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Designing culturally appropriate responses to culturally influenced computer usage behaviors

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Abstract.

Cultural variables impact across a wide range of behaviours when interacting with computers. The Diamond Model provides an organizing structure for these variables and their instances from specific territorial cultures. Instances of cultural factors in Jordan impact at several levels on computer usage. Where such impact is adverse, culturally appropriate responses are required. Such responses need to be at the appropriate level from individual user behaviors, via organizational IT and work policies, national educational and economic policies, and global IT practices. We present examples of adverse interactions between cultural variables and computer users' behaviors in Jordan and propose a range of culturally appropriate responses at the individual, organizational, national and global level.

Keywords: Culture · Arabic Language · User Interface Design · IT Policies

1 Introduction

Culture shaping of human behaviour has many aspects. To understand its main meaning, Kroeber, and Parsons (1958) define culture as a “transmitter and created content and patterns of values, ideas, and other symbolic meaningful systems as factors in the shaping of human behaviour and the artefacts produced through behaviour”.

Culture is to a human collective what personality is to an individual. Personality has been defined by Guilford (1959) as “the interactive aggregate of personal characteristics that influence the individual's response to the environment”. Culture could be defined as the interactive aggregate of common characteristics that influence a human group's response to its environment, but terms such as ‘structure’, ‘system’ and ‘pattern’ are preferable to “aggregate”. There are common relationships between aspects of cultures. For example, there is a direct relation between policies and religion in Muslim country such as the regulation in courts which are part based on religion.

Culture shapes most human behaviour, including interaction with computers. In much Human-Computer Interaction (HCI) research, culture is assumed to impact design preferences. However, many cultural variables identified in the general literature have no clear link to design preferences. For this reason, we developed a new model, the Diamond Model (EL-Qirem and Cockton, 2011), to help designers, and developers to understand users culture in better ways through identification of the cultural variables that impact usage most, which is tied to users' behavior that is affected by culture.

The Diamond Model also can act as a tool for field studies, providing a structure for identifying and organizing instances of Jordanian cultural variables. It also later supported compact communication of these variables and instances via a novel representation, the Dramatic Sketch (EL-Qirem and Cockton 2015).

The balance and range of cultural variables in the Diamond Model suggests that culture should have impact beyond design preferences (as often assumed when considering the impact of culture on user interface design), and should also influence how users react to, explain and evaluate difficulties when using computers. Some of these difficulties can be addressed by user interface design, but others require responses from users, internal services (IT), organizations, governments and the IT industry. In this paper, we report on a new application of the Diamond Model, based on data from field studies in Jordan, that supports the identification of culturally appropriate responses to adverse behaviors and experiences of computer users.

2 Culture and HCI

This paper builds on our previous research on the impact of territorial culture on computer usage in Jordan how this shapes users' responses to the problems during usage. Territorial cultures are ones that are geographically coherent due to pervasive political, economic and sociocultural influences. They co-exist with other cultures in a territory, for examples ones associated with age, gender, occupation, status or wealth, but can reasonably be expected to shape how other cultural factors operate across a territory such as a city, nation or wider geographical region. We use the term 'territorial factors' to refer to the combination of cultural and other differences for a specific geographical area that are influential across a range of users who may differ considerably in terms of temperament and competence. For example, through our studies we discovered cultural variables led users in Jordan to have different experiences of computer usage to those from other cultures such as the USA: self-reported anxiety and frustration differed between users in a US study and ours in Jordanian, as revealed by repeating a questionnaire and triangulating the results with interviews with a range of stakeholders (EL-Qirem and Cockton 2012).

Much of the overt frustration recorded in western studies may be much less evident elsewhere. We should not assume that what is a usability problem in the USA will be one in Jordan, not only in its severity, but also whether it is viewed as a problem at all. Our views on the value of usability in the West are much based on the negative emotional impact of poor usability, yet in other cultures, these associations may not hold as much, even at all. Effective localisation guided by software quality needs to

consider this. It is not just that the same feature judged differently by the same quality criterion, but that quality criteria themselves may be radically different.

For example, Jordan users do not get angry with their computers, even if they have experience of using IT. If they face any problem, they often do not know if the problem comes from the computer or from them. Therefore, the last things that users may think are that the problem is from computer itself. If this is so, then they will not be angry with their computer.

Jordanian computer users were thus shown to respond differently to similar usage problems when compared with UK users and US. However, in some contexts, Jordanian users' responses to similar usage problems were similar to those reported in the mainstream literature on Human-Computer Interaction (HCI). In addition, Jordanian users experienced problems that are not typically reported in European and American studies, which are related in the Diamond Model to specific cultural variables.

Usage problems in Jordan may thus be different from or similar to those reported for Europe and America. Different problems require culturally specific responses, as do similar usage problems that have culturally different responses. In this paper, we focus on these areas of difference and propose a range of culturally appropriate socio-technical design responses.

3 Jordanian Users' Experiences with Computer Usage

In field studies (EL-Qirem and Cockton 2011), Jordanian users reported some common difficulties that face the users such as the English language, which some find hard to read or write, therefore they prefer an Arabic version if one is available. However, sometimes there are quality problems with Arabic software, for both locally developed software and localisations of English language software.

However, some users use English software to learn words and improve their English language. One user in our studies suggested including both Arabic and English in the same software by having the meaning of an English word in Arabic appear when the mouse is over it.

Another source of problems that affect computer usage is a lack of training. This is often due to cost problems, because some users cannot afford a specific training program, or their company cannot afford to pay for training because of the cost.

The example behaviours and experiences above are related to cultural variables that have been discussed in detail during the development of the Diamond Model (EL-Qirem and Cockton, 2011). Another problem discussed in the context was users who could not trust the internet to buy or sell products, which limited the development of e-commerce. Overall, a wide range of cultural variables were seen to be influencing the behaviours and experiences of Jordanian computer users in our studies. These cultural variables included:

1. Degree of familiarity and competence with the *English language*.
2. *Economic* contexts.
3. Access to, and *Experience with, Technology*
4. Individualistic and *collectivist* behaviors

5. *Family obligations (Nepotism)* that result in many employees who are free much of the time and do not experience pressure at work.
6. *Attitude to Time*, evidenced by situations where a user's computer was faulty, delaying work with it, but there is other work that does not depend on their computer, but they don't switch to that but enjoy their time by sitting and having a rest until someone comes and fixes their computer.
7. *Power distance and authority*, for example, when a computer is faulty in some way (hardware or software difficulties), an employee will not try to fix it because the employee will be worried by their manager's reaction if they damage it more. Employees can be limited in solving computer problems because they are afraid to cause further 'damage' to the computer, as the employee will be responsible for any damage happen when they solve the problem. In our studies, users often interpreted usage difficulties as being due to their computer being 'damaged', and not to difficulties of operation.

Some of the difficulties above, such as those associated with the English language, can be addressed via user interface design, but others require interventions at the level of internal services (IT), organisational policies, national programmes and even global IT industry practices. There can thus be long causal chains, mediated by cultural variables, between user behaviours and experiences and their effective root causes.

Furthermore, there are differences between users in Jordan and we cannot generalize all of them into an identical user stereotype. For example, students in our studies took deadlines more seriously than employees, and were thus more frustrated by usage difficulties than employees. Even so, there are some common territorial factors that have similar impacts on different users in Jordan. Users in Jordan continue to have different needs that have steadily reduced in western countries such as the US and UK, but were more apparent in the 1980s and 1990s when computers started to spread through the workplace and then homes.

4 Jordanian Usage Experiences and Some Proposed Responses

Some common problems face both users in Jordan and users in western country, but on the other hand, there are difficulties that face users in Jordan that the western users do not typically encounter. The first group relate to the English and Arabic Languages

- Users in Jordan would like to have special emoticons to express their special Jordanian emotions when they chat with friends or family such as, for common phrases that only Jordanians say for example when they say "Hi" to each other the users like to have their own way of say and express their emotion of saying greeting by having special word that mean "Hi", or just a symbol that means "Hi". One example of a Jordanian specific emotion could be to have a famous Jordanian cartoon character (Abu Majoob) say "Hi" in Arabic language (and if spoken, with a Jordanian accent).
- Users in Jordan need better support from English software, which does not use their first language. Some company policies force employees to use English software rather than an Arabic version, creating the need for users to de-

velop their English language competences. Some users in Jordan suggested the use of Arabic tool tips in the software to help them translate the word from English to Arabic, as in Figure 1.

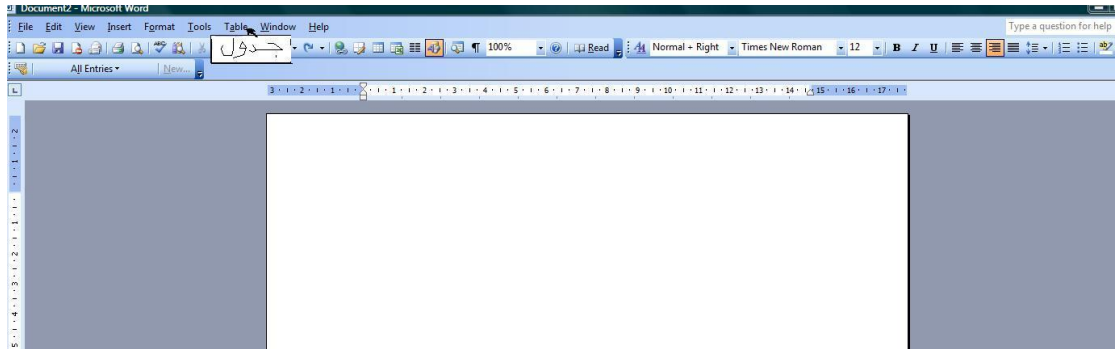


Fig. 1. Suggested provision of Arabic tool tips shown for Microsoft Word.

- Usage difficulties arise due to translating from English to Arabic because sometimes localisations translate a word too directly from English, changing in the meaning of the word. Sometimes, a word will be reversed. Writing in Arabic runs from right to left, which is the opposite direction to English; therefore sometimes a translation from English to Arabic will be reversed (word will be miswritten from left to right) which change the word and it will be unknown for the reader. For example, see Figures 2 and 3 below.



Fig. 2. Example Google translate from English to Arabic, writing Arabic in the wrong direction.

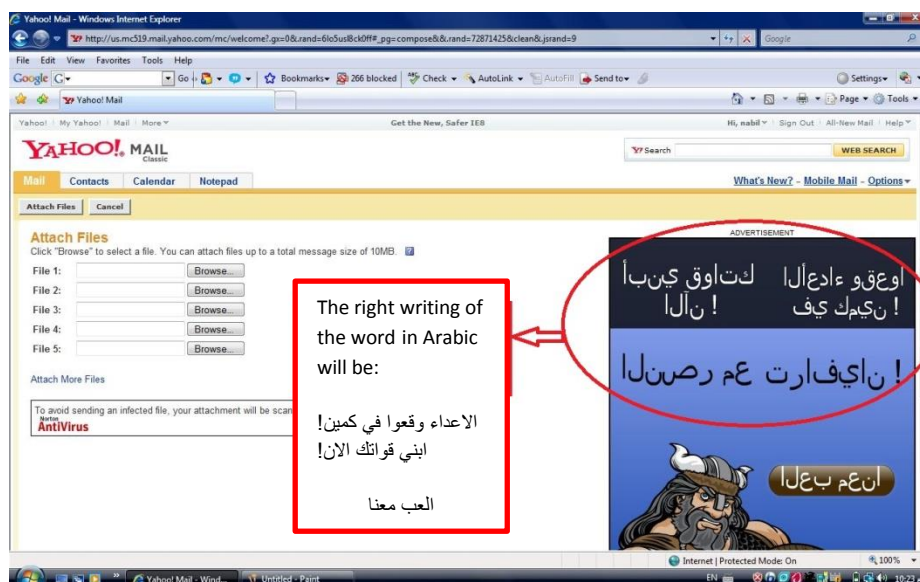


Fig. 3. Example of reversed Arabic word.

- Help messages in some localised Arabic software are not as supportive as they should be; because help messages in Arabic may lack the full details of the English ones, only part of the help text may be translated. Worse still, in some Arabic versions of software, the operational interface will all be in Arabic but help messages will stay in English, which is not helpful for users with weak English.
- Generally, Jordanian users need more context in help messages. It is not enough to simply fully translate from English. More detailed help is needed. *Diagrammatic Help* could be better than text help messages, because it could show the solution of a problem step by step by showing pictures or sketches of how to solve a problem, reducing or even avoiding language problems.
- Keyboards with both Arabic and English alphabets cause some problems for users because sometimes they forget to press the 'change from Arabic to English' button therefore users get confused when they realise that the keyboard has not changed from Arabic to English or vice versa. Keyboard modes should be more salient, either through hardware cues such as lights (as on some caps lock keys) or screen reminders (as when caps lock is on during password entry)

Arabic tooltips, more salient language modes (Arabic versus Roman writing systems), higher quality translations, and enhanced Arabic help text (more explanation, perhaps with diagrammatic support) place increasingly higher demands on software localisation. Appropriate responses here rely on the global IT industry improving hardware features and restricting localisation to tool tips and help, but with the latter going beyond simple translation. Local responses are less likely to be effective.

Another set of difficulties that require responses from global IT industries concerns cybercrime:

- Viruses are a common problem for computer users all over the world, and in Jordan they are also a big problem because they damage users' trust when computer hackers compromise their computers, or when a virus damages a user's computer. Therefore, global IT industries need to provide strong protection against hacking and viruses for all computers, and not just the more recent operating systems that require expensive hardware. Low cost or free protection is needed for countries with aging hardware and limited economic resources.

Studies also revealed some specific problems with web interfaces:

- High bandwidth internet connections are still high cost for regular users in Jordan, which makes them use low bandwidth connections, therefore it would be much better if web designers minimize uses of pictures and large colour images in websites to make the website open quicker and faster than one fully loaded with pictures.
- Simplifying the web user interface, especially for government websites, because users across different work sectors will have different levels of education, and computer experience.

Unlike the first two sets of difficulties, culturally appropriate responses to the two difficulties above can be local, with Arabic web pages designed with slow internet connections and low IT literacy in mind, especially for government web sites where there is no alternative (commercial customers can find a better web site, citizens can't as there is typically only one).

The final two sets of problems require appropriate responses at organisational and national levels. Employers and governments have a role to play in reducing the difficulties that Jordanian users face with computers (even if these difficulties rarely annoy them relative to Western users). Desirable interventions here include:

- IT support should be available for users when they need any help, such as having a call centre or help desks in any company or establishment using computers. Support should go beyond 'repairing' 'damaged' computers to developing users' competences so that they can become more independent.
- At the same time, IT services need to restrict users' authority, to limit their ability to 'damage' their computers.

Organisations, and especially internal IT services have an important role to play in improving Jordanian users' experience of computers. However, some difficulties are best addressed at government level, whether local, regional or national:

- Training is the key issue for effective usage, when then users are trained, the possibility of problems will face users less, and users will have more experience, which will support their work and knowledge.

- Governments could provide free courses for teaching the principles of computer skills, how to use new technologies, and what to do when they face problem and how to deal with computers, with award of certificates for different levels of computer skills. This does not appear to be a focus for international aid programmes, but could be.

5 Conclusions

Identifying and understanding cultural variables that impact on computer usage experiences is an important first step towards improving user experiences across a wide range of territories worldwide. However, the important step requires these understandings to be translated into actions.

Culturally appropriate responses to factors that result in adverse user experiences in computer usage are often seen as being restricted to user interface design. At the levels of language in all its manifestations, user interface design can offer valuable effective responses to current difficulties. However, both hardware and software responses may be needed, and even high quality translation and compatibility with different writing systems may not be enough. For features such as help, instruction and guidance needs to be culturally appropriate, and not just linguistically complete and correct. Conversely, it can be better to not completely localise a user interface, to support the development of English language competence across the world. Adequate responses here require the involvement of global IT industries. Computer security for everyone is a high priority here.

Responses at the individual, departmental, organisational, governmental (local, regional, national) or international (aid programmes) are needed to complement the efforts global IT industries to deliver good user experiences worldwide. Web site design can be readily addressed at relatively local scales. Training and education can develop individual competences, supported by organisations, especially their IT support departments. Growth in users' competence needs to be supported, with some becoming local experts who can take some of the load off IT support. At the same time, the opportunities for inadvertent harm to a computer system need to be reduced at a local level as well as through the actions of global IT industries.

A wide range of insights has been presented above, with recommendations on culturally appropriate responses. This range goes beyond that common for studies of localisation and user interface factors. By developing broad and high level perspectives in our field research through a mixed methods approach across multiple studies (EL-Qirem and Cockton 2012), we were able to span a wide scope of responses from the individual to the international. At the same time, we were able to collect detailed instances of cultural variables in action in our field research, as we all as some co-created responses (i.e., some of our proposed responses above were proposed by our respondents in our studies). This exposes the complexity of computer user experience and its relation to territorial factors. Reducing digital divides worldwide requires a range of initiatives at all scales from the individual to the global. Everyone has a part to play here.

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