

## M-Ibadah Pro Application Development for Older Adult Users

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**Abstract:** Older adults are the generation that shows large number of increase in Malaysia by 2030 whereas, it is predicted that 15% of Malaysian population is older generation. As Malaysia comprises majority Muslims community, therefore, it is believed that spirituality plays an important role in shaping older adults well-being and the advancement of recent mobile application technology can provide a solution for this issue. A series of workshop and interview session was conducted with 15 older adult users to explore older adults' requirement for spiritual mobile technology. Based on feedback gathered from the participants, an apps called M-Ibadah Pro was developed to assist older adult users in performing daily Islamic religious activities by using mobile application. This apps contain six main modules which are Doa Collection, Prayer Time, Kiblah Locater, Hadith 40, Hijri Calendar and Zikr Counter which was developed by using Android platform. This study aims to enhance previous M-Ibadah apps by adding two more modules which are Hijri Calendar and Zikir Counter. The new version known as M-Ibadah Pro applies text resizing features, language, simplicity, audio and video, use of color and application design to tailor the older adult users' need.

**Keywords:** User experience, elderly, spirituality, techno-spiritual

### 1. Introduction

Since few years ago, ageing has become an international agenda. It is predicted that the rate of population ageing in the 21<sup>st</sup> century will exceed the previous century, whereby, the number of older people has tripled since 1950 and the projected number is 2.1 billion of older adults by 2050 [1]. In Malaysia, it shows a sharp increase of older adults population by 2030 [2]. Dasar Warga Emas Kebangsaan, [3] has stipulated that age 60 years old and above is define as older people in Malaysia.

With the significant size of older adults in the near future, it is important for us to see them as a large-scale user group for technology. In the past few years, a variety of Islamic religious applications has been developed by mobile developers to cater the needs of the Muslim community worldwide. These applications facilitate many Islamic religious rituals and practices such as Mobile Prayer Reminder to remind the user of the five prayers in a day; Mobile Quran for the reciters and as reference; Mobile Qiblah Compass which allows its users to synchronize the Qiblah by always facing Kaabah in the city of Mecca; and also Mobile Zikr Counter to prompt its users of how many times they have already recited the Zikr.

Currently, as can be seen from the Google Play application store, most applications on Islamic religious practices provide information for general category of users. Most mobile applications had not been designed with older adult users in mind and eventually make them avoiding the technology. Although older adults perceive to turn into spirituality as they aged; stated by scholars as 'gerotranscendence' (Tornstam, 1997), however there are no Islamic religious applications that are purposely designed to tailor older adults' needs and interest. Therefore, this research aims to uncover the following questions: 1. How to consolidate a single application that covers few important Islamic Practices from the perspectives of older

adults? 2. How the older adults' preferred elements discussed in previous study can be embedded in the deployment of M-Ibadah?

## 2 Older Adult Users and Mobile Technology

### 2.1 Technology Bridges Gap in improving Older Adults Quality of life.

The relations of spirituality and older adults have been investigated in quite a number of studies especially in the area of how spirituality can contribute towards the successful ageing of older people. In fact, few studies have recognized spirituality as one of the elements for successful ageing instead of physical, mental and social well-being [4]. Tornstam [5], relates ageing with spirituality known as Gerotranscendence (GT) Theory which claims that ageing is characterized by 'a shift from a materialistic and rational view of the world to a more cosmic and transcendent one, normally accompanied by an increase in life satisfaction'.

Therefore, with the rapid development of Information and Communication Technology (ICT) especially the mobile technology industry, it is an urge to develop technology to support the functional independence to support aging-in place of older adults [6]. Spiritual mobile applications are seen as a tool which can contribute towards successful aging and independence of older adults [7]. In fact, there are lots of spiritual mobile apps in the market, especially for Muslims such as the mobile Quran, mobile Adhan/Prayer Reminder, Zikr Counter, Islamic Calendar, Qiblah Locater etc. However, innovation in mobile apps often ignored needs and limitation of older users [8] that eventually unease older people from using new technology [9]. Therefore, there is an urge in developing spiritual mobile applications from the perspective of older people to ensure mobile app-acceptance among older people.

### 2.2 Spiritual Mobile Apps

The proliferation of mobile apps has drawn the attention of researchers to investigate on the impact of their development and use within digital culture. The use of mobile media and social culture resulted in the rise of spirituality and mobile culture context. Scholars reported individual and communities start using mobile media and apps for spirituality or religious purposes [10]. Besides, the study of spirituality in technology, or 'techno-spiritual' has also well-known and deem important within the community of Human-Computer Interaction (HCI) researchers. Based on the literatures, there are several scholars proposes a model of unique categories for spiritual mobile apps. Wagner [11] at first presented an initial categories of spiritual apps used for spiritual experience and identity formation on iTunes. The scholar proposes six categories of spiritual apps which are prayer apps, ritual apps, sacred text apps, religious social media apps, self-expression apps, and meditation apps. However, the categories are quite selective in which the categories were based only on the spirituality apps that were used to build spirituality identity, authorship and authenticity. Campbell [12] next extended Wagner's model by proposing broader spiritual apps typology. There are two categories of spiritual mobile applications which are Apps oriented around religious practice and Apps embedded with religious content. The details of spiritual mobile apps are explained as following:

***Category 1: Apps oriented around religious practice***

• ***Sacred Textual Engagement***

Sacred textual engagement apps is about sanctified texts for specific religion such as Al-Quran. It includes as well any tools that provide connections or resources to the holy texts of particular religious tradition.

• ***Prayer***

Prayer apps is associated with apps that facilitate human in performing prayer. It includes also multiple form of assistance such as prayer by reading text from apps, listening to audio prayer and typing in prayer request.

• ***Focus/Meditation***

Focus/Meditation apps provides images, sounds, zikr to perform religious meditation. Meditation and focus can be elaborate as somebody's practice involving contemplation towards higher power in order to better the self.

• ***Devotional Worship***

It is about apps which is related to sacred text, and the design aims to facilitate spiritual practices. This apps usually contain image, uplifting quote or commentary.

• ***Ritual***

Ritual apps provides medium for specific particular religion to practice their act of worship. This category is not suitable for adherents of Islam because Islam does not contain certain rituals to its followers except for the pillars of Islam.

***Category 2: Apps embedded with religious content***

• ***Religious Utilities***

Religious utilities apps is related to specific religious that were used to assist users perform specific religious practices, for example to find mosque or remembering prayer reminder. This apps provide support and could be as reminder during in an offline setting.

• ***Religious Wisdom and Leaders***

Apps in this category offers information about religion from key religious leaders who have books, lectures and saying to provide insight for religious life.

• ***Religious Media Outlet***

This category of apps are linked to media products produced either by religious institutions, organizations or other media channel that offers religious content. There are also apps that were linked to website such as the online sermon or radio.

• ***Religious Games***

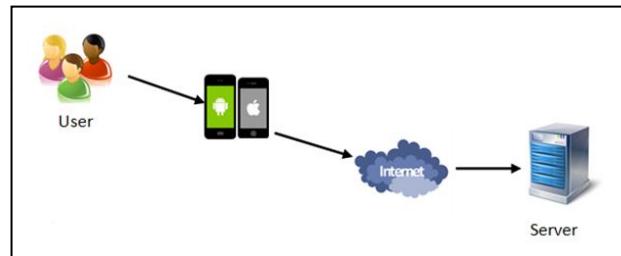
Religious games apps is about playing mobile games that educate users regarding rituals, text, history, tradition or rules. Example of apps for this category is such as Islamic Kids Quiz, or by using artwork and audio to tell kids stories from Al-Quran.

• ***Religious Social Media***

Apps in this category can be defined as specific social media developed by religious institutions or organization for use by members. Religious social media allow people to build connection as well as asking and answering about their religion by sharing text and comments.

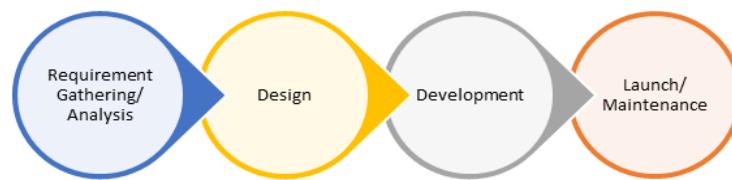
### 3 M-Ibadah Pro Mobile Apps Development

The following Figure 1 depicts the mobile application development framework for M-Ibadah Pro.



**Figure. 1.** Mobile Application Development Architecture

The development of M-Ibadah Pro application is based on Mobile Development Life Cycle (MDLC) as depicted in Figure 2. There are four phases involved in the development of the application which are requirement gathering and analysis, design, development and launch with maintenance.



**Figure. 2.** Mobile Application Development Lifecycle

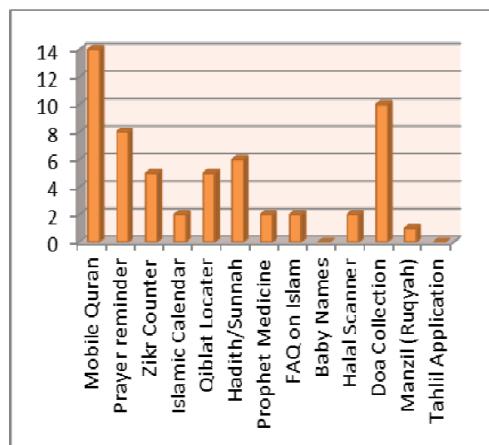
**Requirement Gathering/Analysis.** Older adults requirement for the mobile apps development have previously been collected with 15 older adults participant from Kompleks Warga Emas Shah Alam, Selangor, Malaysia [13]. Quran Bahasa Melayu apps was used in order to get the information about spiritual mobile application. The participants profile is as depicted in Table 1.

**Table 1.** Participant's Profile

<b>Id</b>	<b>Age</b>	<b>Gender</b>
P1	68	Male
P2	61	Female
P3	67	Female
P4	70	Female
P5	74	Male
P6	61	Male
P7	65	Male
P8	68	Female

P9	61	Female
P10	63	Male
P11	63	Female
P12	60	Female
P13	63	Female
P14	72	Male
P15	74	Female

A serial workshop was implemented at the complex which the goal is to give exposure to the older adults on using spiritual mobile applications. The older adults were presented with a montage presentation, spiritual mobile apps video demo and also a short training. Before end of the workshop, all the older adults' participants were interviewed by the researcher one by one to obtain their experience and opinion using the spiritual apps. The detail procedures and data gathered from the workshop has been discussed thoroughly in the previous article [13]. As depicted in Figure 3, the list of common spiritual apps as discussed in Section 2.2 were ranked based on the data gathered from the interview session with older adult users. The following figure shows result by ranking of spiritual mobile apps. The most important spiritual mobile apps for older adults are mobile Quran, doa collection, prayer reminder, hadith/sunnah, kiblah locator and zikr counter. Based on this result, the M-Ibadah Pro apps were developed tailored to older adult's need.

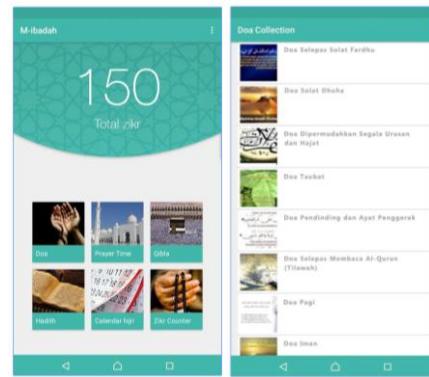


**Figure. 3.** Analysis from User Interview

Instead of collecting data about list of spiritual apps preferences among older adults, the requirements of spiritual mobile apps for the older adults were also investigated. The following Table 2 are the results of user requirements for spiritual mobile apps development which have been discussion in previous article [13] stipulated in table form.

**Table 2.** Result of Older Adults Requirements

<b>Older Adult users Comments for Spiritual Mobile Apps</b>
Should have a function that can resize the font suitable for elderly that have short-sighted and long-sighted
Better use Bahasa Melayu compared to other languages, easier to understand
Use of color is important especially to highlight tajweed and look more attractive
No need so many functions, it can make the elderly confuse
Tablet PC screen is big and the lights helps me to see the text clearly. Easy to bring anywhere
I like applications that have audio, it helps me to gain more attention
For Quran applications, it is good to provide video as I can see the reciter correct pronunciation
It is good to have the image, I want to see the reciter face
Translation makes me happy to use the application
The Tablet PC screen is too sensitive
Virus notification is so irritating
Put together all important applications in only one application. Easy for us, just one single click



**Figure. 4.** M-Ibadah Pro Main Interface and Doa Collection Module

The development of M-Ibadah Pro apps were done by considering all the comments and suggestions gathered from the older adults.

**Design.** The app's design considers the input gathered from an interview session with 15 older adults from Kompleks Warga Emas Seksyen 24, Shah Alam. Results from the interview [13] identifies few important elements needed by older adults in their app such as simplicity, language use, text resizing functions, colour, mobility and also usage of multimedia elements. The older adults also requested an Islamic app that can act as their ibadah kit by combining several priority Islamic modules into only one application rather than one application for one module. Therefore, the M-Ibadah application contains four Islamic modules which are among high ranking apps in previous studies [13] including Hadith 40, Waktu Solat, Himpunan Doa and Kompas Qiblat.

**Development.** The development of the M-Ibadah application on Android platform was done by using Brackets, Cordova and easy PHP development tools. The M-Ibadah Pro apps consists of six main module such as Doa Collection, Prayer Time, Kiblah Locater, Hadith, Hijri Calendar and also Zikr Counter. Figure 4 illustrates the main interface that consists of six modules in M-Ibadah Pro that reflects the results gathered from older adults in previous section.

Figure 4 shows a collection of daily doa module. Each of doa selection was displayed horizontally and continuously. Title of the doa is in Bahasa Melayu to make sure it is easy for the muslims older adults to choose the doa based on their mother tongue language. For those who wants to listen to a specific doa can select the doa, then, automatically the doa video including the Arabic word and the recitation will be displayed in a new window. User is allowed to resize video resolution, pause and stop the video.

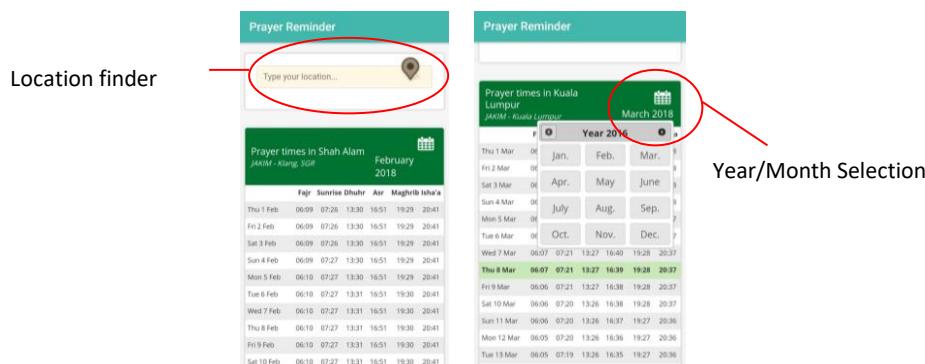


Figure 5. Prayer Time

The above Figure 5 shows prayer reminder module. Daily day and date, together with Fajr, Sunrise, Dhuhr, Asr, Maghrib and Isha'a prayer time will be displayed on the screen. Besides, user can enter their location for example, 'Shah Alam' and the apps will automatically find the prayer time for the stated location. Other than that, the user can also search the prayer time for specific location either by year, month or both of it. Current prayer time will be highlighted in light green colour.

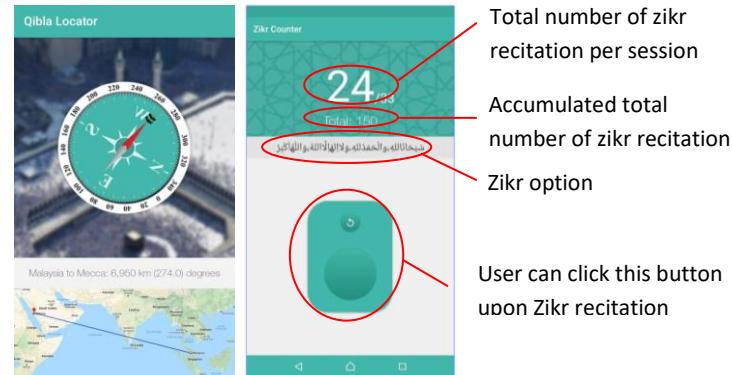


Figure. 6. Qiblah Locater and Zikr Counter Modules

Another module is qiblah locator as shown in Figure 6. This module allow users to get the precise qiblah direction from their current location. The compass will automatically redirected to qiblah and helps Muslims to find qiblah direction all around the world. The direction of Kaaba in Mecca (Makkah) is pointed out with an arrow on the map, so that user can adjust their direction before start the prayer. In addition, the user do not need internet connection in order to find where the qiblah is.

Next module is the zikr counter. This module as shown in Figure 6 provides a digital version of tasbih that helps Muslims zikr activity. Zikr counter is a simple app which allows elderly user to count tasbih activity. On top of the apps, there will be an indicator showing the total number of zikr recitation per session and also the accumulated total number of zikr recitation by elderly user. Elderly user can also choose zikr option either *Subhanallah*, *Alhamdulillah*, *Lailaha illallah* or *Subhanallah walhamdulillah wa lailaha illallah*. There is also a count button on the screen mimicking the manual counter device. Elderly user can press the count button on the screen to start counting and press reset button to reset counter.

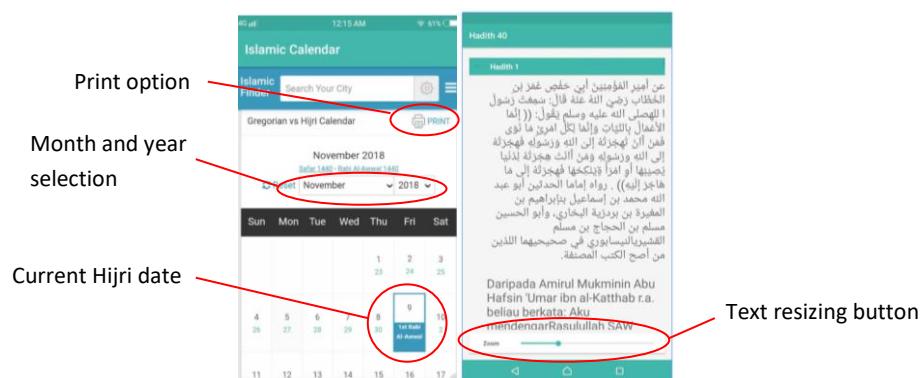


Figure. 7. Islamic Calendar and Hadith Modules

Figure 7 depicts an Islamic/Hijri calendar module. This module presents a lunar calendar consisting of 12 months in a year of 354 or 355 days [13]. It is used in Muslim countries to determine the proper days of Islamic holidays and rituals. In this module users can view current date in Hijri Calendar. Users however are allowed to select the Hijri date based on month and year selection. Besides, there is also print function whereby user can view the total of 12 months of Hijri calendar in one sheet of paper and print it.

The other module in M-Ibadah Pro is Hadith 40. Hadith 40 is a compilation of forty hadiths by Imam al-Nawawi, most of which are from Sahih Muslim and Sahih al-Bukhari [14]. Users can view each of the hadith from Hadith 1 until Hadith 40 by clicking on the title selection.

The zoom function in this module is very meaningful for older adult users as they can resize the text based on their preferences.

**Launch & Maintenance.** The final phase in MDLC is the launching of the mobile apps in an Android platform. There are several steps that should be completed before the apps can be published. Firstly, the developer need to have an account to allow the app to be registered in Google Play. Developers should enter basic information about the apps and prepare the final version of the app with .apk format. Secondly, pay the registration payment to Google payments and once the registration is already verified, the developer will be notified through an email account. Thirdly, the developer can upload the application file by using the Google Play Developer Console and the application is finally available in Google Play Store. M-Ibadah Pro apps was launched on December 2017 and currently both version of this apps (M-Ibadah and M-Ibadah Pro) has already achieved more than 100 downloads.

#### 4. Conclusions

The increasing number of older people population worldwide especially in Malaysia makes it essential that older people remain independent and maintain their wellbeing in their old age. Spiritual mobile application undertakes to assist older people in fulfilling their spirituality practices such as reminder for daily prayer times, giving guidance on doa and hadith compilations and also tools for locating qiblah at ease. The development of M-Ibadah Pro apps is believed to provide significant contribution for Muslim older adult users since the designing part of the apps takes into account older adults requirements starting from the initial stage. Older adults' requirement which was gathered from previous study is used as a guidance and principal of M-Ibadah Pro apps. Although mobile Quran is one of the spiritual apps that is indispensable for the older adults but there are several constraints in developing the module in M-Ibadah Pro. According to INFAD scholars, developers need to get approval from Malaysian authority (Ministry of Home Affairs) to publish any Quran apps in this country. The application should also be reviewed by the *lajnah tasheh* to ensure that there is no error in each verses. With the time constraint to complete this project within the grant time frame, therefore, the Quran module cannot be developed. This research in fact provides an insight about older adult's challenges and difficulties in using mobile apps. The researchers especially from Human Computer Interaction field are urge to further study on ways to improve mobile applications design and interfaces to tailor older people's needs and desire. Currently, the M-Ibadah Pro apps is only available on Android platform and in the near future, we plan to deploy this application on iOS platform as well, so it could benefit older adult users to carry out Islamic practices by the assistance of ubiquitous mobile technology.

#### 5. Acknowledgements

The work described in this paper has been fully supported by the Geran Penyelidikan Bestari UNISEL GPB-UNISEL17/ST-18 project. Special thanks to Universiti Selangor (UNISEL) and also older adult participants from Kompleks Warga Emas, Seksyen 24, Shah Alam, Selangor, Malaysia for their willingness and cooperation in this study.

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