

The Effect of Signaling Principle in Asmaul Husna Mobile App on Knowledge, Perceived Awareness and Perceived Motivation Among Muslim

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ABSTRACT: Signaling principle makes people learn better when cues that highlight important materials are added. Therefore, this study is carried out to determine the effect of the principle in asmaul husna mobile application among Muslim on knowledge and perceived awareness on the context and perceived motivation of the learning material. As a contribution to the body of knowledge, this study hybridizes Cognitive Theory of Multimedia Learning (CTML) with signaling principle. It will disclose the benefits of learning through mobile towards bridging theory to practice particularly in Islamic mobile application. The proposed design and development of Signaling Principle Mobile Application (SPMA) will assist multimedia practitioners or developers in designing and developing Islamic multimedia learning application particularly in educating Muslim in asmaul husna with the assimilation of Signaling Principle and Nielsen's Design Guidelines. This study is classified into quantitative category and utilizes quasi-experimental approach using pre-test and post-test factorial design, and the design and development phase in this study will be governed by Alessi and Trollip Instructional Design Model.

Keywords: signaling principle, Nielsen's design guideline, asmaul husna, mobile application.

INTRODUCTION

Wireless technologies particularly mobile or smart phones have transformed the way people communicate and managing their personal as well as social life. Compared to computer where the nature of usage majorly revolves around job and home environment, mobile technology involves human-technology interaction in diverse and dispersed contexts (Karim, Alias, Mokhtar, & Rahim, 2009) that are not bound by place and time. In the context of education, paradigm shift is necessary for this mobile technology to succeed. Some suggest that parents and teachers need to encourage children's learning via mobile phones under their supervision and monitoring, while others concern on how mobile learning might not be suitable and can cause extra work for teachers. (Ariffin, Dyson, & Hoskins-McKenzie, 2012).

Malaysia is among the countries that carry out many innovative efforts to deal with Industrial Revolution 4.0 (IR4.0) at all levels of its training system and throughout the entire life cycle of its citizen especially in the academic fields as it is venturing into Higher Education 4.0 (MOHE, 2018). Massive Open Online Course (MOOC) is highlighted in this vast education as it offers flexibility, luxury and an effective way of learning for generation Y. MOOC is accessible via mobile phones, desktop computers and laptops. Therefore, mobile learning is a great initiative as Malaysia is shifting towards IR4.0 and the attention is on cyber-physical systems, that will benefit many parties, especially digital users, who enjoy more interactive and personalized experience through SMAC (social, mobile, analytics and cloud) technologies (Selamat, Alias, Hikmi, Puteh, & Tapsir, 2017) and also embrace the MOHE's vision for Higher Education 4.0.

To adapt with mobile learning, theories like Cognitive Theory of Multimedia Learning (CTML) (Mayer, 2001b) and Cognitive Load Theory (CLT) (Sweller, 1988) could be employed, as these theories focus on cognition centered approaches, which serves as the theoretical foundation of the signaling effect or cueing in terms of learners' limited cognitive resources (Schneider, Beege, Nebel, & Rey, 2018; Yung & Paas, 2015). The idea is on emphasizing elements in the material (Mayer, 2005). According to the knowledge construction hypothesis, signaling can serve as a cognitive guide that helps learners make sense of the presented material (Mautone & Mayer, 2001). It assists readers by emphasizing the semantic or the structure of the content, thus facilitates them in selecting the texts and connects (making them understand) to the information provided. All in all, in line with CLT, cueing can reduce subjective cognitive load, facilitate retention and transfer performance (Richter, Scheiter, & Eitel, 2016; Schneider et al., 2018; Xie et al., 2017; Yang, 2016).

PROBLEM STATEMENT

IR4.0 is a real phenomenon, transforming manufacturing and other sectors including education into connected and digital trade with added benefits and various technologies, it is the Internet industry. This is in line with the customer-centricity perspective which brings personalization and customization for the new user via the use of mobile applications technology. As CTML encompasses several aspects of the science of learning and instruction, this could be embedded in mobile applications as it could be one of the impact towards the development of IR4.0 which is to embrace the MOHE's vision for Higher Education 4.0. Furthermore, eventually mobile learning will benefit the learners towards dueling into the IR4.0 educational era that is inclining towards knowledge, industry and humanity, besides enhancing student outcomes which is the NKRA in the education area.

Focusing on real learning situations, Mayer conducted several in-depth studies involving the testing of learning theories. From CTML, Mayer has identified, studied, and explained numerous

effects and design principles to improve learning outcomes with multimedia instructional materials. One of the principles suggested by Mayer (2009) is Signaling Principle. The Signaling or Cueing Principle idea is on emphasizing what is important in the material presented (Mayer, 2016). The emphasizing technique can be applied in visual and audio representation. In technical terms, signaling and cueing means emphasizing using verbal or highlighting using graphics. The techniques used in signaling involved using a higher tone of voice in audio or using bold font in written texts; or highlighting important parts by using circles, arrow or zooming effect. Another signaling or cueing effect is in using color-coding (Gog, 2014), for example the use of red, yellow and green for traffic lights that indicates either "stop", "beware" or "go" instructions. According to the knowledge construction hypothesis, signaling can serve as a cognitive guide that helps learners make sense of the presented material (Mautone & Mayer, 2001). It assists readers by emphasizing the semantic or the structure of the content thus, facilitate them in selecting the texts and connect (making them understand) to the information provided.

Table 1. displays the previous projects that have been designed and develop with the use and hybrid of various multimedia principles and the aspects being studied.

Table 1. Hybridization of Principles in Multimedia Presentation

Author	Context	Principles	Aspect of Study
(Abdul Wahab, 2016)	Cyberbully	Personalization Principles + Persuasive Technology Principles (Similarity, Suggestion and Tailoring)	Knowledge, Perceived Awareness, Perceived Motivation
(Al-Rikabi, 2016)	Arabic Language	Coherence, Spatial Contiguity, Temporal Contiguity, Multimedia and Voice Principles	Perceived Usefulness, Ease of Use, Learnability
(Muhammed, 2016)	English Language	Signaling Principle	Listening Skills, Motivation
(Othman, 2015)	Children Sexual Abuse	Personalization Principle + Persuasive Technology Principles (Attractiveness, Similarity, Suggestion, Simulation in Real-world Contexts)	Knowledge, Perceived Awareness, Perceived Motivation
(Osman, 2015)	Dyslexia	Segmenting Principles	Knowledge, Self-Efficacy Belief, Perceived Motivation
(Rapp, 2013)	Science Class	Signaling Principles + Multimedia Principles (Modality, Segmenting, Temporal Contiguity, and Redundancy)	Knowledge Retention, Cognitive Difficulty
(Govinda samy, 2011)	Science Subject	Personalization Principles (Pedagogical Agent)	Perceived Motivation, Self-Efficacy Belief, Learning Engagement
(Mohamed, 2011)	Educational Video	Segmenting Principles, Weeding Principles, Signaling Principles	Knowledge, Knowledge Retention
(Foo, 2010)	ICT in Education	Personalization Principles (Pedagogical Agent)	Achievement, Motivation, Learners' Cognitive Style

Referring to Table 1, there are a few researches executed with the adoption and hybridization of multiple multimedia principles as well as other principles. They were carried out in various

contexts of study. Besides, none of them combined Signaling Principle with Nielsen's Design Guidelines in the design and development phase. As Signaling Principles and Nielsen's Design Guidelines are two very powerful principles, this study believes hybridizing them contributes significantly to knowledge acquisition and motivation. While previous works studied on various context, this study ventures into Islamic content. Particularly asmaul husna knowledge, perceived awareness and perceived motivation. Therefore, the study on Islamic mobile applications have been performed as in Table 2 to find the underlying principles such as multimedia principles that have might been applied on the previous Islamic mobile applications.

Table 2. Islamic Mobile Applications

Author	Context	Investigated Multimedia Principles
(Dollah et al., 2017)	Islamic Banking and Finance	Not Applicable
(Ismail, Samsudin, Sulaiman, Zainol, & Zaid, 2016)	Islamic Study	Not Applicable
(Osman & Mohamed, 2016)	Pregnancy	Not Applicable
(Sarlan et al., 2016)	Lifestyle of the Prophet Muhammad PBUH	Not Applicable
(Almosallam et al., 2016)	Quran Memorization	Not Applicable
(Saidin, Mohamed, Adzmi, & Azhar, 2015)	KAFA (UPKK examination)	Not Applicable
(Elobaid, Hameed, & Yahia Eldow, 2014)	Quran Learning	Not Applicable
(Abdulkarem & Sevkli, 2014)	Cultural Learning through Hadith	Not Applicable
(Ismail, Ismail, Hanis, & Razak, 2013)	Zakat	Not Applicable
(Rahman, Fauzan, & Zeki, 2014)	Muslim Necessities	Not Applicable
(Rosmani, Ahmad, Mazlan, Zainuddin, & Ibrahim, 2014)	Dhikr	Not Applicable
(Mantoro, Jaafar, Aris, & Ayu, 2011)	Hajj Locator	Not Applicable
(Ismail, Ismail, Hanis, & Razak, 2013)	Islamic History	Not Applicable
(Al Ali, Berri, & Zemerly, 2008)	Muslim Reminder (e.g. the time and call of prayer)	Not Applicable

(Huraimel, Zemerly, & Al-Hammadi, 2007)	Zakat Calculator	Not Applicable
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Based on Table 2, there is no evidence that these Islamic mobile apps have been developed with multimedia principle especially the Signaling Principle. They only considered on the content of the application and neither guidelines nor multimedia principles were applied to assist the learning process described in the research paper. As changes in Islamic knowledge dissemination are rapidly growing from just preaching, books and radio to the era of Information Communication Technology (ICT) (Ismail, Ismail, Hanis, & Razak, 2013), such innovation is very helpful for all ages who sought information in the field of religion. The findings show that research on Islamic applications, its criteria (including multimedia principles), users' awareness and usage of mobile Islamic content is still deficient (Ismail, Ismail, & Abd Razak, 2013; Ismail et al., 2016; Khan & Shambour, 2017). Hence, studies on the development of Islamic-based smartphone applications need to be made on an ongoing basis as the number of Islamic mobile application is still few and more researchers need to venture into this field in line with the development of mobile technology (Ahmad & Razak, 2013; Ismail, Ismail, & Abd Razak, 2013; Ismail et al., 2016; Kamarudin & Salam, 2012; Nawi & Hamzah, 2013; Zuhaidah, Zain, Mahmud, & Hassan, 2013). Consequently, as to fulfil this gap, a study on Islamic mobile application integrated with Signaling Principle and Nielsen's Design Guidelines will be performed to investigate the knowledge and perceived awareness on the context and perceived motivation of the target user in using the learning material. Islamic mobile apps require signaling principle although it can still function if the principle is absent. The major reason is that this principle will assist in guiding attention, organizing and integrating knowledge (Mautone & Mayer, 2001). Generally, it helps reducing extraneous load which is the unnecessary working memory load that may lead to a decline in learning outcomes (Richter et al., 2016). The signals will ease the demands on the user's working memory and thus, reducing the cognitive load and apparently the information will be easily comprehended jointly with the incorporation of Nielsen's

design guidelines that will assist in determining the usability trends (Loranger, McCloskey, & Nielsen, 2014). Therefore, this research is hoped to intensify the motivation of the Islamic mobile app user in using the app and uplift their interest and increase their awareness and knowledge in Islamic content, particularly in asmaul husna.

RESEARCH OBJECTIVES

This research will involve two presentation modes which are; mobile application with Signaling Principle (SPMA) and mobile application without Signaling Principle (NSPMA) both hybridizes with Nielsen's Design Guidelines.

- i. To study the effects of two different presentation modes by conducting an experimental study with Muslim to assess their knowledge before and after the exploration of the mobile application.
- ii. To investigate the effects on their perceived awareness before and after the exploration of the mobile application.
- iii. To assess the effects on their perceived motivation towards the learning material after using the mobile application.

METHODOLOGY

The theoretical framework for the study encompasses macro and micro design strategies as recommended by Van Patten, Chao, and Reigeluth (1986) as the ability to meaningfully entwine micro and macro instructional principles is undoubtedly commendable (Spector, Ohrazda, Schaack, & Wiley, 2005). Macro strategy defines the selection, sequence and organization of the contents that are to be presented, which encapsulates the overall strategic plan. Whereby the micro strategy defines the effective presentation of the learning content to the learner. The macro strategy for this study is fortified by two theories; CLT (Chandler & Sweller, 1991) and CTML (Mayer, 2001b). However, Instructional Design Model is also embedded in the macro strategy as a guideline for the design, development and testing of the multimedia learning application (Alessi & Trollip, 2000). The micro strategy is comprised of Principles of Multimedia Design (Mayer, 2008), Constructivist Learning Environment (Jonassen, 1999) and Nielsen's

Design Guideline (Loranger et al., 2014). Figure 1 depicts the graphical representation of the theoretical framework.

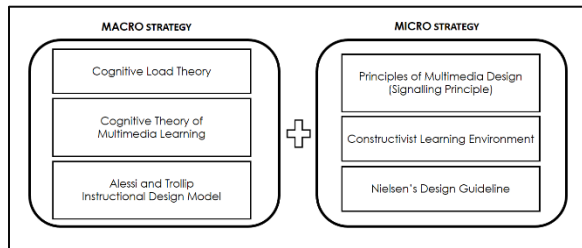


Figure 1. Theoretical Framework

Whereby, the research framework is consisted of an independent variable, three dependent variables and two moderator variables. The independent variable will cause change in the dependent variable with regards to the moderator variable. The independent variable is the two mode of presentation which is SPMA and NSPMA. SPMA is the presentation mode that is integrated with signaling principle and NSPMA is the one that is without the principle. Meanwhile knowledge, perceived awareness and perceived motivation towards learning materials serve as the dependent variables. The moderator variables are also investigated in this study which includes gender and education level of the participants. The research framework is illustrated in Figure 2.

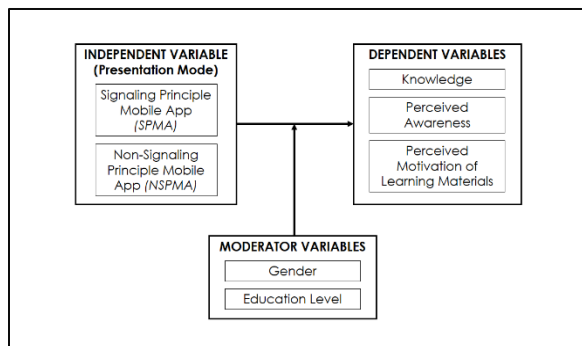


Figure 2. Research Framework

SIGNIFICANCE OF STUDY

The study will contribute to the body of knowledge especially in CTML and signaling principle, and likewise its effects in mobile application. It will reveal the benefits of learning through mobile towards bridging theory to

practice particularly in Islamic mobile application. The proposed design and development of SPMA will assist multimedia practitioners or developers in designing and developing Islamic multimedia learning application particularly in educating Muslim in asmaul husna. On the other hand, it will also provide a reflection of a feasibility of android platform in supporting multimedia learning environment.

This research will also deliver in raising knowledge and perceived awareness about the importance of learning asmaul husna among Muslim. It will assist in increasing Muslim’s knowledge regarding the meaning and benefits of the 99 names of Allah on the road to producing a better Muslim.

CONCLUSION

This study hybridizes Cognitive Theory of Multimedia Learning (CTML) with signaling principle and embedded with Nielsen’s design guidelines in the design and development phase. The study bound to certain limitations; therefore, it may restrict the probability of generalizing the findings of this study. The method focuses on community in general, attempting to rearise the knowledge in asmaul husna and outstretch in understanding and contemplating the benefits of them. The domain area of this study is in Malaysian context, focusing on Muslim community and particularly for those who owns and familiar with the use of mobile phones and mobile applications.

This study is also limited to measure the effects of two different presentation modes of SPMA and NSPMA in increasing Muslims’ knowledge, perceived awareness and perceived motivation levels which assess the users’ learning experience after using both presentation modes. SPMA will be designed according to Mayer’s signaling principle and NSPMA will be without it. Though both will be integrated with Nielsen’s design guideline.

The multimedia application will be designed and developed based on theories and design elements that will be evaluated by content and media experts, however the results of the study

might be influenced by the presentation quality of the devices used.

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