A Comparative Analysis Of Local Culture M-Government Application In MGFHSA Between Omani Citizens In The Public And Private Sectors

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ABSTRACT

Usability can refer to culturally relevant design rules or principles for the user interface of m-gov or mobile government applications. In recent years, the technological world has expanded dramatically. However, there is a lack of guidelines for incorporating local culture in the design of Information Communication Technology. This study aims to evaluate the local culture design in MGFHSA application using heuristic evaluation. A questionnaire based on four Heuristic Principle was distributed to 149 participants from the government sector and 100 participants from the private sector with total of 249 participants. Specifically, suitable content for local culture, aesthetic value according to local culture, the language use is for local culture, and the local philosophy has local culture value were evaluated. The results found that the end users' heuristic evaluation for the all items was found at the high level with an overall mean of 3.81. The finding of this study will help the developers of m-government application and to consider the local culture aspect in their design.

Keywords Cultural Design Elements, Mobile government, Usability, Ministry of housing, Oman.

I. INTRODUCTION

Usability can refer to culturally relevant design rules or principles for the user interface of m-gov or mobile government applications. In recent years, the technological world has expanded dramatically. There is a lack of guidelines for incorporating local culture in the design of Information Communication Technology Ariffin, S. A. (2020) Cultural components in design principles are lacking in design standards such as Schneiderman's and Nielsen's. On the other hand, this research focuses on the cultural aspects of ICT application design, namely the user interfaces of mobile applications. Although the rate of adoption of e-government services is low among citizens, it is a common problem in Arab countries, including Oman. The reason that the old generation is not good at using the techniques also has some difficulties in convincing this old generation. Despite the low rate of adoption of e-government

services by governments, it is a common problem in Arab countries, including Oman Jaradat, Moustafa, & Al-Mashaqba (2018).Oman is one of the countries that have considered the importance of information and communication technologies (ICTs) in the development of the state at every level, either educational or governmental. It has been found that Oman has extensively raised the graph of using mobile devices and also the usage of portable devices for the establishment of technological development across the region Part of the vision of the Ministry of Housing is the regulation and maintenance of land uses the provision of suitable housing for eligible citizens. Among the objectives of the Ministry is to prepare studies, research, and detailed maps for the areas as well as the structural planning in collaboration with the other relevant authorities and in line with the social, economic, and structural development plans of the Sultanate of Oman, housing (2022). One of the main services ministries in Oman is the Ministry of Housing. Among the objectives of the

Ministry is the regulation of land uses by preparing plots, detailed plans for regions and governorates throughout the Sultanate and the distribution of the lands to eligible citizens in accordance with the provisional laws. In addition, through its housing assistance scheme and non-interest housing loans program, the Ministry provides housing units for citizens. This study aims to evaluate the local culture design in MGFHSA application using heuristic evaluation. Hence, in terms of Omani cultural content, this study proposes assessing final goods, with summative evaluation input from citizens in the public and private sectors being more appropriate for the MGFHSA mobile application.

2. Literature Review

2.1 Culturally Appropriate Design Guidelines (CADG)

According to Engelbrecht (2016), one of the most important interactions in user interface or site navigation is that it is intuitive and clear to all users. To process the information, cultural background of the users in fact influences how they interact with the applications. The influences can be seen on many aspects of navigation process such as where the users star, what they pay attention to and the opinions that they develop from using the application. Other elements that are also linked to the users' cultural background are the colours that are used in the applications, symbols and information that relate to their local norms and values Engelbrecht (2016). The need to integrate cultural elements becomes more necessary because mobile applications are evolving to suit the requirements of different users ALsswey, Naufal, and Bervell (2018). According to Wood (2020), it is very critical for the user interface to reflect the culture of the users. Ishak, Jaafar, and Ahmad (2012) stated that users' preferences that include cultural feature in interface design are very important and designers as well as application developers nowadays have started to give great concern on this. However, many developing countries especially are lacking in culturally appropriate design guidelines in order to inform the development of mobile applications that are relevant to the locals Ariffin & Dyson (2015).

The need to address the cultural elements when designing and developing a mobile application is found to be important because the culturally relevant content and provide aesthetic values can increase the level of acceptance towards the applications (Ariffin & Dyson, 2015; Santoso & Schrepp, 2019). Xinyuan (2005) mentioned that

interface design that integrates the elements of culture is in fact a part of computer product design. Therefore, a proper method of integration needs to be proposed into the design and development of mobile applications so that they will be culturally relevant to the intended users. However, Young (2008) and Ariffin (2014) stated that there is still a lack of standardized guidelines for designers to refer to when they need to acknowledge the local cultural elements into the design of the mobile user interfaces. In the context of mobile learning applications in Malaysia, Ariffin (2014) laid out four cultural elements that can make the mobile applications to be culturally relevant to the users.

2.2 The design principles

The design principles discussed in this study are a result of study conducted by Ariffin (2014) that had exameand the elements of culture in mobile learning (mLearning) applications to be used by teachers and students in Malaysia. According to him, the inclusion of cultural elements in the design of user interface can benefit the users which primarily are the students and teachers. Despite he has proposed guidelines that are specific to Malay community, the elements that he has proposed can be seen from wider perspective and taken as guidelines for any designers to accomplish the same intention. The guidelines are:

1. Local cultural content: The aesthetics and philosophical values that represent the community can be used by designers to design the user interfaces. (Ariffin, 2014) highlighted the elements of art and craft in Malay community such as the woodcraft, musical instruments and textiles that are closely linked to the Malays.

2. Local aesthetic values (flora and fauna) and local colours (from nature): the environmental elements that surround the community and the lifestyles are also seen in the aspect of nature where culture is closely connected to as well. According to Ariffin (2014), the use of plants and flowers that are relevant to the community can reflect the cultural background. In addition, colours embodied in the culture are also inspired from nature. Colours also carry philosophical values or to represent certain beliefs of the community such as black to represent bad luck as in the Malay community. Hence, this can be used as a guide for designer to integrate colours or other elements derived from nature into the user interface.

3. Local language: language of the community can be the language of choice for elements found in the applications. For example, Ariffin (2014) stated that since the Malay language or Bahasa Malaysia is the official language and widely spoken among

the Malaysians, the titles, captions or spoken language in the application can be designed through the language or made bilingual.

4. Local philosophy: some communities will have different values and norms from one another. Hence, designers must know what contents that are acceptable and what that should be avoided. For example, language that is considered obscene, violent content, false claims and unsafe must be evaluated according to the local values.

According to Ariffin, (2014), the incorporation of these four elements that can also serve as the guidelines or principles can ensure the mobile applications carry values that are culturally relevant to the users.

In Table 1, the elements of the four design guidelines that have been selected to be discussed are shown and compared. It can be seen that most design guidelines have listed consistency, simplicity in the user interface and good error management. However, Nielsen has further extended the guidelines to include ease of recall, efficiency and flexibility as well as accessibility. On the other hand, CADG is the only guideline that has stressed on the element of local values or cultural elements to be incorporated into the design of mobile applications.

Table 1 Comparison between 4 design guidelines

Elements	Nielsen	Schneiderman	CADG	ISO 9241
Consistency	/	/	/	/
Simplicity of UI design	/	/	/	/
Ease of recall	/		/	
Error management	/	/	/	/
Local elements			/	
Efficiency and flexibility	/		/	
Accessibility	/		/	

2.3 Applications

Ariffin, Ismail, Yatim, and Sidek, (2018) evaluated the use of culturally appropriate design guidelines for a mobile learning website. 62 participants (students from one public university in Malaysia) were recruited to be briefed about the application (mLearn) and respond to a questionnaire. From the analysis, it has been shown that realistic error management was ranked the lowest while suitable content for local culture scored the highest. This result generally strengthens the necessity of integrating cultural principles in the design of mobile applications.

A. H. Alsswey, Al-Samarraie, El-Qirem, Alzahrani, and Alfarraj (2020), investigated the acceptance of mobile health application user interface cultural-based design among the Arab elderly users. According to them, mobile health application (mHealth) has been one way to provide solutions to the non-availability of physical health services in the Arab world. To simply adopt m-health applications from other countries may pose challenges because of their cultural and personal differences.

Santoso and Schrepp, (2019) studied the impact of culture and product on the user experience. Specifically, the study attempted to investigate the user experience when looking at various products available and identify whether it relates to cultural background. 114 students from a public university in Indonesia were recruited to participate in the study. Using a questionnaire, participants were asked to judge the importance of the user experience for several product categories. When compared to a similar study conducted in Germany, results have shown a significant difference concerning the rated importance of user experience for many product categories. This suggests that there is a possible connection between cultural background and user experience. However, the study also showed that the impact of culture is lower that the impact of interindividual differences between persons belonging to the same cultural group. Hence, the study concluded that the product type has a greater impact than the cultural background on user experience.

 A. H. Alsswey et al. (2020).In their study, the design of mobile application meant for health industry (mHealth) is investigated in relation to the Arabic culture. The study specifically argued that integrating specific cultural values of specific

groups into the design can increase the user experience as well as their acceptance towards the technology. For this, a total of 135 users were asked to respond to an online survey that aims to identify their acceptance towards a culturally designed mHealth app. From the survey, it is shown that language, colours, layout and images as components of cultural elements had significant positive relationship with users' behavioural intention to use the app. The findings certainly encouraged designers to identify cultural elements and integrate into the development of their mobile applications.

Similarly, Ariffin, (2020) in the context of mobile applications in Malaysia has investigated the usability of mobile applications that are meant for three local culture groups in Malaysia (i.e., Malay, Chinese and Indian). As such, heuristic evaluation questionnaires were employed in order to compare the experience of different users (academics vs. students) according to three local cultural elements (Jawi, Songket and Batik) when they interact with a mobile application meant for learning purposes. Results showed that there is an opposite preference where the academics' preferences are Jawi, Songket and Batik in ascending order while the students' preferences are Songket, Jawi and Batik in ascending order. However, both groups of users show high preference for Batik as this element has scored higher means in the heuristic evaluation. Consequently, this study has provided new insight into the possibility of four cultural guidelines to be used for the design and development of local cultural mobile applications in addition to general usability design guidelines.

3. Methodology

3.1 Profile of the Respondents

This section provides a description of the demographic characteristics of the sample regarding denveloping m-government of heuristic evaluation of mobile MGFHSA.The demographic profile of the respondents is presented in Table 1 the total final sample consists of 249 cases. The first characteristic, gender, most of the respondents are male (n=171, %=71.9). The second characteristic is age, participants were divided into 8 age categories, with those who were between 35 and 40 years are the biggest group of the respondents 58 (23.3%), followed by those who aged between 30 – 35 years with 50 (20.1 %) respondents. With regard to the work sector, 149 (59.9%) respondents come from the governmental sector and 100 (40.2%) from the private sector. Besides, of the five levels of education represented, those who had Bachelor degree are the biggest group with 110 (44.2%), followed by those who diploma as with 58 (23.3 %) respondents. Regarding the phone brand and type, almost half of the respondents, 120 or 48.2 % stated that they owned Apple brand, followed by those who owned Samsung brand with 65 (26.1%) respondents. Besides, most of the participants 151 (60.6%) used smartphone. Finally, of the three duration of phone usage, those who have been using phones for more than 10 years are the majority of the respondents, 148 (59.4).

Table 2 Demographics and mobile device experience (n=249)

Variable	Category	Number	Percentage
Gender	Male	179	71.9
	Female	70	28.1
Age	20 – 25 Years	31	12.4
	25 – 30 Years	29	11.6
	30 – 35 Years	50	20.1
	35 – 40 Years	58	23.3
	40 – 45 Years	39	15.7
	45 – 50 Years	24	9.6
	50 – 55 Years	14	5.6
	More Than 55 Years	4	1.6
Job Sector	Government sector	149	59.8
	private sector	100	40.2
Education level	Less than high school	5	2.0
	High school	43	17.3
	Diploma	58	23.3
	Bachelor's degree	110	44.2

	Master's degree	31	12.4
	Doctoral degree	2	.8
Which phone brand are you using?	Samsung	65	26.1
	Apple	120	48.2
	Huawei	58	23.3
	Nokia	1	.4
	Other	5	2.0
Which type of phone are you using?	Smart phone	151	60.6
	3G Phone	1	.4
	4G Phone	67	26.9
	5G Phone	26	10.4
	Other	4	1.6
How long they have been using mobile devices?	0-2 years	12	4.8
	More than 2 - 5 years	26	10.4
	More than 5 - 10 years	63	25.3
	More than 10 years	148	59.4

3.2 LEVEL OF HEURISTIC EVALUATION OF MOBILE "MGFHSA"

For this evaluation, participants from government and private sectors took part to evaluate the mobile government applications. There were 149 participants from the government sector and 100 participants from the private sector with total of 249. These findings provide feedback and opinions expressed by Omani citizens for mobile applications with local cultural content. In order to identify the level of heuristic evaluation for the mobile application, descriptive analysis (mean and standard deviation) was employed among 249 end users. The results of the mean of practice (ranging from 1 "Strongly disagree" to 5 "Strongly agree") are depicted in Table 3, 4, 5 and 6 below. The level will be decided based on mean scores interpretation where (1-2.33) is low, (2.34-3.67) is moderate, and (3.68-5) is high (Bagheri & Pihie, 2014; Pihie & Bagheri, 2013). According to the results, the end users' heuristic evaluation for the all items was found at the high level with an overall mean of 3.81. The mean from government sector end users is 3.75 and for those from the private sector is 3.89. Looking deeper into the result of every item, it can be found out that the mean for most of the items was above 3.68 which reflects high level. Thus, it can be concluded that the level of the heuristic evaluation of the mobile application was high.

4. Finding And Discussion

Suitable content for local culture

Table 3 Suitable content for local culture of mobile "MGFHSA"

Heuristic Principle	Focus of Statement	Government (n=149)		Private (n=100)		Total (n=249)	
		Mean	Std.	Mean	Std.	Mean	Std.
Suitable content for local culture	Mobile content is easy to learn.	**4.01**	.874	**4.02**	.710	**4.01**	.811
	Mobile content is suitable for local culture	**3.81**	.933	**4.02**	.710	**3.90**	.855

Citizens in both the public and private sectors agreed that the MGFHSA content was mostly suitable to local culture. In addition, they found the local content in the MGFHSA useful and informative for learning about Omani culture. Apart from some concerns with the design of the phones on which the applications were tested, the participant's citizens in both the public and private sectors rated the MGFHSA applications in terms of suitable content for local cultures MGFHSA applications got mean 3.90 scores. The MGFHSA application has got mean 4.02 scores when evaluated by the citizens in the private sector. In addition, The

MGFHSA application has got mean 3.81 scores when evaluated by the citizens in the public sector as illustrated in Table 3.Therefore these results explained why the MGFHSA application utilized in this test is suitable for learning local culture.

More Cultural Content: the users expressed their gratitude towards the cultural representation in the application, starting from the logo to the selection of the colors, which represents the local culture of Oman. However, they suggested to add extra cultural content, such as adding different background pictures of historical places of Oman.

Aesthetic value according to local culture

Table 4 Aesthetic value according to local culture of mobile "MGFHSA"

Heuristic Principle	Focus of Statement	Government (n=149)		Private (n=100)		Total (n=249)	
		Mean	Std.	Mean	Std.	Mean	Std.
Aesthetic value according to local culture	The animation follows local Arabic culture.	**3.75**	.922	**3.89**	.764	**3.81**	.863
	The text presentation is in accordance with local culture.	**3.98**	.826	**4.09**	.668	**4.02**	.767

Responded participant's citizens in both the public and private sectors fairly positively to the aesthetic values of the MGFHSA application interfaces. Which were seen to be in accordance with local culture. Apart from some concerns with the design of the phones on which the applications were tested, the participant's citizens in both the public and private sectors rated the MGFHSA applications in terms of aesthetic value according to local culture MGFHSA applications got mean 3.81 scores. Table 4 illustrates has got mean 3.89 scores when evaluating by the citizens in the private sector. In addition, The MGFHSA application has got mean 3.75 scores when evaluating by the citizens in the public sector. Therefore this indicates the importance of aesthetic value according to local culture.

Local Color: users stated that one of the main reasons people use mobile apps is because the pictures and graphics are appealing to the eye.

Local Motifs: Similarly, the visual aesthetics of the apps enticed users to interact with them.

The language use is for local culture

Table 5 the language use is for local culture of mobile "MGFHSA"

Heuristic Principle	Focus of Statement	Government (n=149)		Private (n=100)		Total (n=249)	
		Mean	Std.	Mean	Std.	Mean	Std.
The language use is for local culture	Local language is helpful for me in learning the local Arabic culture.	**3.99**	.862	**4.00**	.778	**3.99**	.828

Responded participant's citizens in both the public and private sectors fairly positively to the language use of the MGFHSA application. Apart from some concerns with the design of the phones on which the applications were tested, the participant's citizens in both the public and private sectors rated the MGFHSA applications in terms of the language used is for local culture MGFHSA applications got mean 3.99 scores. Which were seen to be in accordance with local culture. Table 5 illustrates has got mean 4.00 scores when evaluating by the citizens in the private sector. In addition, The MGFHSA application has got mean 3.99 scores when evaluating by the citizens in the public sector. Therefore this indicates the importance of the language used is for local culture.

Main Language use: the main language in the application is on the basis of the local cultural,

which is the Arabic language. Further, the application is using the English language as an extra option for the non-Arabic speakers.

The local philosophy has a local culture value

Table 6 the local philosophy has local culture value of mobile "MGFHSA"

Heuristic Principle	Focus of Statement	Government (n=149)		Private (n=100)		Total (n=249)	
		Mean	Std.	Mean	Std.	Mean	Std.
The local philosophy has local culture value	Local philosophy embedded reflects the local culture software	**4.11**	.801	**4.09**	.668	**4.10**	.735
	The local philosophical value is suitable for educational purposes for local culture	**3.99**	.862	**4.02**	.738	**4.00**	.8

Responded participant's citizens in both the public and private sectors were fairly positive concerning the potential for MGFHSA philosophical values to be embedded with local design motifs in the mobile application interfaces. The participant's citizens in both the public and private sectors rated the MGFHSA applications in terms of the Arabic culture and Islamic philosophy MGFHSA applications got mean 4 scores. Which were seen to be in accordance with Arabic culture and Islamic philosophy. Table 6 illustrates has got mean 4.02 scores when evaluating by the citizens in the private sector. The MGFHSA application has got mean 3.99 scores when evaluating by the citizens in the public sector. Therefore this indicates the importance of the Arabic culture and Islamic philosophy used is for local culture.

Local philosophical values: the main philosophical values while developing the application was embedding the main local values, which are the Islamic and Arabic content and design. This philosophy was noticed by the users of the application as reported.

5. Conclusion

The mobile government application was evaluated via heuristic evaluation process with the aid of participants from government and private sectors. Among the findings obtained in relation to this aspect of the research was the identification of the level of heuristic evaluation for the mobile application using descriptive analysis (mean and standard deviation). The results obtained from the end users' heuristic evaluation for all the items revealed high level overall mean average of 3.98, mean average of 3.94 from government sector end users, and 4.04 mean average from the private sector. Conclusively, the level of the heuristic

evaluation of the mobile application was high. The outcome of this study has implications for other relevant stakeholders. Among such stakeholders are mobile network providing companies, application developers, application and webpage handlers and to some extent firms investing in the provision of mobile government in Oman. These and other relevant stakeholders can ensure that they take into consideration the outcome of this study and its likes. For example, application developers should know that if users develop the perception of difficulty in using the application, it is likely to affect their acceptance of application. They should therefore ensure that mobile government applications are as easy in use as they could possibly be. That will instil positive perception about the application right from the outset. They more people perceive the apps as relatively easy in use the more will accept and put them to use. A comparison between citizens the place of work in the Government sector and Private sector their relationships with all the usability design principles including suitable content for local culture, aesthetic value according to local culture, the language use is for local culture, the local philosophy has local culture value and the local philosophy has a local culture value. These findings could be applied to other cultural contexts and mobile application products in various countries.

6. Acknowledgement

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