

The Role of Digital Library in Bridging the Language Divide: Comparison Study of Arabic and Other Languages

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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. Much of the attention given to the digital divide had focussed on the most severely disadvantaged countries (particularly in Africa and parts of Asia). This study was examined the phenomenon in the context of developing Arab countries, with a particular focus on the capacity of digital libraries to bridge the 'divide' as it applies to research and scholarly communication. This will entail a case study of University of Jordan. A particular focus of the study will be on assessing the particular challenges and frustrations facing Arabic-speaking researchers in their use of networked 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 networked environment. The research will investigate the potential for digital library services to better serve Arabic-speaking scholars, in particular though the increased access to scholarly publishing in Arabic. It will also explore the policy initiatives and constraints that may impact upon the future development and implementation of digital library services for the benefit of Arabic-speaking scholars. There are no current published studies that deal with the capacity of digital libraries to address the digital divide in the developing Arab World. The findings of this research will provide important recommendations aimed at improving the capacity for digital libraries in Jordan and the wider Arab World to promote Arabic scholarship.

Keyword: Digital Libraries, Arab world, Arabic language

Introduction

There is a time gap between introducing the Internet in developed countries and the Arab countries of approximately 6 to 8 years. Most of the Arab countries, particularly the Arab Gulf nations, introduced the Internet after the mid-1990s. However, Insistence on using English or French in preference to Arabic for scientific and educational purposes in the Arab World has been identified as a factor that threatens the wider use of Arabic as a scholarly language. Many Arab academics within science disciplines have denied the capacity of Arabic to serve effectively as a scholarly medium and thereby enhance the communication of Arab based scholarship. There are a number of factors described that induce researchers to publish in English-based journals and monographs. These factors include the concern of researchers with achieving a global reputation, and the desire to make their research output as accessible and widely available as possible. that the problem with Arabic as a scholarly language is in the language itself, but rests rather with deficiencies with the Arabic scholarly communication system in its totality. Particular problems include the dearth of an advanced publishing system, and the weakness of Arabic bibliographic control. Other obstacles identified by Qasim include the "lack of unified standards on editing and production, lack of the content quality assurance, lack of systematic constant issuing of journals, and lack of proper and advanced technologies on both traditional and digital environments" (Qasim, 2005, p.130).

Research Question:

How can digital libraries assist a university in a developing Arab country to bridge the language divide?

Research Objectives:

The primary objectives of this research are to:

- 1- identify the components of any digital divide (i.e. technological, linguistic and cultural),
- 2- Assess the potential role of digital libraries in Jordanian universities in overcoming the language divide.

Research methodology:

The basis of the project will be a detailed case study of University of Jordan. The research design supporting this case study will involve both quantitative and qualitative approaches, using survey methodology encompassing questionnaire and interview techniques (see below). These methods will be used to address research objectives.

Questionnaire and Interviews

Subsequent data was be collected in one phase, by use of a questionnaire, insights gained from an extensive literature review was form the basis of the questionnaire that will include both closed and open-ended questions. There will be an initial pilot validation of the questionnaire to ensure the design and the wording are precise, and revision was made prior to the distribution of the final questionnaire. The questionnaire was distributed as widely as possible to research staff and students in the five discipline areas used for the citation sampling.

The purpose of the questionnaire was to obtain information relevant to Objectives 1 and 2, with a particular focus on assessing the challenges and frustrations of Arabic-speaking researchers in their use of networked information services; investigating the potential for digital library services to better serve Arabic-speaking scholars, in particular though the increased access to scholarly publishing in Arabic; to explore the policy initiatives and constraints that may impact upon the future development and implementation of digital library services to Arabic-speaking scholars.

Research significance:

Although it is often postulated that digital libraries will strongly influence the accessibility of information, there are few published studies that deal with the capacity of a digital library to address the digital language divide. The proposed study, measuring the extent of the digital language divide as experienced in a developing Arab country and assessing the capacity of digital library services to bridge that divide, will be the first of its type. The results of the research will generate important baseline information regarding the digital language divide as experienced in the Arab world.

The results of the study will assist decision makers to refine the goals of digital libraries in reducing the digital language divide; help them plan for more professional training; encourage libraries to developed strategically focused digital library services; and provide a framework for future related research.

The finding of this research will also prove important in generating recommendations aimed at improving the status of the digital libraries in Jordan and the wider Arab world. Some of these recommendations may include, but not be restricted to;

- improving the capacity of digital libraries to provide Arabic content for the needs of Arab;
- establishing the necessary ICT infrastructure in support of Arab scholarship;
- developing and implementing appropriate training for librarians and researchers;
- establishing governance regimes and policies which acknowledge the unique needs of Arab scholars in a digital research environment.

Background:

Overview of Jordan:

Jordan is an Arabic country located in the heart of the Middle East and the Arab world. Jordan is a small country; the estimated population in 2014 was more than six and half million (Jordanian Department of Statistics, 2014) living in an area of approximately 92300 square kilometres. About one third of the population live in the capital Amman and its suburbs. Islam is the state religion of Jordan (96% of the population are Sunni Muslims and 4% are Christian), and Arabic is the official language. English is considered to be the second language and is widely spoken and understood at every level throughout the country, especially in higher education institutions and the corporate sector.

Jordan, Lebanon, Syria and Palestine together form what is known as the richly historic region of the Fertile Crescent. Although Jordan has limited economic capacities, 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 a strategic and economic importance as a vital trading and communications centre.

Modern Jordan can be traced back to the mid-1940s when Britain recognized the country as a sovereign independent nation. Jordan is considered to be a 'modern' country by Arab and developing world standards. It has a constitutionally based democratic system and a representative parliament as its legislative body. Jordanian society is, to some extent, considered to be a conservative. Extended family ties are very strong and traditional tribal loyalties remain influential.

Trends towards increased personal liberty and openness have started to shape all layers of Jordanian society. Since 1992 a wide spectrum of political parties has been legalized in the country. More recently, a new press code has been enacted which allows these political parties to issue their own newspaper and other publications. To date, public communications and broadcasting facilities remain government-controlled.

Jordan has limited natural resources, and its economy has been profoundly affected by the Arab-Israeli conflict. A peace agreement has been established between Jordan and Israel with the hope of providing political stability in the region, which in turn will impact positively on the economy. The economy in Jordan has been dependent on foreign aid; but Jordanian economists, strategists and politicians have started to rebuild the economic and political infrastructure in order to make Jordan capable of developing its own natural and human resources.

Transportation, education, health and other service facilities in Jordan have expanded and improved very rapidly. Whereas previously, the government and the public sector provided all public infrastructure services and facilities, recently some degree of privatization has occurred, including in the telecommunications sector. As a result postal, telephone and Internet services have undergone considerable improvement in the last decade.

Higher education in Jordan.

Partly due to having limited natural resources, the education and development of the country's human resources has been consistently viewed as a high priority. The improvement of the educational system at all levels in Jordan has been a vital objective for successive governments since the early 1950s. Jordanians are therefore amongst the best educated, trained, and academically qualified of the Arab people. Literacy rates are amongst the best in the Arab world. A recent estimate is that 91.3% of the Jordanian people are literate (*World-Fact Book*, 2003).

The Jordanian Ministry of Higher Education and Scientific Research (www.mohe.gov.jo) records that higher education began in the 1960s, when colleges were established throughout the country. Since that time higher education in Jordan has witnessed a rapid expansion and development in both quality and quantity, to the point where it has one of the most advanced educational systems in the Middle East region (Roy and Ireland, 1992).

The higher education sector in Jordan consists of both public and private universities. The University of Jordan was the first public university founded in 1962, and University of Jordan—which is to be the focus of the current study. The Amman National University, founded in 1990, was the first private university. There are now a significant number of both public (10) and private (19) universities operating in response to the increasing demand for higher education.

Jordan exports highly qualified academic staff to other Arab Gulf States, and since September 11, 2001 in particular has attracted to its universities a large number of foreign Arab and Moslem students who wish to pursue their studies in an advanced and hospitable environment. According to the Forum for Higher Education in Jordan (2014), there are more than 236,000 students in both public and private universities. 55% of the students are female.

The most important problems facing higher education in Jordan are an acute shortage of funds, non-relevance of some programs, issues of accreditation, lack of quality control, and poor governance. In response to the need for educational reform, senior government officials, including the King, have argued for a reorientation of the education policy in order to meet the needs and ambitions of the country. There is a widespread realisation that changes are needed if the country is to benefit from the many development opportunities offered by emerging information and communication technologies (ICT).

Jordan is one of the developing countries that started to utilize computer technology in its educational system, and distance education is one of the many techniques used for higher education in Jordan. The government has announced plans to establish distance-learning programs throughout the country's public and private universities (Del Castillo, 2002). The plans are part of the broad strategy to continue developing Jordan's educational infrastructure by using ICT.

The digital divide

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 (e.g., Wilhelm 2001; NTIA 2000; 2002; Norris 2001; Warschauer 2001; Hall 2002; Harriggittai 2003; Romelia 2003; Munster 2005). It refers to the difference between individuals and /or communities who can access and use Information and Communications Technologies (ICT), 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 is the significant difference between the information haves and the have notes. (Lynch, 2002; Ishaq, 2001; Marcus & Gould, 2000; Williams, 2001; Munster, 2005; Huggins & Izushi, 2002; Warschauer, 2001, 2003; Carvin, 2000; Paul, 2002; Hunter, 2002).

On World Telecommunications Day, May 17, 2004, 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 digital divide as a crucial component of economic and social ‘development’. The digital divide mirrors the technology gap separating the developed countries from the developing—a gap that opened significantly in the wake of the industrial revolution and has yet to be bridged.

Increasingly, however, it is realized that the digital divide is about more than just *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. Four of the most important issues include:

- language barriers,
- literacy barriers,
- Lack of local information,
- Lack of cultural variety. (Ishaq, 2001; Salinas, 2003; Warschauer, 2003; Harriggittai, 2003; Munster, 2005)

According to Warschauer (2001) language has always played an important role in the promotion and expression of identity in the age of information. At present the Internet is dominated by English, and this appears to be particularly the case for those elements of the Internet associated with ‘scholarly’ information, most of which is generated by the USA and European countries, many of whom choose publication in English to ensure accessibility (Munster, 2005, Global reach 2004).

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 doing so, however, they may run the risk of suppressing vital aspects of their own cultural memory, development and identity. The seminal *Arab Human Development Report 2003: Building a Knowledge Society*, prepared by the United Nations Development Programme, reported that Arabic is a “language in crisis”. The Report identified a number of aspects to this crisis, including 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 detrimental to not only the long-term development and wellbeing of Jordanian—and the wider Arab—culture, but also to the productivity and significance of its academic sector.

The digital divide and the Arab world

Much of the recent research regarding the digital divide has focused on the least developed nations, particularly in Africa and parts of Asia. The Arab countries of the Middle Eastern region, on the other hand, have an ambivalent status in terms of their ‘development’. They have comparatively productive and wealthy economies by the standards usually applied to developing countries, but they are still in a transitional stage of development in terms of providing widespread access to many important human services including education and communication.

The regional setting, however, is particularly dynamic. Internet use and the general demand for information

technology hardware and services in the Middle East are growing rapidly, with a projected market value of \$8.9 billion in 2005. 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. In 2001, the launching of Egypt's first free Internet service provider, Noor, demonstrated wide commitment to market opportunities. The Internet and 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.

In Jordan, His *Majesty King Abdullah II* recognized 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 has progressed with the Connecting Jordanians initiative and related projects that are 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". And although 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) will be completed in 2007, by which time some 3,200 schools will be connected to a fibre network, in addition to 8 public universities, 23 community colleges and 70 Community Access Centres, representing some 1.5 million learners.

While it is easy for governments in the region to ride this wave of enthusiasm for ICTs, they run the risk, however, of neglecting the factors that influence diffusion of technology at the micro level (Loch, *et al*, 2003). Research has identified how local culture can both inhibit and/or encourage technological innovation. In particular, previous studies support the contention that cultural beliefs significantly affect the transference of ICTs to Arab cultures (Hill, Straub, Loch, Cotterman, and El-Sheshai; 1998, 2003).

In this environment it is possible that the real barriers to developing a supportive environment for Arabic-based scholarship and research will prove to be due to factors other than the lack of adequate technology. That is, the 'divide' for some scholarly disciplines may be related to the lack of adequate digital access to primary research material in Arabic.

To date many of the major digital initiatives aimed at supporting Arabic research and culture have originated *outside* of the Arab universities. These include:

- Research centres based mainly on foreign archaeological 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 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 ongoing research of current and future Arab-speaking scholars.

Digital Libraries

Currently many institutions in developing countries cannot afford to build and maintain adequate traditional (ie print-based) libraries in support of research and scholarship. For example, the library of the University of Jordan is the largest in the country, but it is modest by international standards. The library currently holds 900 item, and subscribes to approximately 171000 volume in Arabic and foreign language periodicals (mainly in English), and to 40000 e-periodicals.

Recent years have witnessed the emergence of many initiatives to address this imbalance in the library collection

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.

Digital libraries are libraries that manage collections of digital items, created or acquired according to the established principles of library-based collection development. In the digital library 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. The e-documents in a digital library are ideally made available via user-friendly, 'value-added' interfaces, and proper preservation practice ensures the persistence of such documents over time (Bhattacharya, 2004).

The growth and success of digital libraries involves factors such as their ability 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 developed countries, the major initiative amongst digital libraries is to make publications available on the Web in full text. (Sharma 2001; Gaur 2003; Mahmood *et al.* 2005). The (digital) librarian of the 21st century is expected to play a vital role in anticipating and meeting the changing needs of tomorrow's information community.

What digital libraries achieve by way of narrowing the digital divide depends on factors such as their primary orientation (ie 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 IT staff and librarians which may also hinder their contribution to bridging the digital divide.

University-based digital libraries have, however, begun to establish a crucial role in higher education and scholarly communication in developing countries, In these circumstances academic digital libraries are responsible for meeting the full needs of researchers and scholars in supporting access to not only the Internet, but to the range of other content (particularly scholarly journals) that is now published and distributed digitally. These libraries are potentially a major component in attempts to overcome the digital divide. They can do this both by facilitating access to internationally-sourced digital content, and in creating digital repositories of locally-sourced information.

Libraries of all types have a responsibility to ensure that their services meet the needs of the wider society they serve, but it can be argued that this onus is heavier in developing countries which frequently lack the supporting infrastructure of other research libraries (i.e. national libraries or substantial libraries serving government departments). In the context of university-based digital libraries, this means that the digital content should as far as possible represent all the country's languages, and should be relevant to minorities and disadvantaged groups, including the illiterate and newly literate (Ahmed 2007; Fahmi 2002; Witten *et al* 2002; Blandford *et al.* 2006; Nicholas *et al.* 2006).

Discussion of the Results

The presentation of the data in this study follows the sequence in which questions were presented to respondents in the questionnaire. In the first part of the questionnaire respondents were presented with five questions (1-5) which aimed to establish basic demographic data, including educational and academic background.

Table (1) Gender of respondents

Categories	Frequency	%
Male	305	83.8
Female	59	16.2
Total	364	100.0

The University of Jordan web site (2013/2014), 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 1, 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 University of Jordan. This disparity between the number of males and females making up the academic staff is likely to be explained by the cultural 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 (2) 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
Total	364	100.0

The age variable reported in Table 2 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 University of Jordan are comparatively young, a factor which is not unexpected given the comparatively recent development of higher education in Jordan. These figures pointing to the relative youthfulness of the University of Jordan academic staff are also likely to be relevant when assessing their attitudes towards digital technologies and changes in the scholarly communication environment.

Table (3) Faculty Affiliation

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
Total	364	100.0

The number of academics employed by the faculties of University of Jordan 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 University of Jordan; these are the Faculties as described in the questionnaire consist of the following teaching units of 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 Engineering. The imbalance between respondents from the eight faculties means that there is a significant weighting towards respondents from the arts and Shari'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 eight faculties at University of Jordan (based on data gathered from the web site of University of Jordan, 2013/2014, <http://www.ddp.ju.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 (4) Highest Completed Level of Education

Categories	Frequency	%
Masters	222	61.0
PhDs.	142	39.0
Total	364	100.0

The data in Table 4 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 University of Jordan. Almost 61% (n=222) of the respondents have completed a Masters degree, while 39% (n=142) have already completed a PhD.

Table (5) Academic Rank

Categories	PhDs %	Masters %	Total %
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%
Total %	142 39.0%	222 61.0%	364 100%

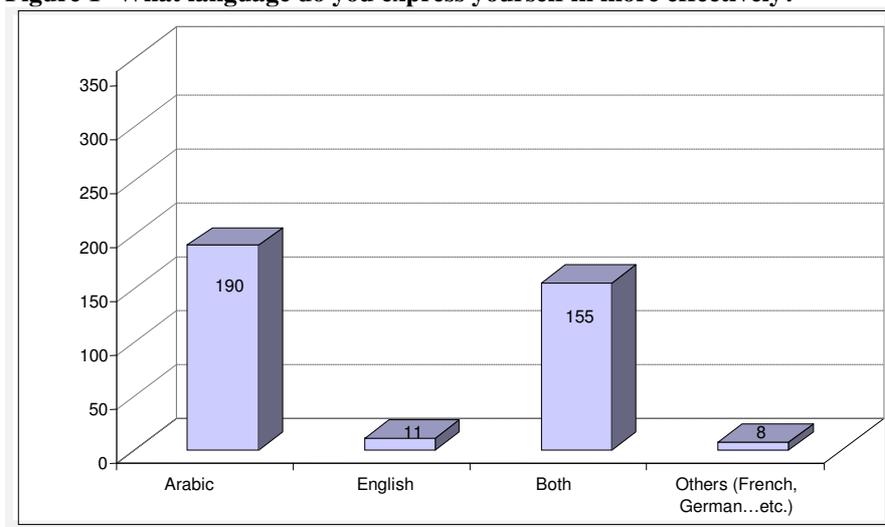
Table 5 shows the distribution of respondents according to the current level of their academic appointment or rank, including those who are currently enrolled in a PhD. The rank most frequently indicated by the respondents (46%) was postgraduate student (PhD level). The remainder of the respondents (54%, n=196) were currently working on the University's academic 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%) was reported by considerably 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 study 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.

Language and Scholarly Communications

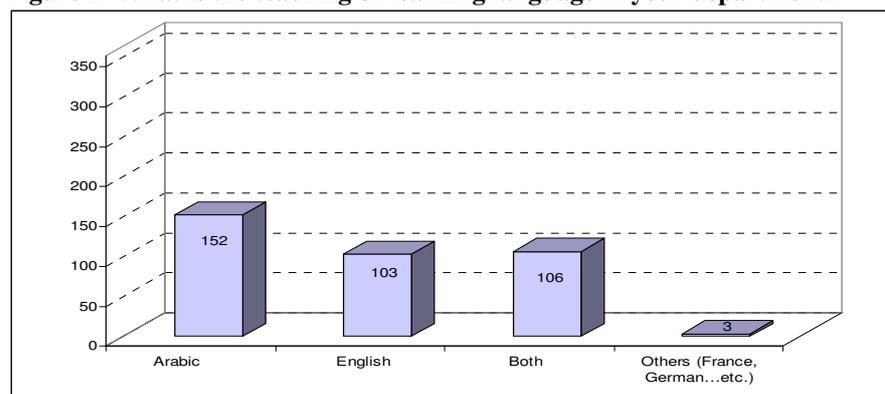
As noted in earlier chapters the Arabic language has been reported as being in a state of crisis regarding its future as a medium for scholarly communication. Questionnaire respondents were therefore presented with questions regarding their use of Arabic and their perception of its future value for the purpose of research and scholarship.

Figure 1- What language do you express yourself in more effectively?



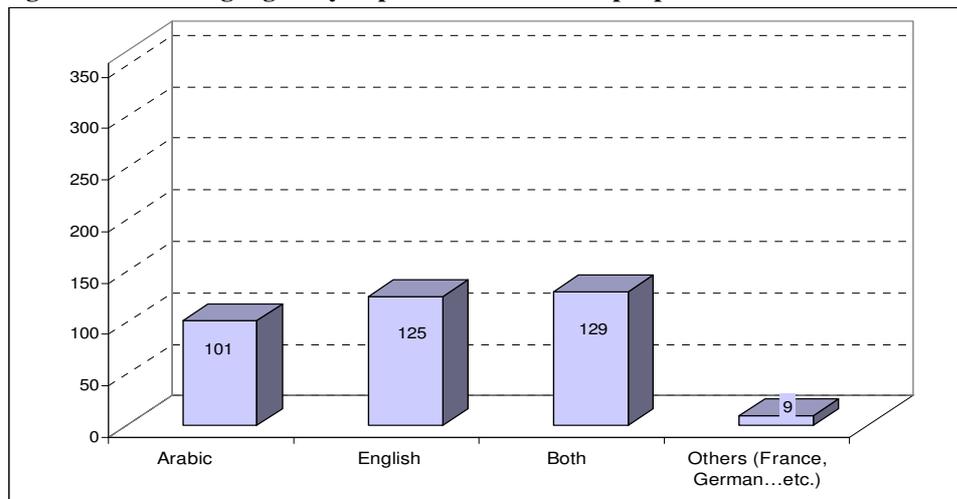
Respondents were asked to indicate which language or languages they use most effectively. The results indicate that respondents use Arabic as a ‘first language’ more than other languages. Out of the 364 respondents, 52.2% (n=190) indicated that they were able to express themselves more effectively in 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 University of Jordan 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 Economics using English language in teaching, research, and publishing scholarly information. It is highly likely that most 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 2- What is the teaching or learning language in your department?



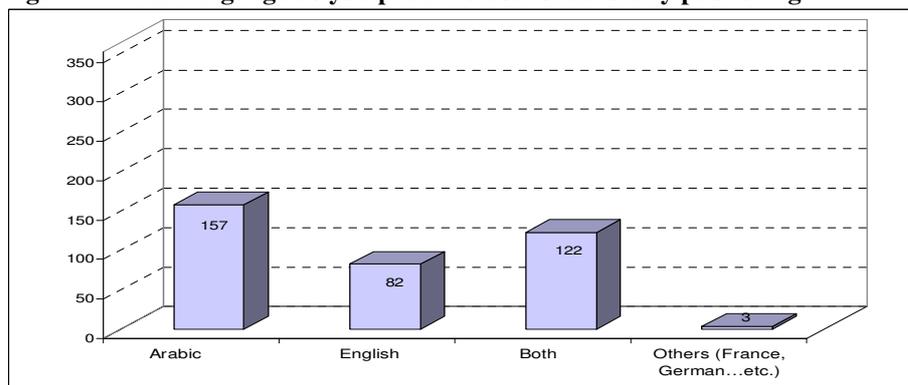
Respondents were requested to indicate which language they used for teaching and learning purposes at University of Jordan. The data indicates that Arabic is still the language used most commonly by respondents, with 41.8% (n=152) indicating this is the language in which they conduct their teaching, 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 University of Jordan, with 106 respondents (29.1%) indicating that they use both Arabic and English for teaching and learning purposes. This indicates that for those Faculties which nominally teach in either English or Arabic that a degree of bilingualism is in fact the norm.

Figure 3- What language do you prefer to use for the purpose of information retrieval?



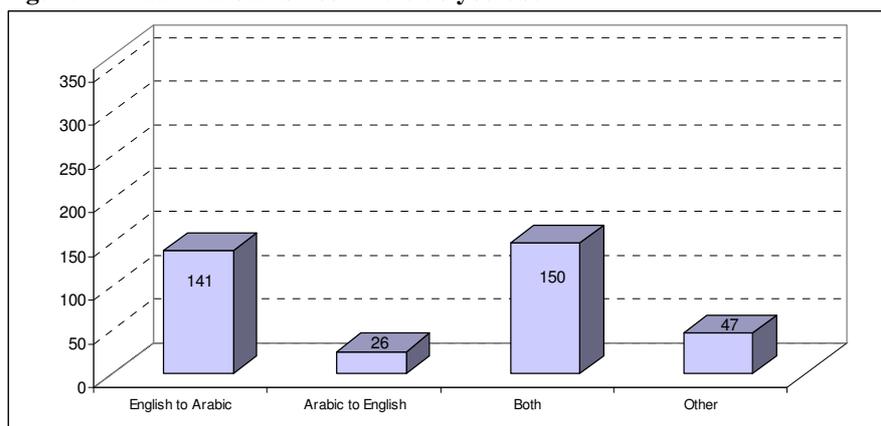
A following question asked respondents to indicate the language of choice for the retrieval and access of information. Not unexpectedly, the strong element of bilingualism is again indicated, with 129 (35.4%) respondents indicating that they use both Arabic and English. Interestingly, however, of those 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 4- 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 6.5), 82 (22.5%) respondents indicated that it is their preferred language for publishing.

Figure 5- 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.

Arabic Language vs. English in 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 preeminence 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 in English only.

In general University of Jordan supports using English for teaching and research activities, particularly in the Faculties of Economics and Administrative Sciences, Information Technology and Computer Science, and for Engineering. 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 the two languages in higher education by using a five point *Likert* scale measuring from, (1) ‘Strongly disagree’, to (5) ‘Strongly agree’.

Table 6 - 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. University of Jordan supports the use of English for scholarly communication	5 1.4%	20 5.5%	97 26.6%	199 54.7%	43 11.8%	3.70
2. Information in Arabic is important to your research	23 6.3%	86 23.6%	38 10.4%	137 37.6%	80 22.0%	3.45

More than 65% of the respondents indicated that they ‘Agree’ or ‘Strongly agree’ that ‘University of Jordan 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).

When considered together these results strongly suggest that respondents have a desire to publish in Arabic, but are discouraged from doing so by the lack of networked scholarly information available in the language. 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 University of Jordan, 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.

Role or (status) of English Language in Arab Countries

The respondents' attitudes towards English were explored further in additional questions.

Table 7 – 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%	2.65
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%	3.60
3. Using English facilitates communication with international institutions and researchers	10 2.7%	15 4.1%	34 9.3%	206 56.6%	99 27.2%	4.01
4. 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%	2.90

While the importance of the Arab language is reinforced by responses indicated in Table 7, the results also suggest that the use of English promotes research productivity which could in turn feed back into Arabic scholarly literature. 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 networks this is a clear indicator of the perceived importance of English.

A further indication of the extent of the perceived threat to Arabic-based scholarship is that the majority of the respondents (65.4%; mean=3.60) '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 are able to research, write and publish in English, the challenges of doing so, as for any second language, means that they are naturally less productive than if they could undertake at least part of the process in Arabic.

Responses were less emphatic to the two propositions dealing with what might be described as the socio-cultural impact of English. Almost half (47.2%) 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% agreed or strongly agreed and 45.6% registered some extent of disagreement. Noticeably, however, the neutral response was again quite substantial (26.6%).

Taken together, the results in Tables 6 and 7 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 also some concern about the use of English at University of Jordan 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 their 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 their use of English in research and publishing.

Advantages of the Internet for Research Communities

Respondents were also presented with the proposition that ‘The Internet is useful for linking research communities in Arab countries’. Although this might seem to be self-evidently the case, the point of this question was to test the strength of opinion on the facilitation of networking with fellow Arabic speakers.

Table 8- Advantages the internet for scholarly community (n= 364).

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
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%	4.05

The substantial majority of respondents were able to see the benefit of the Internet for scholarly communication with more than 82.9% indicating that they ‘Agree’ or ‘Strongly agree’ with the statement. There is therefore a 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 facilitating the building and maintenance of research networks based on shared disciplinary interests.

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 Arabic on the Internet and the related problem of the adequacy (or otherwise) of Arabic information sourced from the Internet.

Table 9 Barriers to the use of Arabic language on the Internet (n= 364)

Item	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5	Mean
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%	3.10
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%	3.66
3. Arabic versions of some sites are not understandable	6 1.6%	60 16.5%	108 29.7%	173 47.5%	17 4.7%	3.37
4. Many sources in Arabic lack authenticity and accuracy	13 3.6%	30 8.2%	118 32.4%	161 44.2%	42 11.5%	3.52

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’. It is arguable that Arabic scholarship will not be able to contribute to human development unless the language has greater presence in the online environment. This result reinforces the view that while respondents 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 supported by arguments related to the convenience of conducting and publishing research in Arabic, their first language, and also the fear that the underrepresentation of Arabic in the online environment may have more far-reaching implications for Arab cultures.

Perceptions about the authority and accuracy of Arabic sources of information are also seen as an issue. More than half (55.6%) 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 (and it should be acknowledged that the authority of Internet sourced information is an issue irrespective of the language) 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% 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%) indicated that 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.

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 very likely an acknowledgement that despite the English proficiency of many of them, 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.

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:

- 1) *Yes, Arabic is the language of the Arab people and an essential component of religion (holy Qur'an) and/or national identity. (122)*
- 2) *Yes, Arabic is important for some faculties and disciplines (97).*
- 3) *Yes, as some students cannot communicate effectively in non-Arabic languages (62)*
- 4) *No, most research is published in English or other non-Arabic languages and Arabic information lacks authority (38)*
- 5) *No, students can use languages other than Arabic, and translate as necessary. (27).*

Promoting the use of Arabic on the Internet in 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 following.

1. *Digitisation of Arabic resources (journals and books) provided with Arabic search engines (98)*
2. *Create Arabic databases and websites of scholarly information for the Internet. (73)*
3. *Enhanced translation (including summaries) of non-Arabic texts. (51)*
4. *Training of faculty members (to use computers, to access the Internet, and to design instructional websites in Arabic) (30)*

5. *Support the publication and acquisition of research output in Arabic. (26)*

In addition a number of respondents (8) indicated that they did not believe it was necessary to support Arabic at University of Jordan as the majority of scholarship and research was not published in the language.

Recommendation

The role of digital libraries in narrowing the digital divide depend 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 IT staff and librarians which may also hinder their contribution to bridging the digital divide.

Digital libraries should try to provide “Local Information or content of the community, by the community, for the community”. Thus different communities who use and benefit from them have differing views of what they are and can do. Do digital libraries help to overcome the gap between information rich and poor, the ‘haves’ and the ‘have nots’, or do they widen the divide, is a continuous factor.

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