparison with Curtin University Library and similar western university libraries. This response might depend on exactly how respondents interpreted the word 'adequate', but indeed the result is not inconsistent with the outcome of the DAT, which demonstrated that while Curtin Library users enjoyed an advantage in this regard it was not as substantial as might have been expected. As discussed previously the most significant discrepancies recorded by the DAT in terms of access to content were with regard to print items (for the international sample), and for material sourced from the free Internet (for the local sample), rather than for library-subscribed databases.

It appears, however, on the strength of the results obtained by the DAT that digital libraries are already making a difference in terms of the digital divide. Although similar tests conducted with other samples might be necessary in order to fully confirm the results, it is quite clear on the results of the international items included in the DAT that the advent of library-based electronic databases has substantially reduced a 'knowledge divide' or 'content divide' previously experienced in Jordan. The evidence with regard to the tests conducted on sample of local items is more problematic given the discrepancy in the scholarly publishing base of Jordan and Australia and Yarmouk University's role as a deposit library, but on the available figures it is again likely that the digital library services is serving to close the knowledge/content divide.

Despite the advances that have apparently been made, the issue of the need for increased access to databases was one that featured in the interviews when participants were asked about the role that digital libraries might play in reducing the digital divide. The issue was raised by academics ('*Our library can do so many*

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*things; firstly by subscribing to all necessary databases needed by faculty members' (A5)); policy makers ('Libraries can help with getting membership to certain journals, and databases that cost, subscription databases, where people can go for a small fee and have access to this information' (P1)); and librarians ('My advice is that we need to have more and more use of electronic resources. . . we need to have more subscriptions and use of these resources' (L3)).*

Clearly there is an ongoing concern about the need for content associated with an understanding that cost is the prohibiting factor. The sensitivity to the issue of cost was recorded in the questionnaire when 38.1% (n=139) of respondents agreed or strongly agreed that, 'The cost of some electronic databases is too expensive for Yarmouk Library subscription'. Interestingly, however, this question received the highest 'Neutral' response (49.2%, n=179) to any Likert Scale used in the questionnaire, suggesting that it is an issue to which many respondents have given little thought or on which they have no knowledge.

One of the academic interviewees was, however, quite decisive in his view of the matter, noting that, *'There are databases that are so expensive that no one university library in Jordan could afford them on their own'* (A7). He then went on to use this lack of affordability to introduce a key issue with regard to the development of library services—the need for regional cooperation. In particular he argued that, *'there must be shared participation between Arab or Jordanian libraries. These libraries can decrease the gap by funding a digital library'*. This suggestion of a national and/or regional library collaborative was another issue that received support from all three categories of interviewees; with one of the policy makers (P3) advocating for *'inter Arab activities'*, including *'all universities to coordinate together and establish a central library'*; and one of the librarians (L2) arguing for, *'some kind of cooperation between most academic libraries in the country by establishing some kind of coordinated institution like a consortium or a federation between academic libraries or university libraries'*.

The reasons they suggest for the creation of such a consortium include not only the cost saving that will result from shared purchasing arrangements, but also the enhanced capacity to develop new services and content targeting regional needs.

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For several of the interview participants this is an issue of libraries being not only passive subscribers to commercial databases, but also becoming proactive by creating databases of local Arabic content. Interviewee P1 suggested that even when searching for content about the Arab region he retrieved information from non-Arab sources, and that therefore *'the role [of libraries] is plugging the gap of actual knowledge and information produced in this region and about this region, so that it is not just other peoples' perspectives. . . They should be responsible for putting that knowledge online for the world'*. This view was echoed by one of the librarian participants who noted that:

*Arabic material, until now, it is not available in a database. So it's our task here to provide this material in a digital format for our staff members and students. (L1)*

Interviewee L1 also noted that whereas the sciences were well catered for by publishers in the west, that it may be up to Arab libraries to provide material in Arabic, *'which is very significant for Arabs, especially for studies in Arabic languages, Islamic studies, social studies, and the like'*.

And if publishing databases in Arabic for the benefit of Arab scholars was seen as important, so to was the need to also create databases of local and/or regional scholarship that could be made available to non-Arabic speakers. One of the academic participants sees a need for libraries to create dual language databases that convey Arab knowledge to both local and international readers.

*All libraries have to encourage academic research by setting up special databases that will be accessible from anyone, anywhere, at any time, not by academics only but by all. These databases have to be written in English language, so that western countries can understand our culture . . . You [can] publish the same document in both Arabic and English language and it would be accessible by English language speakers and Arabic language speakers. (A6)*

This same interviewee went on to argue that librarians with English language skills should also serve as translators of scholarly material published in English,

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and thereby also create databases that transmitted English language publishing to the Arab World.

One of the librarian interviewees (L1) described several librarian-led database projects that have already commenced, but other interviewees expressed concern that librarians lack the influence and skills required in order to build the needed databases. One academic participant (A5) argued that the skills of librarians and the role of the library were overlooked because they were seen as ‘*an administrative service*’ of little importance rather than as an academic partner.

*. . . some decision makers at the universities do not know how important the role of the library is and they deal with the library as if it is just one of the units in the university. Libraries are the most attached units to the faculties and academic departments in the university, and that is the thing everybody in university or every decision makers should know. . . (A5)*

Other academic interviewees suggested that the reason for the low profile of librarians with regard to the academic and research processes of the University may be due to their skill levels. Although they were non-specific in their comments about particular skills, these interviewees implied there was scope for improvement. Interviewee A7 noted that, ‘*They should raise their knowledge of library science . . . Librarians should know what happens in scientific conferences from Western countries, especially those available on the Internet, to know the directions of library work.*’; and A10 commented that, ‘*. . . they have to seek help from other institutions. . . . I think we need help in terms of expertise, we need to send people overseas to developed countries to learn how to do things*’. These interviewees both refer to the need to learn from ‘western’ or ‘developed’ countries, thereby suggesting that they believe a component of the digital divide is the gap in the knowledge of how to optimise ICTs in the academic library environment.

For other academic respondents the key issue with regard to skills was not so much the lack of them by the librarians, but rather the failure of the librarians to convey their knowledge to the academic users of the Yarmouk Library. For these interviewees the skills shortage with regard to digital library services was with the

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academic staff, and the University's librarians have the potential to remedy this with proper training and promotion. This issue was emphasised by interviewee A4 in particular: '*. . . you have to make more effort to spend more time talking to people at the University, to faculty members, to researchers, to convince them to utilize the library and to learn the skills to use the digital library*'.

The issue of training was not, however, indicated as a concern for most respondents to the questionnaire. Only 20.9% (n=76) disagreed or strongly disagreed with the proposition that, 'The librarians offer adequate bibliographic instruction and assistance to enable me to use the electronic resources effectively', whereas 52.5% registered some level of agreement with the statement (Table 6.C22).

Despite this generally non-critical response on the issue of training reported from the questionnaire, the academic interviewees had support from other categories of interviewees in arguing the need for additional training. Several of the librarian participants in particular stressed the need for both training and promotion; *The best way is to have some kind of promotion about the use of electronic sources, how to use the available databases, providing some kind of training sessions or seminars about the use . . .* (L2); '*. . . we need to have more and more workshops and training courses for the users . . . We need to teach them, we need to educate them . . . in order to enable the users to access these valuable resources*' (L3). Interviewee L3 also stressed that the training needs to be broadly targeted, aimed not only academic staff, but at students and library staff.

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## Chapter 9 Conclusion

Based on the results presented in Chapters 5, 6 and 7, and the discussion in Chapter 8, it is possible to draw some conclusions regarding the potential for digital library services to bridge the digital divide as it is experienced in Jordan. Five ‘conclusions’ are presented below. There are other outcomes that might be discussed in relation to this research, and a number of these have been touched upon in the preceding discussion. The point of briefly highlighting these five conclusions is to focus attention on the most important outcomes of this research, and on the areas where it is recommended action should be focused in order to bring about positive changes to the Jordanian experience of the digital divide. These conclusions stop short of being ‘recommendations’ because the intention is to highlight ‘what’ needs to be changed, rather than to focus in detail on ‘how’ these changes might be implemented. That is beyond the scope of the current investigation.

The five conclusions bypass issues of general ICT development and implementation and related funding issues in order to concentrate on matters that address the key issue of the role of digital libraries in bridging the digital divide. This is done for four reasons.

Firstly, the purpose of the conclusions is to answer the research question—that is, ‘How can digital libraries assist universities in Jordan to bridge the digital divide?’—rather than to address issues which are beyond the scope of libraries to directly influence.

Secondly, the general findings of the research support the contention that the digital divide is as much a product of social and cultural inequality and difference as it is one of technology imbalance. This appears to be more true of Jordan and the wider Arab Middle East than of more underdeveloped regions where the problem of lack of access to technology is manifested more profoundly. For no developing country, however, is it likely that the digital divide will be overcome

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by simply supplying access to digital technologies, and without addressing the broader need for social, educational and cultural adjustment.

Thirdly, it is quite clear that the technology gap between Jordan and countries with fully developed ICT infrastructure will continue to narrow, and to narrow quite rapidly. As explained in Chapter 2, the Jordanian government has enunciated a policy for national growth and development that is grounded in the nexus between ICTs and education, and there is no reason to believe that this will change. Whatever issues remain in terms of availability of ICTs are therefore likely to be addressed quite rapidly, due to a marriage between government policy and the increasing affordability of core ICT components and infrastructure.

Fourthly, the conclusions will also not directly address the issues of ‘funding’, or ‘resourcing’, or ‘cost’, which underpin some of the evidence gathered in this research. While these issues provide a crucial part of the context in which the research has been conducted, they have been canvassed in the preceding chapters, and relate to Jordan’s broader economic circumstances rather than the immediate research question and objectives. It is, however, highly likely that if developments are made with regard to the conclusions presented below, then this will have the result of improved funding flowing to the research and library sectors. It could be contended that improved funding is necessary in order to bring about some of the desired changes, but it is equally necessary for Jordan’s academic libraries to assume leadership in order to produce outcomes that will result in enhanced support.

The conclusions will not refer in any detail to the evidence presented in preceding chapters, the most important aspects of which has already been discussed at length in Chapter 8. Rather, this chapter will distil that evidence into the key areas that should be the focus of activity if Jordan’s academic libraries are to assume a leading role in addressing the digital divide.

The conclusions are presented not in order of ‘importance’, but rather in a sequence that attempts to offer a logical progression in terms of how they relate to the research question.

## **9.1 Five conclusions**

### **9.1.1 Research culture**

A thread running through the research results, and highlighted most forcefully in the interviews, is that Jordan suffers from a comparatively immature research culture. This is manifested in several ways that impact upon the issue of the digital divide. The Government is prone to underfunding research; the universities are not likely to make sufficient allowance for the time and support needed to conduct quality research; and individuals may not see it as being critical to their own career advancement. These factors will in turn have an impact upon research productivity and the value that is placed upon scholarly content (be it in digital or other forms).

That Jordan has an undervalued and underfunded research sector is not surprising given the relatively recent commencement of higher education in the country. In these circumstances the priority has understandably been to establish undergraduate teaching in order to create a critical mass of new graduates. However a culture that prioritises research, and provides the country's best scholars with the opportunity to engage in research, is needed if the bridging of the digital divide is to become a high priority.

Academic librarians can promote and support a mature research culture in several ways that are outlined in the following conclusions. In essence, however, they relate to the need for academic libraries in Jordan to develop a role within their universities that more closely resembles that of similar libraries in more developed higher education systems. They need to strive to become recognised as partners in the planning and execution of research by bringing their knowledge of scholarly communication, digital content and information retrieval to their local users. In this way they can use their knowledge and skills to hasten the maturing of the Jordanian research environment.

### **9.1.2 Professionalism and skills development for academic librarians**

There are a number of indications arising from the research that the professionalism and skills of academic library staff are not as yet sufficiently recognised, perhaps by some members of academic staff and certainly by the University. This can again be explained by the comparatively recent development of academic library services in Jordan, and the delayed recognition of librarians as key players in the implementation of high quality information services that are crucial to successful research and learning outcomes. The recognition that is denied to librarians has also been denied to libraries, which seem to be viewed as necessary adjuncts to academic life rather than key components in research infrastructure.

Recognition of the role that libraries and librarians can potentially play in supporting research needs, however, to be won by the librarians themselves. This will only be achieved if they are able to play high-profile roles in developing and making available appropriate content and services, and taking a leadership role in meeting the information and content needs of their user communities in Jordan. It is not sufficient for librarians to be the passive receivers of international research content, but rather they need to be pro-active in identifying, accumulating and making available in digital form the unique resources that are required to support Jordanian research across the various disciplines.

### **9.1.3 Collaboration in the creation and delivery of digital scholarly content**

While collaboration between libraries, even to the point of undertaking cooperative collecting programs, has long had an important role for academic libraries, the advent of digital content has placed a premium on libraries working cooperatively. And whereas libraries working in a print environment were forced to look to libraries located in close physical proximity when seeking partners, the digital library operates with technologies that allow for a much wider geographical

dispersion. But while physical geography becomes a somewhat redundant consideration in the digital library context, it might still make sense for Jordanian libraries to collaborate within a framework of cultural geography. That is, if content and services are to be developed with Arab scholarship in mind, then Jordan's academic libraries should be collaborating with similar libraries from the Arab Middle East in order to provide access to the necessary content.

As noted and discussed at several points in the preceding chapters there is evidence of collaborative projects being undertaken between libraries in Arab countries, and some of these are aimed at building content in Arabic for the use of Arab scholars. There are, however, also indications that more could be done in this regard, and that the goal should be to create pan-Arab databases of scholarly content. These databases should harvest the best of traditional and classic Arab scholarship in order to provide an easily accessible foundation to foster current research, and create an outlet for new and emerging scholars to make their research output as widely available as possible to the relevant audience.

Library collaboration between Arab countries should also look beyond creating databases of digital content, and explore other forms of cooperation. These could include sharing technical expertise and other skills; undertaking consortia-based purchasing or leasing of commercial content; encouraging professional networks and formal associations; and creating opportunities for continuing professional development. These forms of collaboration would contribute substantially to building and consolidating the 'professionalism' referred to in conclusion 2 above, and would also assist in the development of an enhanced research culture as addressed in conclusion 1.

#### **9.1.4 Open Access publishing and archives to be developed**

The evidence from the research—particularly the document availability tests—indicates that one form of 'publishing' that has had a significant impact on the availability of international content to the libraries of Jordan is the use of open access archives in the form of subject or institutional repositories. Unfortunately there was

very little evidence gathered in the current research that indicates that open access publishing, through either the use of such repositories or alternatively free online periodicals, has yet had much impact on the availability of Arab scholarship.

In developed countries librarians and associations of librarians have been some of the most influential proponents of open access, and the building of institutional repositories in particular has often become the responsibility of academic librarians. This has been an important innovation in terms of the role of libraries as producers and suppliers of content as opposed to simply being passive receivers and managers.

Digital repositories of Arab content will serve an important dual function, in making the results of Arab scholarship more accessible to both Arab readers and to an international audience. It is librarians who have the required skills to select and aggregate digital content and to ensure that it is retrievable. The role of translation may also need to be addressed in this context, as it could well be another opportunity for librarians to assume leadership in ensuring that content published in Arabic is also made available in English.

Implementation of open access institutional and subject repositories would benefit from the form of collaboration discussed as conclusion 3, and would contribute substantially to the increased professionalism described in conclusion 2.

### **9.1.5 Advocacy and training**

Another area of need with regard to librarians' role in delivering digital services that became apparent from the research was a greater visibility in terms of the promotion of ICTs in the academic and research environments. The evidence suggests this could be achieved in two ways. Firstly, by librarians becoming more active advocates for the benefits of ICTs and of informing researchers of relevant developments that would benefit their access to information and research productivity. And secondly, further increasing their profile as the recognised experts in digital content and

services by providing more training opportunities for researchers, teaching staff and students.

Academic libraries serving universities in developed countries have long been established as key participants in the advocacy for ICTs in support of teaching and research. This has been important, not only in producing the best outcomes for these universities in terms of knowledge access and creation, but also in further establishing librarians as important partners in the research process. Success in this regard will have a beneficial impact on the issue of professionalism raised in conclusion 2.

## **9.2 To what extent is the experience of the digital divide in Jordan relevant to other developing Arab countries?**

This study provides baseline data regarding the extent of the digital divide in Jordan. This inevitably raises the question as to the extent to which this data might be true for other developing Arab countries. The term ‘Arab world’ has been used frequently in this thesis to describe the Arab countries of the Middle East and the wider region, but as has also been noted (including by several of the interviewees) this is far from an homogenous group of countries in terms of their economic capacity; their adoption of ICTS; the development of their education systems, and other key factors related to this research. On the other hand, they also share some important elements. These include their general status in terms of their current levels of development, and the use of forms of Arabic as a common language. These countries also have in common many similar cultural and social norms resulting from heavily inter-connected ethnic, religious and historical influences.

With some caution, it is possible to say that Jordan is in many regards ‘typical’ of Arab countries of the region, and that similar studies conducted at other universities serving the Arab countries of the world would likely raise many of the same issues. For while Jordan is a regional leader in terms of its adoption of ICTs, the quality of its higher education, and the implementation of national information policy, it shares with many of its Arab neighbours a belief that technology and education are key factors in hastening socio-economic development.

It might therefore be surmised that the results and conclusion presented in this study—in so far as they relate to the key research questions and objectives—can be extrapolated to other developing Arab countries. The extent to which this is the case for any particular country will depend on the extent to which local circumstances and conditions mirror those with Jordan, but it might be reasonably expected that the cultural factors that are held to be a crucial component of the digital divide in Jordan will also be found to be common to other Arab countries of the region.

The ‘divide’ that is apparent within the Arab world is that which separates the countries of the Arab Middle East from the North African countries of the Arab Maghreb (Morocco, Algeria, Libya, Tunisia and Mauritania). It is suggested that the results of this research would be more applicable to the former rather than the latter; although to establish the extent to which this is the case would require further research.

What is far less certain is the extent to which the results might also be applicable to non-Arab developing countries. As has been pointed out in the preceding chapters, the gaps in the degree of ‘development’ required of various countries differ considerably, and Jordan and other countries of the Arab Middle East are in the lower end of the spectrum of need, enjoying as they do comparatively high levels of economic independence, and educational and ICT infrastructure. As the conclusions of this research are also inextricably tied to the cultural circumstances of the Arab world, it might therefore also be assumed that other local cultural ‘realities’ would produce a different set of issues and outcomes. Therefore while it is likely that non-Arab developing countries would find some of the findings of this research to be relevant, it is also the case that they will face particular localized issues regarding the digital divide and the development of digital libraries.

### **9.3 Limitations of the current research**

A review of the research conducted for this project indicates no particular limitations. The response rate to the questionnaire was satisfactory, and the interviews attracted a representative sample of the target populations.

The outcome of the measurement of the digital divide in Jordan was dependent upon the sample items that were randomly selected. It is possible that a different set of sample items may have produced some differences in the general nature of the results. It is hoped that this possibility was protected against, in so far as possible, by selecting highly representative journals and by including as many sample items in each group as could reasonably be checked.

It would have been desirable to have a better representation of the science disciplines (as opposed to social sciences and humanities) in the questionnaire respondents. As indicated, however, the disciplinary profile of the teaching staff and research students at Yarmouk University mitigated against this. It does mean, however, that it has been more difficult to draw firm conclusions about differences between disciplines (for example, with regard to the use of language for scholarly publishing) than might have otherwise been the case. The discussion and conclusions on the point of disciplinary difference have therefore been inconclusive, and this could usefully be the focus of further research.

### **9.4 Future research**

As noted above there is scope for future research that would further investigate the differences with regard to the experience of the digital divide in different Arab countries, or between Arab countries and non-Arab developing countries. It is suggested that this research could draw upon the document availability testing method developed for this project, and could also draw from elements of the questionnaire. This would enable the most direct comparison possible to be undertaken.

Other ways in which the current research could be extended include:

- Implement the methodology of the current study to other universities (both public and private) in Jordan in order to establish how typical the Yarmouk University results are. It might be hypothesised that other, less well endowed universities, would demonstrate a greater impact of the digital divide.
- Replicate the document availability test using different sample items in order to test the results achieved in this study.
- Further investigate the differences between disciplines—in particular those relying on either English or Arabic—in order to gather additional knowledge regarding role of language in creating and bridging the digital divide.
- Investigate the extent to which Jordan's public libraries can meet the information needs of the user from different categories of information (for example scholarly and non-scholarly content; English and Arabic content) in order to assess the extent of the digital divide as experienced by citizens without access to academic libraries.

## **9.5 Summary**

The literature of the digital divide is rife with both pessimistic and optimistic predictions regarding the future prospects for bridging the divide. The former stress a growing gap between the technologies available to developed and developing countries, and envision a world where full engagement with learning, scholarship, and knowledge production, and the economic benefits that result, will remain the privilege of the developed west. The latter look at the possibility of developing countries being able to 'leapfrog' developmental stages by importing fully tested and implemented ICTs that allow them to rapidly shift to new forms of information access that serve in turn as a pathway to developing more successful social, economic and political models.

The research conducted from within the library and information science discipline brings an important perspective to the issue of the digital divide and its likely

future. Librarianship is extremely well placed to investigate the causes of, and solutions to, the digital divide, and the research reported in this thesis has undertaken that task in an important region of the world that has the potential to make significant contributions to the betterment of mankind. It is hoped that this study has contributed to existing digital divide research in two significant regards.

Firstly, by emphasising the library and information science discipline's longstanding interests in; the welfare of individuals and maximizing their potential to contribute to healthy, well-informed and literate societies; the recognition that equality both within and between societies is constituted of access to social and cultural capital as much as economic advantage; and the understanding of the value of knowledge rather than information, and of content rather than the technologies that deliver it.

Secondly, the relationship between academic librarians and university-based scholars and researchers has been at the core of a considerable body of research in recent years, as librarians have sought to understand how they can best contribute to educational and research outcomes. It is a relationship, which when well understood and nurtured, has become influential in producing active research cultures and the generation of new knowledge. To date most of the research into the relationship between libraries and researchers has been conducted in the developed west, but this project brings new understanding regarding the current state of practice in the developing Arab World.

Despite the complexity of the issues and the various uncertainties that face any country in the throes of development, the results of this research point towards a cautiously optimistic view of the digital divide for Jordan and other Arab countries. There is evidence that digitisation has already delivered benefits in terms of access to information and knowledge, and there is also ample scope for improvement in terms of the creation of local content and services and therefore a more productive research environment. Although the continued development and improvement will require effort from various sectors, the conclusion of this research is that digital libraries need to be active leaders and participants in the process.

Guided by the conclusions resulting from this research and outlined above, the challenge is for academic libraries in Jordan to develop programs resulting in the implementation of digital library collections and services than aim to achieve world's best practice.

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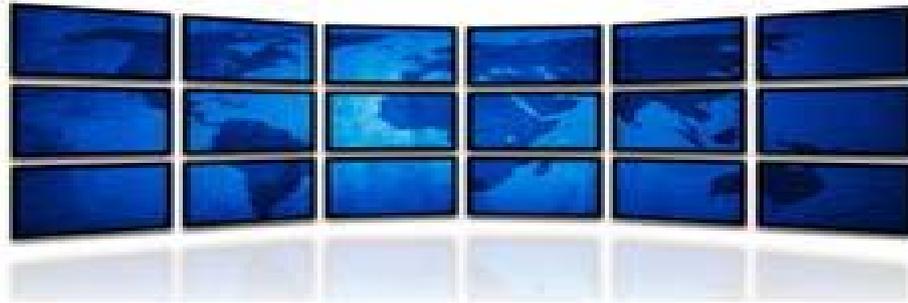
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Every reasonable effort has been made to acknowledge the owners of copyright material. I would be pleased to hear from any copyright owner who has been omitted or incorrectly acknowledged.



## *Digital Divide*

This survey, which is being conducted as part of a PhD study at Curtin University of Technology, Australia, investigates the role of digital library in bridging digital divide at Yarmouk University, Jordan. It is hoped to produce important and significant findings which should benefit you and other academics around the Arab World.

You are kindly requested to participate in the following questionnaire. If you wish to comment on any questions or qualify your answers where no space is provided, please use the space provided on the back and reference the questions concerned.

This survey has received the approval of the Human research and Ethics Committee of Curtin University of Technology. All aspects of the study, including results, will be strictly confidential and only my supervisor and I will have access to the data. No findings which could identify any individual participant will be published. It is estimated that the survey will take approximately 15 minutes to complete. Thank you very much for your cooperation.

**OTHMAN A. OBEIDAT**  
Curtin University of Technology  
Faculty of Media, Culture and Society  
Department of Information Studies  
e-mail: [obeidatothman@yahoo.com.au](mailto:obeidatothman@yahoo.com.au)  
Tel. +61 401 84 5258

## Appendix A. Major Questionnaire (English Version)

### *Questionnaire*

#### *Information sheet*

**Project Title:** *An Investigation of the Role of Digital Libraries in Bridging the Digital Divide in Developing Arab Countries: A Case Study of Yarmouk University, Jordan.*

I am writing to ask you to participate in the above-mentioned project. This survey is being conducted as part of PhD study with the Division of Humanities, Curtin University of technology, Perth, Western Australia. The research is also being conducted with the support and approval of Yarmouk University.

The survey aims to identify the components of any digital divide (i.e. technological, linguistics, and cultural). Suffered by Arab universities, and to assess the potential role of university-based digital libraries in overcoming this digital divide. In order for this survey to be successful, I am seeking input from researcher to help identify the extent and nature of the digital divide. I would greatly appreciate your participation in this research.

All aspects of the study, including results, will be strictly confidential and only my supervisor and I will have access to the original data. No findings which could identify any individual participant will be published.

This survey has received the approval of the Human Research Ethics committee of Curtin University of Technology. Any questions can be addressed to:

The Secretary, HREC  
Curtin university of Technology  
Office of Research and development  
Po Box U1987  
Perth WA 6845  
herc@curtin.edu.au

The survey has four pages and it is estimated that it will take approximately 15 minutes to complete.

Thank you very much for your interest and cooperation.

Researcher

Othman Obeidat

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[o.obeidat@postgrad.curtin.edu.au](mailto:o.obeidat@postgrad.curtin.edu.au)

Supervisor

Dr Paul Genoni

tel. +11618 92667256

e-mail. [p.genoni@curtin.edu.au](mailto:p.genoni@curtin.edu.au)

### Section A: Demographic Information

**For Questions A1-A5 you should tick one box only.**

**QA1. What is your gender? Please tick as applicable**

1. Male

2. Female

**QA2. What is your age? Please tick as applicable**

1. Less than 30

2. Between 31-40

3. Between 41-50

4. 51 years or more

**QA3. Which Faculty do you teach or study in? Please tick as applicable**

1. Social Sciences & Humanities

2. Education & Arts

3. Information Technology

4. Engineering

5. Business & Economics

**QA4. What is your level of education? Please tick as applicable**

1. Masters degree

2. Doctoral degree

**QA5. What is your academic rank? Please tick as applicable**

- |                         |                          |                                 |                          |
|-------------------------|--------------------------|---------------------------------|--------------------------|
| 1. Assistant Professor  | <input type="checkbox"/> | 2. Associate Professor          | <input type="checkbox"/> |
| 3. Professor            | <input type="checkbox"/> | 4. Lecturer                     | <input type="checkbox"/> |
| 5. Postgraduate student | <input type="checkbox"/> | 6. Others, please specify ..... |                          |

**Section B: Internet Use**

**For Questions B1-B3 you should tick one box only**

**QB1. Where do you access the Internet for work purposes? Please tick as applicable**

- |            |                          |                             |                          |
|------------|--------------------------|-----------------------------|--------------------------|
| 1. At home | <input type="checkbox"/> | 2. At your work desk        | <input type="checkbox"/> |
| 3. Library | <input type="checkbox"/> | 4. University computer labs | <input type="checkbox"/> |

**QB2. How long have you been using the Internet? Please tick as applicable**

- |                     |                          |                      |                          |
|---------------------|--------------------------|----------------------|--------------------------|
| 1. Less than a year | <input type="checkbox"/> | 2. 1-3 years         | <input type="checkbox"/> |
| 3. 4-6 Years        | <input type="checkbox"/> | 4. More than 6 years | <input type="checkbox"/> |

**QB3. How many hours do you use the Internet for work purposes? Please tick as applicable**

- |                            |                          |                            |                          |
|----------------------------|--------------------------|----------------------------|--------------------------|
| 1. Less than an hour a day | <input type="checkbox"/> | 2. 1-3 hours a day         | <input type="checkbox"/> |
| 3. 4-6 hours a day         | <input type="checkbox"/> | 4. More than 6 hours a day | <input type="checkbox"/> |

*For QB4 you may tick more than one box.*

**QB4. What purposes best describe why you use the Internet? Please tick as applicable**

- |  |                          |
|--|--------------------------|
| 1. Send and receive personal email                       | <input type="checkbox"/> |
| 2. Monitor academic bulletin boards and discussion lists | <input type="checkbox"/> |
| 3. Seek information related to my research               | <input type="checkbox"/> |
| 4. Initiate contact with fellow researchers              | <input type="checkbox"/> |
| 5. Contact publishers                                    | <input type="checkbox"/> |
| 6. Access full text periodicals and library databases    | <input type="checkbox"/> |
| 7. Publish my research findings.                         | <input type="checkbox"/> |

**QB5. Would you please indicate your level of agreement or disagreement with the following statements (1-15)? Please tick as applicable**

<i>Question</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>
1. I lack sufficient computer skills and knowledge to search the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
2. I am interested in learning more about using the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
3. I am aware of the potential benefits of using the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
4. There is a lack of access to the Internet at Yarmouk University	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
5. I don't have the time to use the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
6. I lack the desire to use the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
7. There is a lack of support for using the Internet at Yarmouk University	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
8. I don't have equipment and facilities to use the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
9. Access to the Internet is interrupted by system errors or equipment failure	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
10. Finding information on the Internet is easier than using traditional sources	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
11. The Internet contains information relevant to my research	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
12. The Internet has become the most important information source for my study and research	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
13. Since I began using the Internet, I have spent less time using printed information resources	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
14. Academics in western countries have a technological advantage in using the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
15. Academics in western countries have a linguistic advantage in using the Internet	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

**QB6. In your opinion, what are the benefits of using the Internet in your teaching or learning, research and academic work?**

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**QB7. What do you think are the biggest barriers to the effective use of the Internet in your teaching or learning, research and academic work?**

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<b>Section C: Library use</b>
<b>For Questions C 1 -C 4 you should tick one box only</b>

**QC1. How often do you visit the university library in person? Please tick as applicable**

- |                        |                          |                |                          |
|------------------------|--------------------------|----------------|--------------------------|
| 1. Never               | <input type="checkbox"/> | 2. Once a week | <input type="checkbox"/> |
| 3. Several days a week | <input type="checkbox"/> | 4. Every day   | <input type="checkbox"/> |

**QC2. How has your actual visit to the library become after being able to access it via the Internet? Please tick as applicable**

- |                  |                          |                       |                          |                  |                          |
|------------------|--------------------------|-----------------------|--------------------------|------------------|--------------------------|
| 1. Less frequent | <input type="checkbox"/> | 2. The same as before | <input type="checkbox"/> | 3. More frequent | <input type="checkbox"/> |
|------------------|--------------------------|-----------------------|--------------------------|------------------|--------------------------|



**QC6. How do you perceive the impact of the digital library on your academic research and other activities?**

.....

.....

.....

.....

.....

<b>Part D: Languages and scholarly communications</b>
<b>For questions D1 to D5 tick one box only</b>

**QD1. What language do you express yourself in more effectively? Please tick as applicable**

1. Arabic                       2. English                       3. Both   
4. Others please specify.....

**QD2. What is the teaching or learning language in your department? Please tick as applicable**

1. Arabic                       2. English                       3. Both

**QD3. What language do you prefer to use for the purpose of information retrieval? Please tick as applicable**

1. Arabic                       2. English                       3. Both   
4. Others please specify.....

**QD4. What language do you prefer to use for scholarly publishing? Please tick as applicable**

1. Arabic                       2. English                       3. Both   
4. Others please specify.....

**QD5. What translation software do you use? Please tick as applicable**

1. English to Arabic                       2. Arabic to English                       3. Both

**QD6- Would you please indicate your level of agreement or disagreement with the following statements from question 1 to question 11? Please tick as applicable**

<i>Question</i>	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly Agree</i>
<b>1. Yarmouk University supports the use of English for scholarly communication</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>2. Using English language indicates prestige and civilization.</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>3. Using English for scholarly communications takes place at the expense of Arabic</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>4. Using English facilitates communication with international institutions and researchers</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>5. Using English in our institution indicates cultural colonization by Non-Arab countries</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>6. Information in Arabic is important to your research</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>7. The Internet is useful for linking research communities in Arab countries</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>8. I cannot read some of the Arabic information on the Internet due to unrecognised Characters</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>9. There is inadequate scholarly information in Arabic on the Internet</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>10. Arabic versions of some sites are not understandable</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
<b>11. Many sources in Arabic lack authenticity and accuracy</b>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

**QD7. In your opinion, is it important for universities in Arab countries to promote the use of Arabic language for the purpose of scholarly communications?**

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**QD8. In your opinion, what could your university do to promote the effective use the Arabic language in academic environment?**

.....  
.....  
.....  
.....  
.....  
.....  
.....

**\*\*\* Would you be willing to participate in interview session about points raised in this survey?**

- 1. Yes
- 2. No

If yes please complete the following

**Name** .....

**Mobile** .....

**E-mail:**

## Appendix B. Major Questionnaire (Arabic version)

### الاستبيان

الأخ الباحث, الأخت الباحثة

تحية طيبة وبعد:

عنوان البحث: دور المكتبات الرقمية في تخفيض الفجوة الرقمية في الدول العربية النامية: دراسة حالة للجامعات الأردنية.

نرجو المشاركة في البحث المذكور اعلاه. علما ان هذا البحث جزء من متطلبات اكمال درجة الدكتوراة في (دراسات في الانترنت) في كلية العلوم الانسانية / جامعة كيرتن التكنولوجية / بيرث / غرب استراليا, وهذا البحث حاصل على دعم وموافقة الجامعات الأردنية. يهدف البحث الى التعرف على عناصر الفجوة الرقمية مثل: (التكنولوجيا, اللغويات, والثقافة) ثم تحديد امكانية الدور الاساسي للمكتبات الرقمية الجامعية للتغلب على الفجوة الرقمية. أرجو من الباحثين, المساعدة في الإجابة على الاستبيان بكل دقة وأمانة علمية للتعرف على مدى وطبيعة الفجوة الرقمية الموجودة على المستوى الأكاديمي.

إن تعاونكم في الإجابة على هذا الاستبيان بكل صدق وموضوعية من شأنه أن يدعم هذه الدراسات, علما أن جميع المعلومات التي تقدمونها لن تستخدم إلا لأغراض البحث العلمي.

كما أن هذا البحث حاصل على موافقة لجنة أخلاقيات البحوث الإنسانية في جامعة كيرتن التكنولوجية, أي أسئلة يمكن أن ترسل إلى العنوان التالي:

The Secretary, HREC

Curtin university of Technology

Office of Research and development

Po Box U1987

Perth WA 6845

herc@curtin.edu.au

يحتوي هذا الاستبيان على 4 صفحات يمكن ان تاخذ 10 دقائق لاكمال الاجابات

أقدم شكري وتقديري للمشاركين في البحث, مقديرا لكم جهودكم الطيبة في دعم وتطوير المسيرة العلمية

Researcher

Othman Obeidat

tel. +962785279591

[obeidatothman@yahoo.com](mailto:obeidatothman@yahoo.com)

[o.obeidat@postgrad.curtin.edu.au](mailto:o.obeidat@postgrad.curtin.edu.au)

Supervisor

Dr. Paul Genoni

tel. +11618 92667256

e-mail. [p.genoni@curtin.edu.au](mailto:p.genoni@curtin.edu.au)

**القسم الاول : المعلومات الشخصية**  
**يرجى اختيار إجابة واحدة فقط للأسئلة من 1- 5 :**

س1. الجنس.

1. ذكر  2. انثى

س2. العمر .

1. اقل من 30 سنة  2. بين 31-40   
3. بين 41-50 سنة  4. اكثر من 51 سنة

س 3. الكلية التي تعلمت أو تعلم فيها؟

1. العلوم الاجتماعية والانسانيات   
2. التربية والفنون والاداب   
3. تكنولوجيا المعلومات   
4. الهندسة   
5. الاقتصاد وادارة الاعمال

س4. المؤهل العلمي.

1. دبلوم عالي  2. ماجستير  3. دكتوراة

س5. المستوى الأكاديمي؟

1. مساعد استاذ  2. استاذ مساعد  3. استاذ

4. محاضر  5. طالب دراسات عليا  6. اخرى, رجاء حدد ذلك .....

**القسم الثاني: استخدام الانترنت**  
**يرجى الإجابة على الأسئلة من 6 – 9 :**

س6. فترة استخدامك للانترنت؟

1. اقل من سنة  2. بين 1-3 سنين   
3. بين 4-6 سنين  4. اكثر من 6 سنين

س7. عدد ساعات استخدام الانترنت؟

1. اقل من ساعة باليوم  2. 1-3 ساعات باليوم   
3. 4-6 ساعات باليوم  4. اكثر من 6 ساعات باليوم

**ملاحظة:** للأسئلة (8 + 9) يمكن ان تضع اكثر من اجابة

س8. المكان الذي يتاح فيه الانترنت لأغراض العمل؟

1. البيت  2. مكتب العمل   
3. المكتبة  4. مركز كمبيوتر الجامعة

س9. الأغراض التي تدعوك لاستخدام الانترنت تتمثل بما يأتي:

1. إرسال الرسائل الالكترونية الشخصية واستقبالها   
2. مراقبة لوحة النشرات الاكاديمية وقوائم المناقشة   
3. البحث عن المعلومات ذات العلاقة ببحثي   
4. القيام بالاتصال مع الزملاء الباحثين   
5. الاتصال بالناشرين   
6. إتاحة النصوص الكاملة للدوريات وقواعد بيانات المكتبة   
7. نشر كتاباتي من البحوث

يرجى اختيار الإجابة الأقرب لمستوى التوافق مع العبارات الآتية للإجابة عن الأسئلة من  
15-1:

موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة	السؤال
<input type="checkbox"/>	1. عدم كفاية مهارات استخدام الكمبيوتر والمعرفة بالبحث في الإنترنت				
<input type="checkbox"/>	2. ارغب في التعلم أكثر حول استخدام الإنترنت				
<input type="checkbox"/>	3. مدرك لامكانية وفوائد استخدام الإنترنت				
<input type="checkbox"/>	4. هناك ضعف في إتاحة الإنترنت في جامعة اليرموك				
<input type="checkbox"/>	5. لا اشعر بتوفر الوقت الكافي لاستخدام الإنترنت				
<input type="checkbox"/>	6. اشعر بالرغبة في استخدام الإنترنت				
<input type="checkbox"/>	7. هناك ضعف في دعم استخدام الإنترنت في جامعة اليرموك				
<input type="checkbox"/>	8. اشعر بأن هناك ضعفا في توفير أدوات وتسهيلات استخدام الإنترنت				
<input type="checkbox"/>	9. إتاحة الإنترنت تنقطع بواسطة أخطاء في النظام وفشل بالتجهيزات				
<input type="checkbox"/>	10. نتائج الحصول على معلومات على الإنترنت اسهل من استخدام المصادر التقليدية				
<input type="checkbox"/>	11. الإنترنت تضم معلومات ذات علاقة ببحثي				
<input type="checkbox"/>	12. اصبح الإنترنت في الغالب مصدر معلومات هام لدراستي وبعثي				
<input type="checkbox"/>	13. عندما بدأت استخدام الإنترنت فإني أمضي وقتا اقل في استخدام مصادر المعلومات المطبوعة				
<input type="checkbox"/>	14. الباحثون في الدول الغربية لديهم ميزة التكنولوجيا في استخدام الإنترنت أكثر من الباحثين العرب				
<input type="checkbox"/>	15. الباحثون في الدول الغربية لديهم ميزة اللغة في استخدام الإنترنت أكثر من الباحثين العرب				

س25. حسب رايك(مفهومك) ما فوائد استخدام الانترنت في تعليمك أو تعلمك, وفي البحث والأعمال  
الاكاديمية؟

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س26. باعتقادك ما أكبر عائق لتفعيل استخدام الانترنت في تعليمك وتعلمك وفي البحوث والأعمال  
الاكاديمية؟

.....

.....

.....

.....

**القسم الثالث: استخدام المكتبة:**  
يرجى اختيار إجابة واحدة فقط للأسئلة من 27- 30 :-

س27. عدد أيام حضورك إلى مكتبة الجامعة بشكل شخصي؟

1. لا أحضر  2. يوم في الأسبوع   
3. عدة أيام في الأسبوع  4. يوميا

س28. الى اي مدى كان وصولك للانترنت في اثناء وجودك في مكتبة الجامعة؟

1. اقل تكرارا  2. كما في السابق  3. اكثر تكرارا

**ملاحظة:** السؤال 9 يمكن ان تضع اكثر من اجابة

س29. ماهي خدمات المكتبة التي تصل اليها من خلال استخدام الانترنت؟

1. الفهرس  2. المصادر الالكترونية   
3. الاعمال المرجعية الالكترونية  4. الحجز الالكتروني   
5. الكتب الالكترونية  6. قواعد البيانات ذات النص الكامل

س30. هل انت مدرك لمحتويات المصادر الالكترونية التي تشترك فيها مكتبة الجامعة؟

1. لست مدرك  2. مدرك لبعض منها  3. مدرك

**يرجى اختيار الإجابة الأقرب إلى مستوى التوافق مع العبارات الآتية للإجابة عن الأسئلة من 31 - 36:**

السؤال	غير موافق بشدة	غير موافق	عادي	موافق	موافق بشدة
1. تقدم المكتبة اتاحة ملائمة للمصادر الالكترونية	<input type="checkbox"/>				
2. المكتبيون يقدمون تعليمات ببيلو جرافية ملائمة عن استخدام المصادر الالكترونية بفاعلية	<input type="checkbox"/>				
3. مصادر المعلومات المقدمة من المكتبة الالكترونية ذات جودة عالية	<input type="checkbox"/>				
4. الوقت المتاح للبحث في المصادر الإلكترونية كاف	<input type="checkbox"/>				
5. تكلفة قواعد البيانات الالكترونية التي تشترك فيها جامعة اليرموك عالية جدا	<input type="checkbox"/>				
6. الدول الغربية تزود بقواعد البيانات الالكترونية ذات النص الكامل اكثر من الدول العربية	<input type="checkbox"/>				

س37. كيف تلاحظ تأثير المكتبة الرقمية على البحوث الأكاديمية والنشاطات الأخرى؟

.....

.....

.....

.....

**القسم الرابع: اللغات والاتصال العلمي**  
**يرجى اختيار إجابة واحدة فقط للأسئلة من 38 - 42 :-**

س38. اللغة التي تعبر بها عن نفسك بفاعلية أكثر؟

1. اللغة العربية  2. اللغة الانجليزية  3. العربية والانجليزية
4. أخرى, رجاء حدد ذلك.....

س39. لغة التعليم والتعلم التي تستخدم في قسمك؟

1. اللغة العربية  2. اللغة الانجليزية  3. العربية والانجليزية
4. أخرى, رجاء حدد ذلك.....

س40. اللغة التي ترجع إليها وتستخدمها لأغراض استرجاع المعلومات؟

1. اللغة العربية  2. اللغة الانجليزية  3. العربية والانجليزية
4. أخرى, رجاء حدد ذلك.....

س41. اللغة التي ترجع إليها وتستخدمها لنشر الأعمال العلمية؟

1. اللغة العربية  2. اللغة الانجليزية  3. العربية والانجليزية
4. أخرى, رجاء حدد ذلك.....

س42. برامج الترجمة التي تستخدمها عند الحاجة؟

1. اللغة العربية  2. اللغة الانجليزية  3. العربية والانجليزية
4. أخرى, رجاء حدد ذلك.....

يرجى اختيار الإجابة الأقرب الى مستوى التوافق مع العبارات الآتية للإجابة على الأسئلة من 43 – 53 :

السؤال	غير موافق بشدة	غير موافق	عادي	موافق	موافق بشدة
1. تدعم جامعة اليرموك استخدام اللغة الانجليزية للاتصال العلمي	<input type="checkbox"/>				
2. استخدام اللغة الانجليزية يشير الى الرقي والحضارة	<input type="checkbox"/>				
3. استخدام اللغة الانجليزية للاتصال العلمي تأخذ مكانا على حساب اللغة العربية	<input type="checkbox"/>				
4. استخدام اللغة الانجليزية للاتصال مع الباحثين والمؤسسات على المستوى الدولي	<input type="checkbox"/>				
5. استخدام اللغة الانجليزية في المؤسسات يشير الى الاستعمار الثقافي من الدول المستعمرة.	<input type="checkbox"/>				
6. المعلومات باللغة العربية ذات أهمية بالنسبة لبحثي	<input type="checkbox"/>				
7. الانترنت مفيد للاتصال بين مجتمعات البحث في البلدان العربية	<input type="checkbox"/>				
8. لا استطيع قراءة بعض المعلومات العربية على الانترنت بسبب عدم ترتيب الأحرف العربية	<input type="checkbox"/>				
9. هناك معلومات علمية غير ملائمة وغير محكمة باللغة العربية على الانترنت	<input type="checkbox"/>				
10. الطبعة العربية لبعض المواقع على الانترنت غير مفهومة	<input type="checkbox"/>				
11. الكثير من المصادر باللغة العربية على الانترنت تعاني من عدم الوثوق بها وبقية المعلومات الواردة فيها	<input type="checkbox"/>				

س54. برأيك, هل من الأهمية بالنسبة للجامعات في الدول العربية أن تحسن استخدام اللغة العربية على الانترنت لأغراض الإتصال العلمي؟ وضح ذلك رجاءا.

.....

.....

س55. برأيك, ماذا تستطيع أن تقدم جامعتك لتحسين وتفعيل استخدام اللغة العربية على الانترنت في البيئة الأكاديمية؟ وضح ذلك رجاءا.

.....

.....

ملاحظة: هل ترغب بالمشاركة في المقابلة التي ستجرى بعد ظهور نتائج تحليل الإستبيان .

الإسم: ..... الجوال: .....

البريد الإلكتروني: .....

الشكر الجزيل لجميع المشاركين

## **Appendix C. Questionnaire Reminder Lettre One**

Dear faculty member,

I have recently handed over a questionnaire survey to your department to be received by you. The survey An Investigation of the Role of Digital Libraries in Bridging the Digital Divide in Developing Arab World Countries: A Case Study of Jordanian Universities. Your participation and response to the survey is extremely vital and central to the success of my PhD research.

I am writing to ask you to please help participate to the survey. I am hopeful that the result of the study might make a significant change to the strategy of delivering information and knowledge to you once the result is proposed to Yarmouk University and academic environment in Jordan.

If you have already participated and sent the survey out for collection, thank you for the effort you gave and I will be e-mailing you a report of the result as soon as the data is finalized. If you have received nothing and willing to help me achieve my goals, I am attaching the survey in and all you need to do is to print out the survey, fill it up, and submit it back to the coordinator of your department.

For any further details, please let me know

Looking forward to getting your imperative response to the matter...

Kindest regards...

OTHMAN OBEIDAT

Curtin University of Technology

Dept of Information Studies

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[o.oobeidat@postgrad.curtin.edu.au](mailto:o.oobeidat@postgrad.curtin.edu.au)

Tel: +962 795 903929

## **Appendix D. Questionnaire Reminder Lettre two**

Dear faculty member,

About three weeks ago I sent to you a questionnaire as part of a survey intended for faculty members and PhD students of Yarmouk University concerning the subject of the use of Internet and library resources for the purposes of scholarly communication and bridging the digital divide. As of today, I have found the response rate is extremely insufficient and without your help I will never succeed.

I have undertaken this survey process to assess the extent of the digital divide in academic environment in order to provide you with adequate and appropriate support in the near future and to have a positive role in reducing the digital divide. I feel that your experiences and comments will produce insightful information to the matter.

If you have completed and returned the questionnaire please accept my countless thanks for your cooperation and assistance.

It is for these reasons that I am sending you this e-mail one more time. If you have not yet found the time to do so, I would be grateful if you would complete and return the form in the next few days. If the questionnaire has been mislaid, please download the attached copy, answer it, and email it back to me or print it out and hand it in to the coordinator of your department.

If you are an Arabic academic and would prefer to answer the Arabic version, it is attached for your convenience...

With best wishes, sincerely yours,

OTHMAN OBEIDAT

Curtin University of Technology

Dept of Information Studies

Email: [oobeidat73@yahoo.com](mailto:oobeidat73@yahoo.com)

[o.obeidat@postgrad.curtin.edu.au](mailto:o.obeidat@postgrad.curtin.edu.au)

Tel: +962 795 903929

## Appendix E. Interview Schedule

The outcomes of the questionnaire will form the basis of the interviews. The questionnaire data will provide quantitative information on how and why academics use networked information for research and scholarly communication practices.

The interviews will supplement the data of the questionnaire and document availability test by exploring in greater detail the academics use of Internet information, Library, with reference to the Arabic context in particular; current faculty/librarian/decision makers collaborative activities; establishing whether the role of the library/librarians/ and decision makers is clearly identified, and the extent to which digital library can delivery and bridging the digital divide in academic environment.

Qualitative information of this sort could not be discovered using a questionnaire only. Questions in the semi-structured interviews with academics would be categorized as follows:

- Background Information including academic discipline and experiences.
- Their experience with the practice of research and scholarly communication and how it has been changed by the use of networked information.
- Attitudes on the use and future of the Arabic language in the networked environment.
- The details of the uses they make of networked information.
- Faculty/librarian collaboration.

Particular questions include:

***Q1. How do you perceive the impact of the internet on your academic and professional activities?***

س1. ما هو تصورك لأثر الإنترنت على النشاطات الأكاديمية و المهنية؟

**Q2. In your opinion, what could your government do to promote the effective use of the Internet?**

س2. برأيك, ما هو الدور الذي يجب ان تقوم به الحكومة لتحسين وتفعيل استخدام الإنترنت؟

**Q3. In general, what are the most important factors that promote the effective use of the Internet in the academic research?**

س3. بشكل عام, ما هي أهم العوامل التي تطور وتفعيل استخدام الإنترنت في البحوث الأكاديمية؟

**Q4. If you are familiar with the term 'digital divide' what it mean for you?**

س4. إذا كنت على معرفة بمصطلح الفجوة الرقمية وماذا يعني لك هذا المصطلح؟

**Q5. Do you believe that a digital divide exists among Western countries and Arab countries?**

س5. هل تعتقد بوجود فجوة رقمية بين الدول الغربية والدول العربية؟

**Q6. If yes to Question 5, what do you believe are the causes of this digital divide, and how does it disadvantage Arab scholars?**

س6. إذا كانت الإجابة بنعم على سؤال 5, ماذا تعتقد أسباب الفجوة الرقمية, وما هي سلبياتها على الباحثين العرب؟

**Q7. In your opinion, how could your libraries help your institutions to bridging the digital divide?**

س7. برأيك, كيف يمكن للمكتبات أن تساعد المؤسسات والجامعات في تجسير الفجوة الرقمية؟

**Q8. If you were giving some advice to librarian / decision makers in digital libraries, what would that advice be?**

س8. إذا أردت أن تقدم بعض النصائح للمكتبيين / أصحاب القرار في المكتبات الرقمية, ماذا تحب أن تقدم لهم؟

## **Appendix F. Consent Form Attached to the Interview**

### ***Informed Consent to Participate in Research***

#### **Curtin University of Technology**

You are being asked to participate in a research study. This form provides you with information about the study. Please read the information below before deciding whether or not to take part. Your participation is entirely voluntary and highly appreciated.

#### **Title of the Study:**

An Investigation of the Role of Digital Libraries in Bridging the Digital Divide in Developing Arab World Countries: A Case Study of Jordanian Universities.

#### **Principle Investigator:**

The research study is being conducted by **Othman Obeidat**, a PhD student at Curtin University of Technology, Faculty of Media, Society and Culture, under the supervision of **Paul Genoni (PhD)** and **Michele Willson (PhD)**.

#### **Purpose of the Study:**

The study proposes to investigate the role of digital library/librarians/ and decision makers and how understand and perceived the impact of Internet information on academic environment in reducing the digital divide between developed and Arab developing countries. It shall provide information on role of academics/librarians/ and decision makers in bridging the digital divide.

#### **Description of the Study:**

The interviews will supplement the data of the questionnaire and document availability test by exploring in greater detail the academics use of Internet information, Library, with reference to the Arabic context in particular; current faculty/librarian/decision makers roles and activities; establishing whether the role of the library/librarians/ and decision makers is clearly identified, and the extent to which digital library can delivery and bridging the digital divide in academic environment.

**Risks or Discomforts:**

No physical, emotional, or psychological harms and inconveniences are foreseeable. At any case, you have the right to discontinue participation to this study if you feel uncomfortable.

**Benefits of the Study:**

The study is expected, upon completion, to result on a potential benefits to you and to science and society. The result might assess the needs to form effective educational strategies where networked information plays a potential role in speeding up the process of the delivery of knowledge and developing the science and civilization.

**Confidentiality:**

This survey has received the approval of Human Research and Ethics Committee (HREC) of Curtin University of Technology. All aspects of the study, including results, will be strictly confidential and only my supervisor and I will have access to the data. No finding which could identify any individual participant will be published. Data will be stored securely at the department of Media and Information for five years after the study is completed. Any identifying information will be removed to protect the confidentiality of participants.

**Agreement:**

I am aware of all information provided up and I agree to participate to this study:

Yes     No

Signature:

**Investigator:**

OTHMAN OBEIDAT  
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Tel: +962 795 903929 (Jordan)

## Appendix G. Samples of data sheet

**Instruction:** Fill or tick in all the shaded areas of the form and where the “Other” option appears, provide details on the line/space immediately after.

### 1. Document availability data sheet form – International - Yarmouk University & Curtin University of Technology.

#### IDENTIFICATION (ID)

<b>ID1</b>	Group number	1	
<b>ID2</b>	Sample number	1 American Journal	Speech-Language Pathology
<b>ID3</b>	Author	Abbeduto, L., & Hagerman, R.	1
<b>ID4</b>	Title	Language and communication in fragile X syndrome.	1
<b>ID5</b>	Publication Details	Mental Retardation and Developmental Disabilities Research Reviews, 3, 313-322.	1
<b>ID6</b>	Date Of Publication	1997	1

#### ITEM CHARACTERISTICS (IC)

<b>IC1</b>	Language	Arabic	1	
		English	2	✓
		European	3	
		Other	4	
<b>IC2</b>	Subject Area	Australian Studies Journals	1	
		Jordanian/Arab Studies Journals	2	
		International Journals	3	✓
<b>IC3</b>	In what form of publication, does the sample item cited?	Journal article	1	✓
		Book	2	
		Web document	3	
		Conference paper	4	
		Other	5	

#### ITEM AVAILABILITY (IA)

<b>IA1</b>	Search in the Yarmouk catalogue is	Successful - print	1	
		Successful - electronic	2	
		Unsuccessful	3	✓
<b>IA2</b>	Search in the Curtin Catalogue is	Successful - print	1	
		Successful - electronic	2	✓
		Unsuccessful	3	
<b>IA4</b>	Is it freely available from the Web (as a free e-resource)?	Yes	1	
		No	2	✓
<b>IA5</b>	If answer to IA4 is ‘yes’ how is it available on the Web i.e. what type of Website is it? (Tick more than one if applicable).	E-Print Repository	1	
		Personal Website	2	
		Conference Website	3	
		Free online periodical	4	
		Other	5	

**2. Document availability data sheet form – local content - Yarmouk University.**

**IDENTIFICATION (ID)**

<b>ID1</b>	Group number		2
<b>ID2</b>	Sample number		أبحاث اليرموك 2
<b>ID3</b>	Author		المخزومي، مهدي 1
<b>ID4</b>	Title		مدرسة الكوفة ومنهجها في دراسة اللغة والنحو 1
<b>ID5</b>	Publication Details		ط. 3 بيروت: دار الرائد العربي 1
<b>ID6</b>	Date Of Publication		1986 1

**ITEM CHARACTERISTICS (IC)**

<b>IC1</b>	Language	Arabic	1	✓
		English	2	
		European	3	
		Other	4	
<b>IC2</b>	Subject Area	Australian Studies Journals	1	
		Jordanian/Arab Studies Journals	2	✓
		International Journals	3	
<b>IC3</b>	In what form of publication, does the sample item cited?	Journal article	1	
		Book	2	✓
		Web document	3	
		Conference paper	4	
		Other	5	

**AVAILABILITY (IA)**

<b>IA1</b>	Search in the catalogue is	Yarmouk Successful	1
		Unsuccessful	2 ✓
<b>IA2</b>	If the answer to IA1 is 'successful' in what form is it available in the library collection	Print	1
		Electronic	2
<b>IA3</b>	Is it freely available from the Web (as a free e-resource)?	Yes	1
		No	2 ✓
<b>IA4</b>	If answer to IA3 is 'yes' how is it available on the Web i.e. what type of Website is it? (If More Than, one type please ticks those applicable).	E-Print Repository	1
		Personal Website	2
		Conference Website	3
		Free online periodical	4
		Other	5

**3. Document availability data sheet Form – local content - Curtin University of Technology.**

**IDENTIFICATION (ID)**

<b>ID1</b>	Group number	3	
<b>ID2</b>	Sample number	1 Australian Journal of Lang. and Literacy	
<b>ID3</b>	Author	Michèle Anstey, Geoff Bull	1
<b>ID4</b>	Title	<b>Reading the Visual: Written and Illustrated Children's Literature</b>	1
<b>ID5</b>	Publication Details	Sydney: Harcourt Australia	1
<b>ID6</b>	Date Of Publication	2000	1

**ITEM CHARACTERISTICS (IC)**

<b>IC1</b>	Language	Arabic	1	
		English	2	✓
		European	3	
		Other	4	
<b>IC2</b>	Subject Area	Australian Studies Journals	1	✓
		Jordanian/Arab Studies Journals	2	
		International Journals	3	
<b>IC3</b>	In what form of publication, does the sample item cited?	Journal article	1	
		Book	2	✓
		Web document	3	
		Conference paper	4	
		Other	5	

**ITEM AVAILABILITY (IA)**

<b>IA1</b>	Search in the Curtin Catalogue is	Successful	1	✓
		Unsuccessful	2	
<b>IA2</b>	If the answer to IA1 is 'successful' in what form is it available in the library collection	Print	1	✓
		Electronic	2	
<b>IA3</b>	Is it freely available from the Web (as a free e-resource)?	Yes	1	✓
		No	2	
<b>IA4</b>	If answer to IA3 is 'yes' how is it available on the Web i.e. what type of Website is it? (If More Than, one type please ticks those applicable).	E-Print Repository	1	
		Personal Website	2	✓
		Conference Website	3	
		Free online periodical	4	
		Other	5	