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Lost in Digital Translation? Testing Web-Based Digital Literacy Assessment Tools with Arabic Speaking Internet Users

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Abstract

Many governments have embarked on ambitious programs to make information technology available to their citizens in attempts to decrease the global digital divide. For this strategy to succeed, it is not sufficient to simply make Internet connectivity available, as searchers must have some level of digital literacy to use Web resources. Measuring Web-based digital literacy is thus necessary to plan educational interventions. No such tools exist in Arabic, although Arabic speakers are the 4th largest group of Web users (Internet World Stats, 2014). Accordingly the main goal of this study was to test existing tools in English and Arabic with native Arabic speakers. We observed native Arabic speaker's Web searches, measured their Internet knowledge and their self-reported digital skill level. Regression analysis revealed that Internet knowledge is the best predictor of successful searches, although self-reported skill also predicts search success. The scale of Internet knowledge provides reliable tool for e-government planners to assess the Web-based digital literacy skills of their users and thus plan their ICT development accordingly.

Keywords: Arabic, digital divide, digital literacy, Internet use, Web use

Lost in Digital Translation? Adaptation and Testing of Web-Based Digital Literacy Measurement Tools for Arabic Speaking Internet Users

Doubtless, using communication technologies to make information easily available to an entire society is a wise goal, as it can make access to governmental and other content egalitarian, helping to address existing societal inequalities. However, digital divides occur, where those with the means are able to access the wealth of resources available via the Web leaving those without access further behind (de Haan, 2003; Mancinelli, 2007). Such unequal access widens gaps in knowledge (Bonfadelli, 2002) and thus may exacerbate rather than alleviate existing inequalities. Accordingly many governments have embarked on ambitious plans to improve access to the wealth of resources available on the Web. For this strategy to succeed, it is not sufficient simply to put information on the Web and make Internet connectivity available to all. Access alone does not necessarily eliminate the digital divide; rather, users must have a reasonably high level of digital literacy to find and make good use of those resources available to them, as research in the US (Hargittai, 2002, 2005), Italy (Gui & Argentin, 2011) and the Netherlands (Van Deursen & Van Dijk, 2009) has demonstrated. That is, there is a second level digital divide (Hargittai, 2002).

Diagnosing deficits in Internet searching skills is necessary for a number of areas. E-government developers, in particular, should consider the Web-based digital literacy abilities of their citizenry as research in the Netherlands has shown that many people do not have the digital skills required to find and utilize e-government services (van Deursen & van Dijk, 2009). Educators obviously need accurate information about their students' digital literacy abilities. Website designers across the gamut can benefit from such information as well.

Digital literacy measurement tools exist for English-language users of the Web and have allowed for the creation of interventions designed to overcome the differences in digital skill levels. For Arabic-speaking Web users, no such assessment mechanism has been tested, and it is therefore difficult to impossible for a researcher or policy specialist to know to what extent such users can effectively access and use Web-based information. While some years ago this may not have been a pressing issue, Arabic speakers are now the 4th largest group of Internet users (Internet World Stats, 2014) and the growth has been dramatic, with a 25 fold increase since 1996 (Zuckerman, 2013). Our assessment abilities for this language group have not kept pace with the explosion of Arabic Web-users. Accordingly the goal of this study is to test existing English language Web-based digital literacy measures with Arabic speaking Internet users.

Undoubtedly, having reliable scales to measure Internet literacy for Arabic speaking Web users would be enormously helpful not only for educators but also for media researchers and governments who work with Arabic speakers. However, as has been demonstrated in many areas of social science research, surveys and other measurement tools often unwittingly incorporate the particularities of the society in which they were developed thus may be less intelligible to members of other societies. Simple word choices can be problematic even among speakers of different varieties or dialects of the same language. For example the words "boot" versus "trunk" are used in British and American English respectively for the storage area in the rear of an automobile. A survey measuring consumer attitudes towards this area in cars in one of these societies would likely be confusing to members of the other society. Such issues may be exacerbated when translating surveys and the like into other languages. It is therefore necessary to test whether the tools used in the US context can be used in an Arabic speaking population rather than to import them without such testing. Hargittai's (2012) Web-based digital literacy

assessment instrument for example, developed for use in the US, may also work in an Arabic population simply in a translated form, or it may require modification. The results of our study will establish if the existing tools accurately measure Arabic speaker's Web-based digital literacy, or if some adaptation is required.

In countries that are attempting modernization programs, the question of whether their citizens are able to keep pace with the transition to a digital world is quite relevant. As a case in point, the government of Qatar, an emirate in the Arabian Gulf, has embarked upon an almost unprecedented development plan to reinvent Qatari society on practically all levels in a single generation. The gleaming skyscrapers of Doha, I.M. Pei's Museum of Islamic Art, successful and not completely successful bids for major sporting events such as the FIFA World Cup and the Olympics, the Al Jazeera media conglomerate, and the significant role played in regional conflicts are all interlinked components of a grand strategy to make Qatar a model 21st century state. Inextricably linked to these goals is an ambitious strategy to make the resources of modern information technology available to all citizens and residents of the country. The Qatar National Development Strategy 2011-2016 explicitly tasks the Ministry of Information and Communications Technology, (formerly ictQatar--Internet and Communication Technology Qatar), the governmental entity charged with developing ICT in the country with responsibility for developing access to and use of digital technology in Qatar. And the Ministry includes among its goals to "universalize access to social services and to create a knowledge-based online society" (Al-Jaber & Dutta, 2008). Qatar is an appropriate test bed for our project because of its program to rapidly provide access to all as well as its extremely diverse multi-lingual community including a large expatriate population with many Arabic speaking individuals from across the Middle Eastern and North African (MENA) region and beyond.

Web-Based Digital Literacy Measures

In previous studies done on digital literacy the issue of language is not problematized (Hargittai, 2009; van Deursen & van Dijik, 2009). Most measures of digital literacy are self-reported and the question of the user's native language and/or the language they use to search is not asked. A particular focus on digital literacy skills for people whose first language is not English is a unique feature of our study. The two languages in which the majority of Web content is written are English and Chinese. A vast amount of information is available in these languages. Speakers of other languages are disadvantaged by the lack of information in their language. Tools such as Google Translate are an imperfect solution as the quality of the translations is often lacking. However, recent trends in Web use habits indicate that more Web content is increasingly available in other languages. One reason for this change is that rather than simply being passive consumers of information, Web users are increasingly becoming Web content creators (Zuckerman, 2013). These users often create content in their native languages rather than in English, especially when they wish to reach other speakers of their language (Zuckerman, 2013). This trend makes it more important to understand such speakers' Web-based digital literacy than it may have been in the past.

In researching Web-based digital literacy Hargittai (2005, 2009, 2012) has developed, tested, and retested survey-based measures of digital literacy. Hargittai suspected that respondents may overestimate their skill level in a commonly used measure of digital literacy that asks Internet users "In terms of your Internet skill, do you consider yourself to be: not at all skilled, not very skilled, fairly skilled, very skilled, expert" (2005, p. 377). She devised a test of Internet knowledge, asking respondents multiple-choice questions about Internet-related items

such as http or JPEG. She correlated their knowledge of the items with observational data of respondents' success at Web searches on assigned tasks. In line with her expectations, she found that self-reported skill level is a considerably less reliable predictor of actual skill in locating Web-based resources than is the knowledge-based assessment. The knowledge scale developed by Hargittai was tested in an English language environment, as was the self-rated digital skill item, with Web searching tasks directed at a US based population. The present study aimed to replicate this work with a native Arabic speaking population to ascertain if the knowledge-based assessment tool and/or the self-rated skill item are reliable predictors of their Web-based digital literacy. To answer this question, two versions of the scales should be tested: The existing English versions and transliterated/translated Arabic language versions. Versions in both languages should be tested to enable respondents to choose which they would prefer to use, recognizing that bilingual Arabic-English speakers may prefer English or Arabic.

A number of variables have been evaluated for their relationship with Internet digital literacy, but are not always consistently related to it. Education has been found to further digital literacy (Van Deursen & Van Dijk, 2008; Van Deursen & Van Dijk, 2011). Older people may struggle more with operational and formal tasks on the Internet, but not with other task types such as informational and strategic searches (Van Deursen & Van Dijk, 2011). Age is also associated with the ability to successfully complete tasks on quite varied topics, with younger users more able to find information on the Web (Hargittai & Shafer, 2006). Gender is related to early adoption of the Internet, with males more likely to be the early adopters. However, although this digital divide has decreased, it is not yet eliminated (Liff & Shepherd, 2004). Men actually overestimate their Internet skill levels and women tend to underestimate theirs (Hargittai & Shafer, 2006). Real skill differences between genders have been found in a study done in Italy (Gui & Argentin, 2011) but not in a study done in the US (Hargittai & Shafer, 2006).

The number of years spent on the Internet is related to digital literacy for at least some types of searching tasks (Van Deursen & Van Dijk, 2011 and to Internet knowledge (Hargittai & Hinnant, 2008). Similarly, amount of time spent online weekly is positively related to Internet knowledge (Hargittai & Hinnant, 2008) and is connected with actual skill level in observational work (Van Deursen and Van Dijk, 2008). The ability to speak more than one language is related to Web searching abilities for native Arabic speakers with bilingual Arabic-English speakers exhibiting higher levels of digital literacy than their monolingual counterparts (Dun & Eskandar, 2014).

In the following section we explain the method we used to test the existing English language digital literacy scales both in their original form and translated into Arabic in a native Arabic speaking sample of regular users of the Internet.

Method

Participants

Convenience and snowball sampling were used to identify potential participants. The research team utilized personal connections to distribute recruitment information via social media and word of mouth. Participants were asked to recommend other potential participants. A field research company was also utilized to assist in recruitment.

There were two inclusion criteria for the study: regular Internet usage and native Arabic language status. In line with existing research, we defined regular use of the Internet as an average of at least one hour a week spent on the Web (Hargittai, 2009). A screening process was used to filter out nonnative Arabic speakers and people who were not regular Internet users.

Native Arabic speaking researchers asked potential participants which languages they speak, read and type and asked about the number of hours they spend on the Internet weekly. Participants who met the criteria were invited to take part in the study. In total, seventy-seven participants completed the study. Seven of the participants were removed from the study due to technical issues with screen capture and audio files that prevented data analysis, resulting in a final sample of 70 native Arabic speaker of which 35 bilingual were Arabic-English speakers and 35 were monolingual Arabic speakers. Literacy was the key determinate of bilingual versus monolingual status. Monolinguals did not have basic literacy skills in English although they may have spoken some English. Bilinguals were able to read and type in English and Arabic

The participants, all of whom are residents of Qatar, include passport holders from many countries, reflecting the diversity of nationalities that is common for Arabs. There are 28 Qataris, 15 Jordanians, 7 Syrians, 5 Egyptians, 3 Palestinians, 3 Lebanese, 2 Britons, 2 Iraqis, and one participant from each of the following countries: Sudan, Kuwait, Iran, Australia and Djibouti. The gender of the participants was roughly evenly distributed between the two groups with 33 men and 37 women. The participants were diverse on age M = 23.4 (SD = 6.75). The majority were single, 83%, and the rest were either married, 16%, or 1% divorced. They were reasonably well educated, with 12% not completing high school, 26% finishing high school, 43% currently in college, and 20% having completed a bachelor's degree.

Predictors

Development of knowledge items in Arabic. Hargittai (2005, 2009, 2012) designed, tested, updated and retested, a scale of knowledge of Internet related terms. The scale uses a multiple-choice format to assess knowledge of the terms' definitions. The items include questions on blogs, tagging, malware, bookmarklets, phishing, torrents, podcasting as well as others. A key decision was how to make the materials available in Arabic. Items could be translated, that is, we could find their equivalent meaning in an Arabic word, or we could transliterate, that is spell them phonetically with Arabic characters. This was a critical decision, given that a lot of the terms do not have a corresponding meaning in Arabic. For instance, the term "phishing" is "**التصيد**" in Arabic, which means fishing for a fish. Terms like "search engine" have a literal translation of "**محرك البحث**" which is an uncommon usage and could confuse Arabic users. Concepts like "torrents" are also meaningless as Web-related terms once translated into Arabic. Some words like" bookmarklet" cannot be translated due to the lack of a meaning associated with the word in the Arabic language. The solution that we used was terms that had an equivalent meaning in Arabic were translated and terms that did not were transliterated.

Self-rated Internet skill. We used the single item self-rated skill item to assess participant's self-reported Web-based digital literacy that Hargittai tested (2005, 2009). This Likert type scale has 5 answer options and simply asks the respondent to rate their skill level from not at all skilled to expert.

Potential covariates. Covariates identified in previous research including language ability (bilingual vs. monolingual), gender, age, education, years on the Internet and amount of time spent weekly on the Internet chatting and amount of time spend weekly on the Internet searching were included as control variables.

Internet-Searching Tasks

Web-based digital literacy was operationalized as the ability to successfully locate information on the Internet in line with Hargittai's (2005, 2009) research on American English speakers. In this method participants are assigned tasks involving locating various types of information on the Web. The tasks vary in difficulty but all require a reasonable level of digital literacy. None of the tasks can be completed by clicking on the first page of search results rather they require drilling down through multiple pages and sometimes using more than one search and/or strategy to locate the information.

As a starting point and to be as similar as possible to the conditions in which the English language digital literacy assessment was done, we adopted Hargittai's (2005) tasks when we could, revising them to be culturally appropriate and relevant as necessary. For some tasks this was not possible so similar tasks were created. For example, one of Hargittai's tasks required locating income tax information, however there is no income tax in our research location so we substituted an e-government task. Another of the tasks required finding emergency contraception, a topic that is rather taboo in our setting thus we omitted it. In addition, it had to be possible to complete the tasks in both Arabic and English, requiring some new tasks. We pretested the items with native Arabic speakers to ensure their equivalency in both languages as well as to be sure they could be successfully completed.

The first task required a price comparison between the different cellular providers in Qatar, our research site (see Appendix A for a complete list of the tasks). To answer this task, the participant must be able to find and search for specific information on each company's website by visiting different sections or pages or using the search bar. The second task asks the respondent to locate imported American food products in Qatar. The content on this topic is very limited on the Internet and fairly challenging. However, it only requires a good use of keywords and the ability of the user to distinguish between facts on websites designed to guide consumers to these products and locals' opinions posted on Internet forums.

The third and sixth tasks were created to identify whether residents in Qatar are able to use e-government tools. The questions ask the participants to find a method to pay for their traffic violations and find the information required to obtain an exit permit, a requirement for almost all residents of Qatar to leave the country. The fourth task asked the participants to find a way to attend a Broadway show in New York City. This task tests ability to do online shopping, for tickets in this case, and finding information on specific information such show titles and timings. The fifth task asked participants to locate information on the 2012 summer Olympics to find the age of the youngest Qatari female athlete of the four who competed in the Games. This task required the participants to find accurate information on a topic that has a significant amount Web content. The participants must be able to tab between different search results to confirm the ages of the female athletes. The final two tasks asked about information that would be used when traveling, in this case to Oslo. First they were required to find a way from the main train station in Oslo to the university of Oslo. To do so they had to find the name of the station and then be able to use Google Maps to locate it. Second, they were asked to find a book on economics while in Oslo, which could not be completed in either English or Arabic, requiring the use of a translation tool such as Google Translate.

Dependent Measure: Task Completion

Web-based digital literacy is defined as the ability to successfully locate information on the Internet. To measure this variable we coded the each of the eight searches on a three-point scale with failure to complete the task scored 1, partial task completion scored 2 and successful task

completion scored 3. Failure was defined as a lack of finding the correct information, either because participants gave up on a search or thought they had found the correct information when in fact they had not. Partial completions occurred when respondents were able to get to, for example, the correct page for a task, but were unable to navigate within the page to arrive at the answer or failed to recognize that the answer was on the page. Successful completion occurred when participants arrived at the correct information and indicated they believed that had done so.

Language of Materials. All of the study materials, including the scales, tasks and instructions, were available both in English and in Arabic. Bilinguals had the option of which format they wanted and they were able to switch should they choose to.

Procedure

Participants were contacted prior to the interview session and screened for regular Internet usage and native Arabic language status. Participants who passed the screening were invited to take part in the study. Data collection took place in a campus research lab. The lab was designed to mimic an environment similar to a normal work or school type Web searching situation to be familiar to participants. The room was furnished as a workspace and refreshments were provided. A long table was placed adjacent to the wall with two laptops on it. Two chairs were placed in front of the laptops. An external keyboard and mouse were provided in case the participants typically used them instead of the laptop keyboard. The laptops were standard PCs, equipped with the four different most commonly used Internet browsers, Google Chrome, Internet Explorer, Safari and Mozilla Firefox. Hypercam, a screen-recording software program, was used to screen capture the participants' searches. Two external audio recorders were also placed in different positions to record the conversation.

Upon arrival at the lab, participants were greeted by the interviewer and guided to the lab. Only the researcher and the participant were allowed into the lab once the session began. The participants were informed that the session would take about 90 minutes and that mobile phones should be silenced or turned off. The participants were then consented prior to the start of the session.

The sessions involved three main parts, first an oral pre survey, second the searching session on assigned tasks, and finally a post survey and follow up questions. In the first part of the session, the oral pre survey, the researcher asked the participants about their typical Internet use to measure known covariates. The self-rated digital skill item was included here. An oral survey rather than a self-administered questionnaire was used to develop rapport between the researcher and participant before the searching session.

In the second part the participants conducted the Internet searches on the assigned tasks. The conversation between the researcher and participants in this section was audio recorded and a screen capture program was used to record the searches. The participants were asked to face the computer, position themselves comfortably and select the Internet browser they typically use or are most familiar with. They were then asked to do the tasks, one at a time. Each search was completed before the next task was introduced. The interviewer encouraged the participants to explain their thought processes and searching strategies orally. When a participant believed they had successfully completed a task and indicated so to the researcher, regardless of whether they were correct, the next task was introduced. As our dependent measure is the ability to successfully locate information on the Internet, we stopped the searching on a task once the respondent believed they had found the correct information, whether or not they were in fact

correct. The researcher did not indicate whether or not the search was actually successful, as doing so would have tainted the dependent measure. The searches were later coded for success/failure. If a respondent wished to give up on a task the interviewer encouraged them to continue but if they were too frustrated to do so they were moved onto the next task.

The final part of the session involved a paper and pen task evaluation and an online post survey. Participants were first asked to fill out a short survey evaluating the tasks. They were then instructed to fill out a post-survey online. The post-survey included questions on demographics, and the knowledge test on Internet-related terms. The participants were then asked some follow up questions by the researcher to further clarify what they did during the searching session. The participants were then paid, thanked and excused from the study.

Results

Dependent Measure

To determine if the knowledge test and/or the self-rated digital skill items were related to respondents' ability to locate information on the Web, a linear multiple regression was used. We coded the tasks as explain above, with 1 for failure to complete the task, 2 as partial task completion and 3 for successful task completion.

The tasks varied in difficulty as can be seen in Table 1, with mean completion rates ranging from 1.46 for the most difficult task, which asked respondents to locate American food in Qatar to the easiest tasks, which both had means of 2.71 and asked respondents to utilize e-government resources.

Table 1

Means and Standard Deviations of Completion Rates

	N	Mean	Std. Deviation
Task 1 Calling Rates	70	1.79	.83
Task 2 American Food	70	1.46	.83
Task 3 Traffic Fines	70	2.71	.68
Task 4 Broadway Tickets	70	2.23	.92
Task 5 Female Olympians	70	1.73	.76
Task 6 Exit Permit	70	2.71	.68
Task 7 Oslo Directions	70	1.66	.87
Task 8 Oslo Book	70	1.70	.86

We sought to evaluate if an index of Internet search skills consisting of the scores on the eight searching tasks could be used rather than each task individually. Cronbach's alpha (Cronbach, 1951) was used to assess inter-task reliability to determine if we could treat the eight tasks as a scale and use the mean task completion score in the subsequent analyses. The eight

items are reliable, with a satisfactory α = .72. Thus each participant's mean score on the eight tasks was calculated and used as the dependent measure.

Predictors

The two main predictors we compared were the score on the knowledge items and self-rated Internet skill. We used Cronbach's alpha (Cronbach, 1951) to assess the inter-knowledge item reliability to determine if we could treat the knowledge items as a single scale and use the mean score in the subsequent analyses. The 19 items are reliable, with a satisfactory α = .84, thus each participant's mean score on the knowledge items was calculated and used in the subsequent analysis. The single item self-rated Internet skill item was scored with 1 as no skill and 5 as expert.

We also included seven potential covariates as control variables, based on existing research including: gender (1 = male, 2 = female), age, which was measured in years, education, (1 = not completing high school, 2 = high school diploma, 3 = some college, 4 = bachelors degree, 5 = some master's work, 6 = master's degree and 7 = a doctoral or professional (MD, JD) degree), number of years on the Internet, hours spent on the Internet weekly chatting or emailing, and hours spent weekly on the Internet searching, measured in one hour intervals, from none, up to 6 or more hours per week. Finally, we included language status (1 = monolingual, 2 = bilingual) as it is related to Web searching abilities (Dun & Eskandar, 2014).

Our research question asks if the knowledge items, self-rated skill level or both predict Internet searching skills, when education, age, gender, years on the Internet, time weekly on the Internet chatting, time weekly on the Internet searching and language status are controlled. In Table 2 we present the results of the ordinary least squares regression we used to answer this question. The predictor variables accounted for over half of the variance in searching ability R^2 = .62, adj R^2 = .56 $F(9, 59) = 10.74$, p >.0001. Although our sample is not a representative one, we use significance levels as a rough indication of the importance of variables. VIF levels are all acceptable, with values ranging from 1.2 to 2.6, below standardly accepted levels of either 5 or 10 (O'Brien, 2007) indicating multicollinearity is not an issue.

Table 2

Determinants of the Completion Rate of Internet Searching Tasks: Results of an Ordinary Least Squares Regression

	Standardized Coefficients
Variable	Beta
Years on the Web	.13
Age	-.01
Gender (male = 1, female = 2)	-.10
Education	.01
Weekly Time Web Chatting/Email	-.10

Weekly Time Web Searching	.01
Language Status	.37**
Knowledge Scale	.24*
Self Rated Skill	.23**

**p < .05; *p <.07

The regression results indicate that three variables contribute to the observed differences in task success: the knowledge scale, the self-rated skill assessment and what language the respondents spoke, with bilingual speakers more able to successfully find information on the Internet.

As both self-rated Internet skill and the knowledge scale contributed to the successful task completion, we ran two follow up regressions to determine if one of them was more related to task completion than the other. We first omitted self-rated skill as a predictor variable. In this model, the predictor variables accounted for 60 percent of the variance in searching ability R^2 = .77, adj R^2 = .60 $F(8, 60) = 11.06$, p >.0001. VIF levels are all acceptable, with values ranging from 1.2 to 2.3, below standardly accepted levels of either 5 or 10 (O'Brien, 2007) indicating multicollinearity is not an issue. In Table 3 we present the results of the regression with self-rated skill omitted as a predictor variable.

Table 3

Determinants of the Completion Rate of Internet Searching Tasks: Results of an Ordinary Least Squares Regression with Self-Rated Skill Omitted

	Standardized Coefficients
Variable	Beta
Years on the Web	.14
Age	-.04
Gender (male = 1, female = 2)	-.13
Education	.04
Weekly Time Web Chatting/Email	-.04
Weekly Time Web Searching	.01
Language Status	.41**
Knowledge Scale	.34*

**p < .001; *p <.01

We then omitted the knowledge scale as a predictor variable. In this model, the predictor variables accounted for over half of the variance in searching ability R^2 = .77, adj R^2 = .55 $F(8, 60) = 11.20$, p >.0001. VIF levels are all acceptable, with values ranging from 1.2 to 1.8, below

standardly accepted levels of either 5 or 10 (O'Brien, 2007) indicating multicollinearity is not an issue. In Table 4 we present the results of the regression with self-rated skill omitted as a predictor variable.

Table 4

Determinants of the Completion Rate of Internet Searching Tasks: Results of an Ordinary Least Squares Regression with Knowledge Scale Omitted

Variable	Standardized Coefficients Beta
Years on the Web	.14
Age	-.02
Gender (male = 1, female = 2)	-.11
Education	.05
Weekly Time Web Chatting/Email	-.14
Weekly Time Web Searching	.03
Language Status	.47**
Self-Rated Skill	.31*

**p < .001; *p <.01

The three models are similar in the amount of variance explained, although the model with the highest adjusted R^2 is with the self–rated skill omitted from the predictor variables. That model has an adjusted R^2 = .60, .05 more variance explained than the model with the knowledge scale omitted and .04 more than the model with both predictors.

Discussion and Conclusion

We undertook this research to ascertain if the scales developed for measuring digital literacy with native English speakers (Hargittai, 2005, 2009) would also work with native Arabic speakers. The research conducted in the U.S. found that Web users overestimate their Internet skill levels when asked to evaluate themselves and that testing their knowledge of Internet related items better predicts their actual searching skills (Hargittai, 2005). Similarly, we found that the knowledge scale better predicts Arabic speaking Web users ability to find Web-based resources than the self-rated skill item, or the combination of both the knowledge scale and the self-rated skill item. Thus, with a native Arabic speaking population, as in the native English speaking one, testing their knowledge level provides the best prediction of their Internet searching skill.

However, the difference between the two predictor variables in explained variance, .05, is not large. It may be that the native Arabic speaking respondents did not overestimate their skill level to the degree the native English speaking respondents did. While our data cannot speak to

why this may be true, we can speculate that there may be cultural differences in the way the respondents evaluate themselves. Why this may be the case would be an interesting area to follow up in subsequent research.

To our knowledge, this is the first study to investigate whether the knowledge-based digital literacy scale developed by Hargittai is a reliable and valid tool for use with native Arabic speaking Internet users as well as first to investigate their Web searching strategies with observational methods. The results of the study should enable easy and reliable assessment of digital literacy in Arabic speaking populations, which could lead to educational interventions in schools in the MENA region as well as assist governments in their development of e-government services. Our study also provides an initial assessment of digital literacy levels in Arabic speaking Web users and contributes to the growing literature on digital literacy.

The study is limited by the use of a non-representative sample, which was necessitated by specific inclusion criteria but nonetheless limits the generalizability of the results. Although in line with similar research, the sample is relatively small. The observational nature of the method requires running participants individually, making large samples less feasible. However, larger, representative samples would strengthen the generalizability of the findings.

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Appendix A

Internet Searching Tasks

Task 1. You constantly call a friend in the USA. Where you can find Qatar/local cellular company with the lowest rates for the USA. You decide to only look at the main companies to simply your search.

Task 2. You're having a birthday party at your house and some of the guests are from America. You decide you'd like to feature some American food that you want to cook yourself. Where can you find food that has been exported from America in Qatar to use when you cook?

Task 3. Let's assume that it is time to pay your traffic violations. Where would you find the necessary forms and get information to help you with the process?

Task 4. You're taking a trip to New York City and want to see a live theatre show. Where can you attend a Broadway show NYC? – Once they find a show, ask them for specific timings for the shows

Task 5. Your friend is working on a project and needs to know some information about the Qatari Olympic team including the age of the youngest Qatari female athlete who participated in the 2012 Summer Olympics. Can you find the information?

Task 6. Your maid needs an exit permit for her upcoming yearly leave. Where can you get one for her?

Task 7. You're taking another trip, this time to Oslo and want to find how to get from the main train station in Oslo to the university of Oslo?

Task 8. While in Oslo you need to find a book about economics. Can you find one?