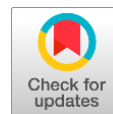


Guidelines for developers when developing an Islamic mobile app: A conceptual framework



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Abstract Islamic mobile apps are one of the most popular and have achieved the highest downloads in the app store. As it relates to holy religious content, several factors need to be considered, particularly in its development. During the app's development, credibility, authenticity, and accurate information are crucial in any religious app, which is trustworthy and good-quality Islamic mobile apps. To produce this type of app, app developers, particularly Muslims, need to have certain values or ethics when developing Islamic apps. Good internal aspects of a Muslim app's developer will show in their behaviors and deeds, which can be associated with Islamic work ethics. Thus, this paper aims to produce a conceptual framework that can be used as guidance for a Muslim app's developer. Activities such as literature reviews and semi-structured interviews have been used in developing the conceptual framework. By the end of the activities, the framework had been developed. The guideline criteria were derived from two points of view, internal and external, as discussed in the model of human nature by Al-Ghazali, which has been selected as the base of the study. Then, other criteria were determined to fix both internal and external aspects to develop the initial framework. The criteria for Islamic working ethics were referred to as *al-birr* and *masuliyah* for the external aspect and *taqwa* and *ihsan* for the internal aspect. In addition, since internal aspects were related to internal spirits, which may relate to the emotional and spiritual intelligence of a Muslim, this study also proposed the use of the Al-Fatihah chapter as a prominent guide in the framework. It is hoped that the guidelines can be useful for Muslims who are developing Islamic mobile apps.

Keywords: mobile apps, muslim, Islamic content, apps developer, Islamic work ethics

1. Introduction

Mobile technology is defined as a technology that goes where the users go and is accompanied by internet-enabled devices such as smartphones, tablets, or watches (International Business Machines (IBM) Corporation, 2020). It is undebatable that the availability of mobile technologies has transformed a learning process to be more sophisticated and easy, which also applies to Islamic learning processes (Abdullah et al., 2019; Khan & Shambour, 2018). In 2014, Campbell et al. (2014) discovered that there are 107 apps related to Islam in the iTunes App Store, which are categorized as Reference, Education, Utilities, Entertainment, Games, and Books.

Unlike other contents, any religion-matter content is sensitive since the content may involve someone's beliefs and worship, as well as for Islam (Buie & Blythe, 2013). For example, the apps developed for Islamic learning content must be effective for the learners to master and at the same time exhibit genuine, authentic, and accurate learning content to the learners to avoid misunderstandings and wrong interpretations (Hameed et al., 2019; Yusoff, 2012). Nonetheless, there are several issues about Islamic mobile apps that need attention among Islamic mobile app developers. Instead of high demand (Hamzah et al., 2019), there are Islamic apps that have been developed poorly and in bad quality (Abdul Manaf et al., 2015). Several researchers have found a lack of reliability and authenticity in the content available online that can mislead mobile apps' users (Bellar, 2017; Hameed et al., 2019). Hameed et al. (2019) highlighted highly sensitive issues about the app's content authentication, credibility, and reliability. Furthermore, there are too few developers who share the originality and authenticity verification of the contents of Islamic mobile apps in the Google Play Store. Therefore, the credibility, authenticity, and accuracy of Islamic apps' content prepared during the process of development are crucial, and more importantly, the apps succeed in increasing understanding of Islam for any learning, education, or reference apps (Abdul Manaf et al., 2015; Hamzah et al., 2019). Islam teaches its believers to always have good intentions in doing or working for something, which is closely related to the belief of *'aqidah* and the practices of Muslims in their daily lives, as all the deeds will be appraised by Allah SWT (Rofie, 2015). Therefore, to deliver good-quality Islamic app, it is essential for Islamic content apps developers, especially Muslim app developers to have certain qualities in developing Islamic learning content, whereby the developers need to rectify and sustain good intentions along with the processes of app development. For example, the



contents developed in the Islamic apps need authorization for utilization from a trusted Islamic-related organization, individual, or developer (Hakak et al., 2017; Hassan & Khairuldin, 2019). Working as a software developer to develop a mobile app is not an easy task when it involves religious content, which is bound by some rules and regulations (Buie & Blythe, 2013), especially when the person gets involved with a project for the development of Islamic-based mobile apps. Besides producing an Islamic mobile app that is attractive, interactive, and capable of attracting millions of app users, the software developer will have the greatest duty to deliver what is accurate about Islam. Hence, shariah-compliant working ethics are highly demanded. Without Islamic work ethics instilled in each Muslim developer, he or she may develop an Islamic mobile app, which is unconfirmed and endangered in Muslim society '*aqidah* and *ibadah*'.

There are a variety of Islamic apps available in the apps store, whether they are from Android or Apple, that are characterized by several types of purposes, such as tajweed learning, Quran learning or reading, supplications (*doa* and *zikr*), zakat, pilgrimage (*hajj* or *umrah*), and other important information regarding the Islam religion (Ghembaza et al., 2018). According to Hameed et al. (2019), the most downloaded Islamic apps are related to Quran apps. Usually, the Quran apps provide information on recitations, translations, and recitation styles with many functions to facilitate learners or readers, such as bookmarks, font (verses) selection, font size selection, and background color selection (Quran Explorer, 2020). Previous studies also discussed the potential of tajweed learning mobile apps in helping users learn tajweed attractively, everywhere, and anytime (Fajarianto & Sensuse, 2013; Mahzan et al., 2019). Pilgrimage mobile apps are also popular among users as well as developers (Al-Aidaros et al., 2013). Besides information regarding the actual pilgrimage while performing *hajj* or *umrah*, such as locations detector, the information, *doa*, and *zikir* to be understood and knew are also crucial. The mobile apps are used to serve the users with all the information they need.

There are many other Islamic mobile apps, such as Islamic mobile banking, which helps boost mobile banking as overall (Syed et al., 2017); pregnancy information for Muslims women based on science and Islamic both baby and mother development (Osman et al., 2013); fasting (Fathi et al., 2019); inheritance (Zulkifli et al., 2018); and others. Islamic mobile apps have enormous potential to facilitate Muslims' lives while practicing religion. Several characteristics need to be considered when developing Islamic mobile apps. The authenticity of the Islamic contents is crucial since the apps are related to religious content (Hameed et al., 2019; Khan & Shambour, 2017). The information in the app must be confirmed by the expert about the accuracy of the app description, quality of information, quantity of information, visual information, credibility, and evidence base (Alquwayfili et al., 2013; Hakak et al., 2017; Hassan, 2019). Trusted content increases users' downloads on the apps, and more importantly, the information or facts are accurate to avoid misunderstandings or malpractices of the *ibadah*. Besides that, the apps also need to meet certain criteria to be considered good, which similar to the other mobile apps. Previous studies have found that functionality (Elazhary, 2017; Kong et al., 2019); visual aspects (Fathi et al., 2019); and engagement (Khan & Shambour, 2017) are the factors needed in any quality mobile app.

To date, there is extensive research and reports to guide software developers in developing good-quality and high-standard mobile apps (Kaur, 2018), but this is limited from a religious point of view (Buie & Blythe, 2013; Campbell et al., 2014). Therefore, this paper is intended to propose a distinctive framework that is suitable for Muslim mobile app developers when they are involved with a project of Islamic mobile app development, with the objective of determining the factors required for producing a good Islamic mobile app. From the Islamic perspective, the person who develops the Islamic mobile app, is not just a mobile app developer; they are also a preacher, a person who is responsible for conveying the truth about Islam, which is something knowledgeable and useful for *ummah* (society). The work ethic of Muslim mobile app developers is certainly centered on their responsibility to Allah, themselves, and the public. They should and must practice being good Muslims in designing and disseminating these Islamic mobile apps, whose ultimate goal is just to seek the pleasure of Allah. No matter what form of mobile app development they will experience, the true nature and ethics of life as a Muslim must remain dormant and practiced.

2. Methods

The crucial part of the study is to determine a set of Islamic work ethic practices and high-quality app content guidelines or criteria for its development. Therefore, the set will be determined in this phase. These sets were collected through a literature survey and a series of structured interviews with mobile app developers and Islamic scholars. Certain activities were employed in the literature review to gather the needed information. On the other hand, for the semi-structured interview, thematic analysis was used.

2.1. Review the Literature

After confirming the research problem, the process of proposing guidelines for developers when developing Islamic mobile apps was initiated, starting with information gathering from previous relevant literature. Topics related to mobile apps, Islamic mobile apps, criteria, and techniques used in the research related to Islamic mobile apps were covered. Based on the information gathered, identification of Islamic mobile app development was performed, as were the criteria for the developers. Not only covers the criteria of quality Islamic mobile apps, but as a developer, particularly Muslim, you also need

to comply with Islamic working ethics to truly be a practicing Muslim. Figure 1 below shows the topics highlighted in the study. However, in general, the literature review activities were adapted from Sarif (2011) and Mohamed Noor (2021), as the reviews are prominent to understand and determine the initial crucial criteria of Islamic ethics for developers as well as mobile app content development for Islamic mobile apps. Figure 2 shows the activities involved in the literature review process in helping to determine those criteria as aforementioned. Besides the literature review, a semi-structured interview by experts also helped with the completion of the criteria determination in this phase.

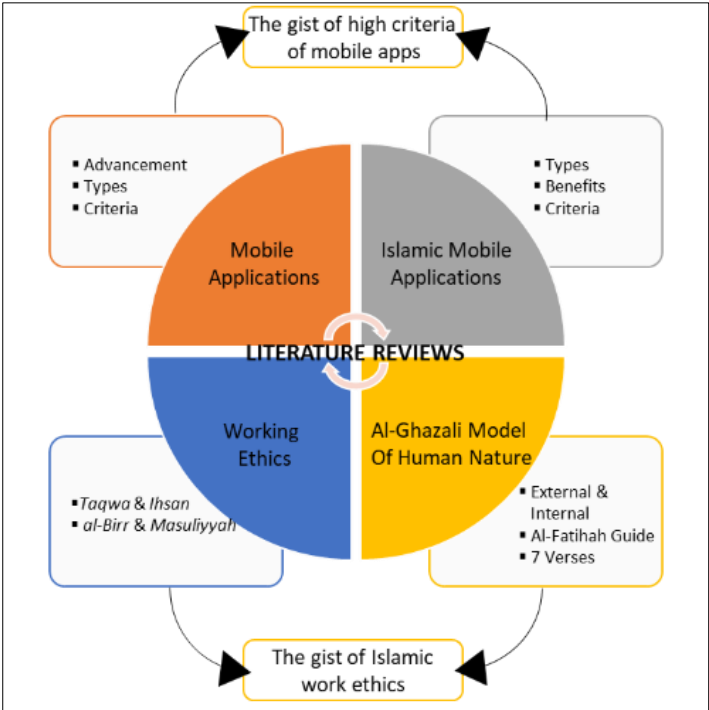


Figure 1 Topics Reviewed in the Study.

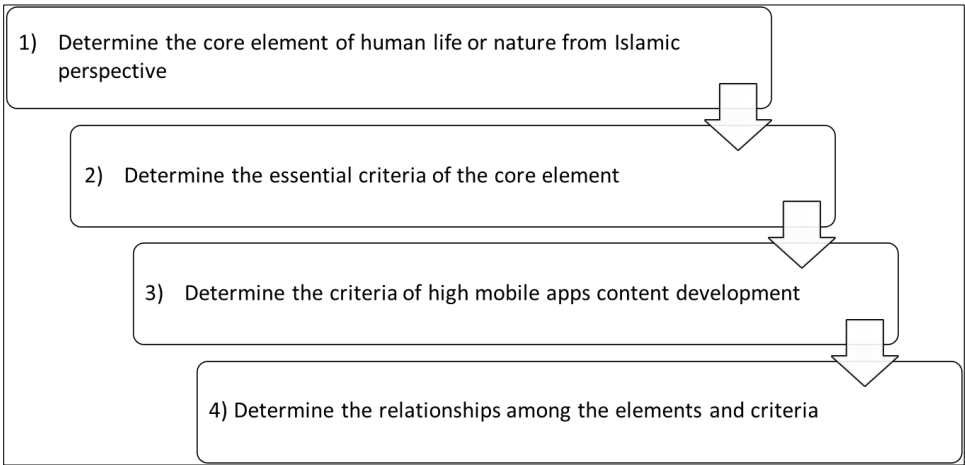


Figure 2 Literature Review Activities.

- a) Determine the Core Element of Human Life or Nature from Islamic Perspective
- The overall comprehension of human nature is important to this study to ensure the foundation of the proposed framework. Even though there are myriad components of a foundation or core that can be used, this study adapted the basic model of a human being as outlined by Al-Ghazali, a well-known Islamic theologian (Sarmani & Ninggal, 2008). An initial understanding of the model was used as the framework foundation, as depicted in Figure 3. External aspects are described as all the inputs from the real world or environment, such as any physical, sensory, or behavioural actions; meanwhile, internal aspects cover the internal spirits, which might be interconnected to the emotional and spiritual intelligence of a Muslim (Rahman & Shah, 2015). Since the focus of the study is related to Islamic mobile apps, working ethics, developers, and development guidelines, both internal and external aspects were modified based on the focuses.



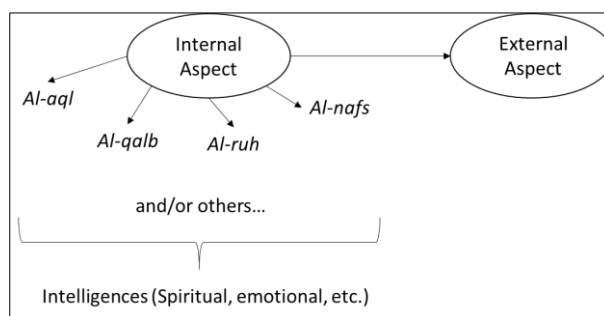


Figure 3 Initial Understanding of the Al-Ghazali Model of Human Nature for the Study.

b) Determine the Essential Criteria of the Core Element

Based on the model of human nature by Al-Ghazali as discussed above, an initial framework for Islamic mobile app development guidelines for developers was detailed out as depicted in Figure 4. The internal and external aspects emphasize the ummul kitab of the Quran, Al-Fatihah, as the guidelines. This chapter is known as a basic guide in Islam; it contains seven verses, covers the whole meaning of the Quran, and revolves around aqidah, ibadah, and life advice (Khalid, 2004). This study categorized those seven verses of Al-Fatihah into intention (verse 1), gratitude (verse 2), compassion (verse 3), repentance (verse 4), integrity (verse 5), hope (verse 6), and improvement (verse 7) based on Agustian (2005) and Sayyid Qutb (2012) translations and descriptions. Basically, these aspects are important to a Muslim, as are the developers, in view of the fact that the scope of this study is for Muslim developers. Al-Fatihah is the 'Ummul Quran' for the book. The chapter is crucial and needs to be recited at least 17 times in a day; without reciting it, a prayer is invalid. This seven-verse chapter is a great deal for the core, basic, or central idea of Islam, beliefs, and concepts that can outline the perceptions and attitudes demanded by Islam (Sayyid Qutb, 2012). For that matter, the verses have been critically interpreted in many areas and uses, such as mental health (Ali et al., 2018; Julianto, 2019; Julianto & Subandi, 2015; Widodo & Triana, 2020), internal (*ruh*) development (An-Nadwi, 1994; Muhammad, 2017), and management (Abdullah et al., 2016). Besides that, as mentioned in the second objective, a set of high-quality mobile app content development guidelines was also determined, as elaborated in the next section.

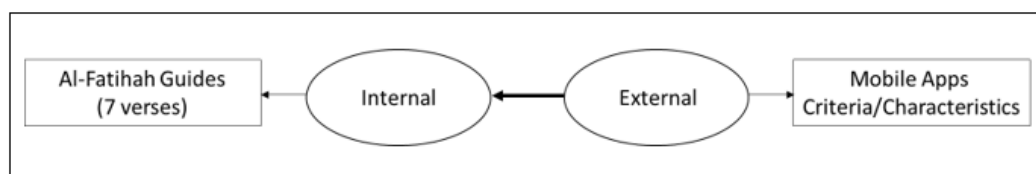


Figure 4 Initial Core Conceptual Framework for the Study.

c) Determine the Criteria of High Mobile Apps Content Development

It is a must to determine the criteria of high mobile app content development guidelines that can facilitate Islamic mobile app development for the developers. Therefore, a set of mobile apps for content development was determined. Engagement, functionality, aesthetics, information, and subjective quality were preliminary determined as the mobile app criteria or characteristics (Ahmad Mustaffa et al., 2020; Al-Ratrout et al., 2019; Alquwayfili et al., 2013; El-Khalil Ghembaza et al., 2018; Elazhary, 2017; Fajarianto & Sensuse, 2013; Hameed et al., 2019; Hamzah et al., 2019; Huraimel et al., 2007; Ishak et al., 2017; Khan & Shambour, 2017; Lestari et al., 2019; Mat Sharif, 2019; Musa et al., 2018; Noordin, 2013; Sugiyanto & Purwanto, 2017) as stated in Figure 5. These criteria were derived from the Mobile Application Rating Scale (MARS) from Stoyanov et al. (2015). There are many other criteria that can be fitted into the development guidelines; however, those aforementioned criteria were selected as previous studies discussed the capability of mobile apps and how success can be achieved by highly considering those criteria (Ahmad Mustaffa et al., 2020; Khan & Shambour, 2017; Stoyanov et al., 2015). Nevertheless, all the criteria will be analysed for several stages to obtain the desired result for this study.

d) Determine the Relationship among the Elements and Criteria

All the determined criteria were associated into a relationship to show its connectedness, as well as to facilitate the process of further analyses in statistical form based on the foundation of the framework, the human nature model by Al-Ghazali, and the criteria of mobile app content development. Basically, the preliminary framework proposed for the study is shown in Figure 6. Next, a structured interview was conducted among experts in Islamic studies and mobile app developers to confirm the criteria before further analysis was conducted to achieve the third and fourth objectives of the study.

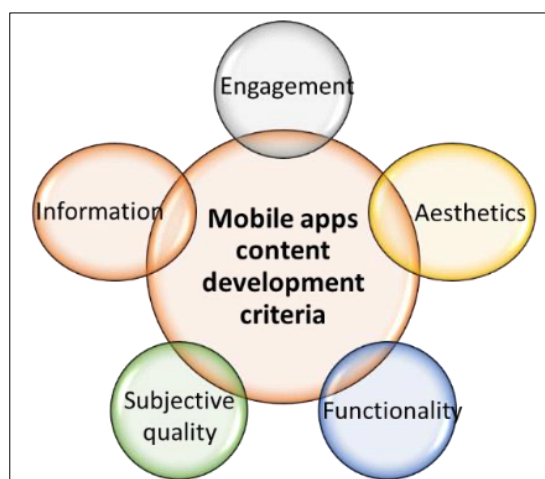


Figure 5 Initial Criteria of Mobile Apps Content Development Guidelines.

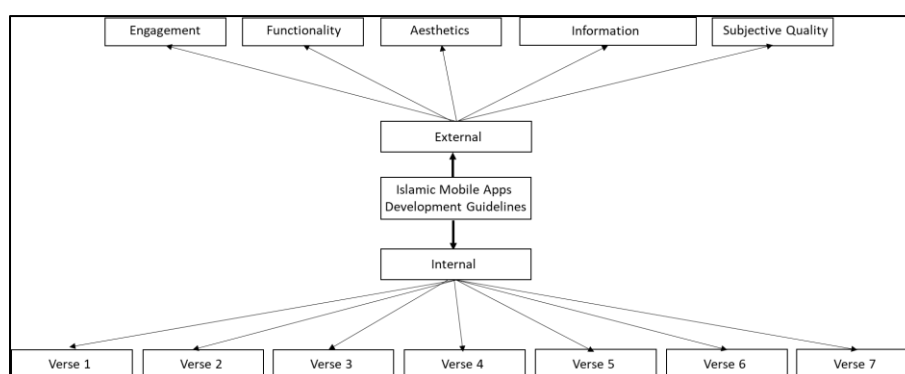


Figure 6 Early Determination of Criteria and Relationship of the Framework.

2.2. Semi-Structured Review

A structured interview is a way of collecting information from people with pre-determined questions in mind (Sekaran & Bougie, 2016). It is a powerful method of collecting data from focused respondents (Becker et al., 2017). Even though researchers tend to employ unstructured interviews as the method permits freedom in question query and more in information gathering, structured interviews provide uniformity in question query, require fewer interview skills for a beginner researcher, and avoid loss of direction (Kumar, 2006). Hence, a semi-structured interview has been conducted for this study. Similar to the structured interview, the semi-structured interview gives the interviewer the freedom to exercise a predetermined question in depth, following the answers from the interviewee (Hair et al., 2007). Mobile app developers and then experts in Islamic studies were involved in the interview. The mobile app developers must have a minimum of five years of experience in mobile app development in any area. Meanwhile, a few criteria of the Islamic studies expert were referred to as below, adapted from Sarif (2011):

- i) an expert is in the Islamic study or Islamic work ethics field or;
- ii) a PhD holder or;
- iii) has experience in the field more than five years and;
- iv) actively involved in seminars, consultations, or formal/informal lectures as a speaker related to the field and;
- v) has knowledge related to Islamic working ethics, Islamic studies, Islamic education, and technological learning or application, or, any related area to this study.

The purpose of this semi-structured interview is to acquire suggestions and recommendations on the determined attributes, factors, and relationships, as well as the overall initial framework that has been previously determined. Three mobile app developers were interviewed first to give any suggestions about the criteria for mobile app content development. Then, three Islamic scholars were interviewed to give any recommendations for the overall framework criteria pertaining to Islamic mobile app development and work ethics. The interview sessions were completed in two ways: face-to-face meetings and electronic mail (e-mail) in 2019. The session first started with a brief explanation of the problem, objectives, and reason for the structured interview. Then, several predetermined questions were asked of the experts. The experts in mobile app content development were asked questions related to the criteria of information, functionality, aesthetics, engagement, and

subjective quality. In addition, a set of descriptions for those criteria were also disclosed, as described in Stoyanov et al. (2015) and Khan and Shambour (2017). Figure 7 indicates those descriptions.

Apparently, all developers' experts agreed with the initial criteria determined in the study, except for the subjective quality. The criterion was removed since the questions were related to a certain mobile app that has been developed and has been used by users for a while. Thus, it was irrelevant since guidelines and criteria were the main focus of this study. Even so, the experts, particularly the developers, concluded that, even though there are tremendous criteria or descriptions available, the determined criteria are valid and highly recommended for any mobile app content, including Islamic-based content mobile apps (Khan & Shambour, 2017). Furthermore, the criteria will be further analysed in the next phases.

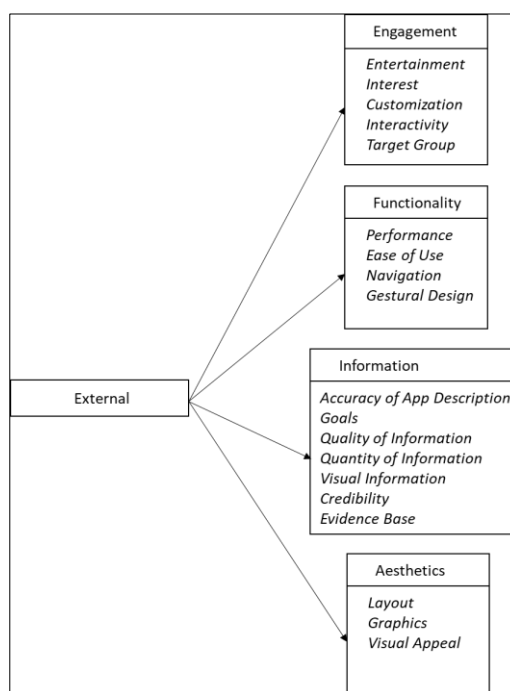


Figure 7 External Criteria Descriptions for the Framework.

After that, three Islamic scholars were involved in the later interview to assess and give suggestions related to overall criteria since the study is related to Islamic working ethics. In brief, the questions were related to Al-Fatihah's seven verses of translations, descriptions, and also the working ethics of Islam. The seven verses of Al-Fatihah were discussed verse by verse, and the questions and answers were expanded to find a conclusion within the initial framework of the study. As the study was mainly focused on Islam, the mobile app criteria were also assessed by Islamic scholars. Therefore, of the 63 descriptions or items, only 57 remained that were relevant to this study. Either the descriptions or items were removed or rearranged. For Al-Fatihah, since there were many inputs, thematic analysis was used to obtain the findings from the interview with the Islamic scholars. The discussions are as below:

a) Become Familiar with the Data

This step is to familiarize yourself with all the information gathered from the interview, which means immersing yourself in the data reading and re-reading to highlight the potential outputs from the data (Braun & Clarke, 2012; Maguire & Delahunt, 2017). Therefore, thorough listening to the interview and some rough notes were made to ensure no important or possible outputs were left behind. Below are some examples of early and rough notes obtained in this step:

In relation to Al-Fatihah's first verse, the experts seem to agree that any human must set in their mind and heart that every deed needs to be implemented just because of God, Allah. It can be said that this is the basic principle of Islamic etiquette: invoking the name of Allah at the beginning of every action. Furthermore, Allah SWT characterizes Himself as the most compassionate and merciful of His utmost natures and shows the relationships between a human and Him. However, the experts realized that every comprehension of the importance of doing things only because of Allah needs knowledge and training.

b) Generate Initial Codes

After getting familiar with the data from the Islamic scholars, the next step in thematic analysis is to generate the initial codes from the interview. In this step, the data were organized in a meaningful and systematic way. There are different approaches to coding, and normally it depends on the point of view of the outcomes and research questions (Becker et al.,

2017). Being concerned about those matters, several crucial understandings have been set up, particularly from Step 1. Moreover, the discussions are related to the seven verses of Al-Fatihah translations and descriptions, which somehow facilitate the search for findings. For example, for the first verse, all the experts translated and gave a description of the verse in detail. Several preliminary ideas about the codes were developed. Prominent transcripts and relevant codes were jotted down separately for all verses. However, these processes were completed back and forth since new codes were generated, and sometimes modifications were also made to previous codes to obtain the best codes. This activity was completed manually, as in Maguire and Delahunt (2017), through some hardcopies of the transcripts, pens, highlighters, and notebook. Table 1 shows an example of a coded transcript in this study. Next, the searching for themes process started, as discussed in the next section.

Table 1 Example of Coded Transcript.

Transcript	Codes
Expert 1: ..actually in our life, no matter what we did, we need to put it is because of Allah, no one else... It also can be a way to prevent us in doing bad things...as we think about the God first...	- life goal - bad deeds prevention
Interviewer: ..yess...	
Expert 1: ..that's why this verse became the first verse in Al-Fatihah, the mother of Al-Quran, so that the first thing that all human, particularly Muslims do is to make sure what they do because of Allah... at least, that's what we need to get reward from Allah...Allah defined Himself as the compassionate and merciful, which indirectly declare His relationship with human..to be compassionate and merciful...	- basic and crucial ethic in Islam - reward for good deeds - compassionate and merciful - God and human relationship

c) Search for the Themes

In this step, themes were determined. A theme is defined as *a pattern that captures something significant or interesting about the data* (Maguire & Delahunt, 2017: 336:6). All the coded data were reviewed, and then the process of searching for similarities between the coded data was run into appropriate themes that could be used to describe the coded data. In this study, the coded data obtained from three Islamic experts was once again reviewed to find any similarities between them. As usual, the processes are also guided by the seven verses of Al-Fatihah. Table 2 shows an example of preliminary theme construction for this study. Upon completion of this step, the next step is to review the themes for relevancy. The next section discusses the steps in detail.

Table 2 Example of Theme Determination.

VERSE 1	
Theme 1	Theme 2
Codes:	Codes:
- life goal	- compassionate and merciful
- bad deeds prevention	- God and human relationship
- basic and crucial ethic in Islam	- The need of Allah's love and mercy
- reward for good deeds	- God gives everything to human without requirement
- the nature of Allah as the first, the last, inward, and outward in every action	- Human too needs to have the feeling of love and empathy towards other human or living creatures
- every action is for the God's sake	
- rewards	
- believe in hereafter life	

d) Review Themes

After searching for themes is completed, the next step is to review those themes. It is a recursive process in which the previously developed themes are revised in relation to the coded data and the entire data set (Maguire & Delahunt, 2017).

Basically, it is also a quality-checking step that requires researchers to recheck the constructed themes thoroughly, particularly for those with large data sets (Becker et al., 2017; Braun & Clarke, 2012; Brooks et al., 2015). There are key questions to be asked in reviewing the themes found in this step. Hence, in general, this study referred to several questions, as mentioned by a previous study, Maguire and Delahunt (2017), such as:

- Do the themes make sense?
- Does the data support the themes?
- Am I trying too much into a theme?
- If themes overlap, are they really separate themes?
- Are there themes within themes (subthemes)?
- Are there other themes within the data?

From the questions, reviews, and thorough studies of the themes and codes, a few things have been refined from the previous findings. The refinements were related to removing and adding codes and themes, as well as the need and appearance of themes and subthemes. After a few rounds of thorough checking, the next step is to define the themes. The next section discusses the process.

e) Define Themes

This step is the final refinement in the overall thematic analysis (Maguire & Delahunt, 2017). According to Braun and Clarke (2012), this step's aim is to identify the 'essence' of what each theme is about; what is the theme about? Are there themes and subthemes? How are themes or subthemes related to each other? These are several examples of questions that can be asked to clarify a theme, and the most important is that the final finding can answer the research question or the required output. Figure 8 shows an example of a thematic map for the first verse of Al-Fatihah.

In brief, the Islamic scholar experts are clear and quite consistent in talking about and describing the rewards and Allah's love that all Muslims need to gain for both current life and the hereafter. Those rewards and love started with a Muslim's intention in every action and deed performed every single day, without fail. The intention to get rewards and be loved by Allah will also guide humans to perform and maximize good actions and deeds in every aspect of life, including other humans and other life-beings. Basically, it is a first concept and foundation in each human, particularly Muslim life. Good intentions lead to good rewards from God, which may increase His love for us as His servants. The processes were completed for all seven verses of Al-Fatihah and 17 descriptions or items from the verses. Figure 9 indicates the themes for the verses.

f) Define Themes

The final step in thematic analysis is to write up. The write-up produces some kind of report, conference paper, journal article, dissertation, or thesis. Apparently, this study produces a thesis describing all the processes, works, and activities necessary to achieve its main objective, to develop a new framework of Islamic mobile application development guidelines for app developers. Hence, thematic analysis is also included in the thesis, as it is an important step in achieving the objective. After completing thematic analysis, a conceptual framework related to the determined guidelines or items was constructed as the result of these activities.

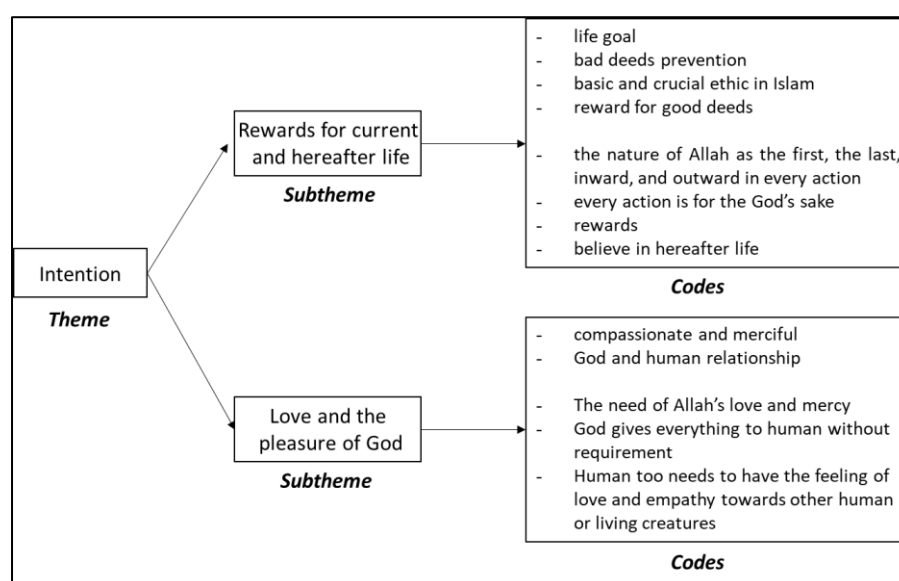


Figure 8 Example of Defining Theme for Verse 1.

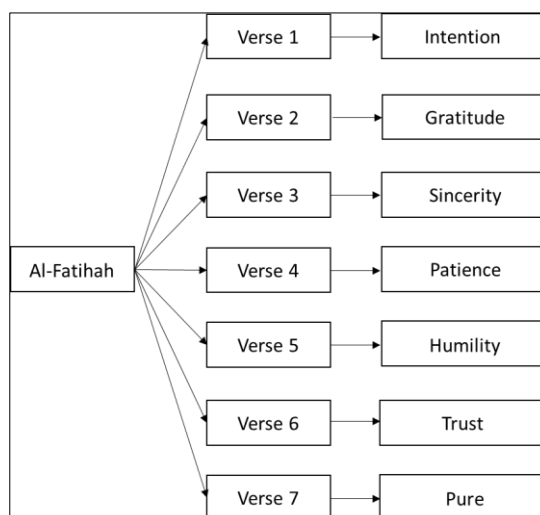


Figure 9 Al-Fatihah Seven Verses of Description.

3. The Proposed Framework

Since the main objective of the paper is to provide a conceptual framework for Islamic mobile apps for developers, the guideline criteria or constructs were derived from two points of view: internal and external aspects, as discussed in the model of human nature by Al-Ghazali, which has been selected as the base of the study. Then, other criteria were determined to fix both internal and external aspects to develop the initial framework. The criteria for Islamic working ethics were referred to as al-birr and masuliyah for the external aspect and taqwa and ihsan for the internal aspect. In addition, since internal aspects were related to internal spirits, as discussed in Sarmani and Ninggal (2008), which may relate to the emotional and spiritual intelligence of a Muslim (Rahman & Shah, 2015); this study also proposed the use of the Al-Fatihah chapter as a prominent guide in the framework. The chapter is a great reference for the fundamentals and beliefs of Islam (Sayyid Qutb, 2012), which may also benefit this study. It can also be a bridge connecting internal and external aspects.

On the other hand, external aspect highlights several quality mobile apps content development guidelines or criteria required by an Islamic content. The criteria are engagement, functionality, aesthetics, and information, as referred in previous studies (Ahmad Mustaffa et al., 2020; Al-Ratrout et al., 2019; Alquwayfili et al., 2013; El-Khalil Ghembaza et al., 2018; Elazhary, 2017; Fajarianto & Sensuse, 2013; Hameed et al., 2019; Hamzah et al., 2019; Huraimel et al., 2007; Ishak et al., 2017; Khan & Shambour, 2017; Lestari et al., 2019; Mat Sharif, 2019; Musa et al., 2018; Noordin, 2013; Sugiyanto & Purwanto, 2017). Figure 10 shows the final output obtained after the process of reviewing the literature and interviewing the Islamic content experts in the previous discussions. The experts reviewed the framework once again after the thematic analysis and matched all criteria with each other to ensure the framework's relevancy, particularly in relation to Islamic work ethics requirements. There are several criteria and items that are crucial in the framework, namely internal and external aspects, comprised of al-birr, masuliyah, taqwa, and ihsan, which are then related to mobile app content development and Al-Fatihah guidelines. For a better understanding, terms and definitions for each criterion are presented. The accuracy of our understanding of these terms is important to avoid any ambiguity or misinterpretation for readers while reading this thesis. The terms and their definitions are tabulated in the below table, Table 3.

Table 3 Terms and Definitions of the Criterion and Its Element in this Study.

Criterion	Definition	Elements in the Criterion
Information	The capability of the mobile apps to convey knowledge, contents, or facts about something or someone presented to the users	The accuracy of the apps, goals, quality of information, quantity of information, visual information, and credibility.
Functionality	The capability of a mobile apps to provide functions and features that implied under specific conditions and requirements	The performance of the apps, ease of use, navigation, and gestural design.
Aesthetics	The capability of the mobile apps to have certain visual appeal factors to grab users' attention	The layout of the apps, graphics used, and its visual appeal.
Engagement	The capability of the mobile apps in making users to stay interacted or used the apps within certain time without failure	The apps might use the elements of entertainment, interest, customization, interactivity, and target group

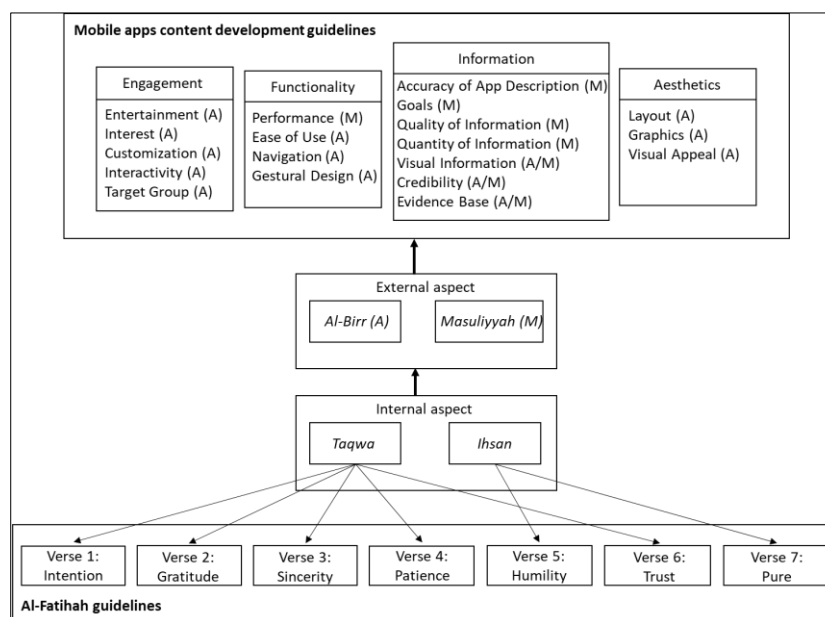


Figure 10 The Developed Conceptual Framework of the Study.

5. Discussion

There are many guidelines or ethics for working in Islam proposed by several Islamic scholars and researchers, and the study in this paper proposes the potential of referring to Al-Fatihah, the opening chapter (surah) of the Quran. Al-Fatihah is also known as a chapter that provides fundamental principles for a Muslim to serve as a caliph and believer in Islam and Allah SWT (Muhammad, 2017). Previous studies have shown that the adaptation of this chapter in management studies (Abdullah et al., 2016) and mental health (Julianto, 2019; Julianto & Subandi, 2015; Muhammad, 2017); but there is none in the working principles, particularly for apps or technological developers. From the chapter's meaning perspective, there is a huge possibility to embed Al-Fatihah *surah* into the requirements of Islamic learning content app development.

6. Conclusions

The main contribution of this paper is to provide an innovative conceptual framework pertaining to developers' design focus and working ethics guidelines when involved in an Islamic mobile app development project. In general, it discovers the relationships among the guidelines or criteria determined, which may strengthen current or find new information. Even though this paper focuses on Islamic views, it can actually help other believers apply or serve as a starting point for them to have a similar view on their beliefs in developing religion apps. Apart from that, this study can contribute to educating developers, particularly Muslims, about evaluating their working ethics based on the teachings of Islam. Any misconduct or lack of awareness in working ethics or design needs can be improved by the study findings. Lastly, this conceptual framework can also help extend research on religious mobile technology apps, which need more exposure to religion-related factors (Wang et al., 2017). For future research, the interrelationship of factors determined in this conceptual framework will be examined, covering the criteria of important mobile app design and Islamic work ethics, which are based on Al-Fatihah. In detail, the interrelationships and clarifications on the prominent associations between the factors will be examined.

Ethical considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

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