Penerbit Akademia Baru

Semiotic Icon Design Framework for Reciting Quran (SIDFQ)

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ABSTRACT

With the rapid growth of information and mobile technologies, icon design has been broadly applied in various fields to convey information faster to user. Icon design refers to process of creating visual symbols or icons that can communicate a specific meaning. Although icons are used widely in many fields, researcher found there are limited icon design studies in certain fields including the Quranic domain. The Quran contains broad and complex information, which can create challenges in knowledge acquisition. Previous studies found that Muslim youth have less motivation in reciting Quran due to low comprehension in Arabic. In addition, studies reported that youth lacked awareness in reciting Quran although many technologies are available. Muslim also faced difficulty to understand Quran content because it has its own interpretation and rich semantic of words. Therefore, the benefit of icon design can be extended to the Quran domain to assist in communicating messages. This study aims to propose the Semiotic Icon Design Framework for Reciting Quran (SIDFQ), a framework for designing the semiotic icons as supportive visual tools to visualize Surah genres and motivate youth to recite the Quran. Relevant journal articles and books published between 2017 and 2022 were retrieved from Google Scholar, Scopus, Science Direct, and ProQuest. The proposed framework integrates Peirce's Theory of Semiotic, the ARCS Model of Motivational Design, the PACMAD Usability Model, and the Technology Acceptance Model (TAM) as its theoretical foundation. This study applied the Design and Developmental research approach (DDR), consisting of three phases: (1) the need analysis phase, (2) design and development phase, and (3) evaluation phase using an experimental post method with questionnaires as the main instrument. The framework incorporated the icon design elements for mobile applications identified from comparative study, namely: recognizable, color, simple, semantic, familiarity, and consistency. The findings of this study include the development of proposed theoretical framework, and conceptual framework for semiotic icon design which contribute to both the field of icon design and its application within the Quran domain.

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1. Introduction

Nowadays, icons play a vital role in communicating information across various fields such as science, medicine, communication, education, and advertising. Graphic technology, particularly the use of icons, can deliver information and messages more quickly and effectively using an interesting and interactive environment that can enhance the information accessibility. Icons offers numerous benefits, including saving space, quick recognition and recall, no translation needed, and being visual appeal as noted by Harley [16], Horton [19], Qiang and Fei [35]. These features assist users in understanding the meaning of information. According to Horton [19], the use of icon can help visualize mental activities of the human mind; when an icon is presented in a specific context, it can trigger memories and associations in the user's mind, thus forming the icon's meaning.

Wang and Li [44] stated that people regularly connect via mobile applications for commercial and everyday tasks. Icons are extensively used as visual representations in mobile applications that support information acquisition and understanding. Icons are small graphic images displayed on mobile interfaces, serving multiple functions, such as branding, defining goals, and attracting user interface visual attention by Yang [45]. The icons can create better visual perception, capable of conveying the meaning of information as stated by Batista *et al.,* [6], Chandler [8], Lin and Lin [27], Landa [26], and Qiang and Fei [35], and easy to recognize and to remember Qiang and Fei [35].

Icon design is the process of creating a graphic symbol that communicates effectively. The element of icon design forms a significant part of the mobile user interface, contributing to the better usability and user acceptance of applications. Developing a comprehensive set of guidelines or frameworks for icon design is therefore essential, specifically relating to the style attributes of icon design. Icons should be designed carefully to ensure they are clear and easily identifiable; otherwise, they may cause uncertainty as mentioned by Salman *et al.*, [39]. Although icons are used widely in many fields, the researcher found that there are limited studies conducted on icon design for the Quran domain.

The Quran contains broad and complex information, which can create challenges in knowledge acquisition. According to Utomo *et al.,* [42], Muslims have difficulty to understand the Quran content because it has its own interpretation and rich semantics of words. Previous studies found that Muslim youth have less motivation to recite the Quran due to the low comprehension of Arabic. A survey found that 73% of youth read the Quran sometime, and 78.4% understand Quran little as mentioned by Chiam *et al.,* [9]. Despite the availability of many technologies, there remains a lack of awareness and motivation in reciting Quran. Another study reported a low level of awareness of 63.8% on reciting Quran, and 50.3% of youth did not recite Quran after prayer as stated by Anas *et al.,* [4]. Hence, the benefit of icon design can be extended to the Quran domain to assist in communicating messages. Therefore, this study proposed a Semiotic Icon Design Framework (SIDFQ) to guide the design and development of semiotic icons as supportive tools for visualizing the genre of Surahs in the Quran. The framework integrated Peirce's Theory of Semiotics, the ARCS Model of Motivational Design, the ACMAD Usability Model, and the Technology Acceptance Model (TAM) as its theoretical foundations. This framework aims to assist in designing semiotic icons for Surah genre, thereby motivating youth to recite the Quran.

1.1 Literature Review

This study reviewed previous studies related to semiotic theories, the ARCS model of motivational design, the People at Centre of Mobile Application Development (PACMAD), the Technology Acceptance model, the Prototyping model, and icon design elements for mobile applications. The

selection of these theories and models was based on the review of existing literature that identified them as most relevant and suitable for this study.

1.1.1 Theory of semiotics

Historically, there are a few prominent modern Theories of Semiotics (1989-1998) such as Peirce's Theory of Semiotics (1931-1958), Saussure's Theory of Semiotic (1974), and Barthes Semiotic Theory by Roland Barthes (1964). Commonly, semiotics is the study of signs and sign process or an epistemology about the presence or the reality of signs in social life. In the present semiotic history, two inventors from Western nations had big influences on the arena, which are Ferdinand de Saussure (1857-1913), a linguist from Switzerland, and Charles Sanders Peirce (1839-1914), a philosopher from America as stated by Hassan and Mahmoud [18], Yakin *et al.,* [47]. Both are main contributors to present semiotics and are known as the two founding fathers of mathematical symbolic logic. Saussure called it semiology and Peirce called it semiotics by Lin and Lin [27].

Saussure was conveying his model of the sign and o 'semiology', the pragmatist philosopher and logician Charles Sanders Peirce expressed his model of the sign of 'semeiotic [sic]' and of the taxonomies of signs. In contrast to Saussure's model of the sign in the custom of a 'self-contained dyad', Peirce presented a triadic model containing the *representamen* or the form which is also called a 'sign vehicle'; an *interpretant* is not an interpreter but slightly the sense end of the sign; and an *object* is somewhat further than the sign to which it denotes, a referent by Chandler [8]. Chandler [8] and Hassan and Mahmoud [18] stated that the elements are important to be nominated as a sign. Sign is a union of three elements what is represented (the object), how it is represented (the representamen), and how it is interpreted (the interpretant).

Nowadays, semiotic methods and thoughts have gained wide attention and are frequently used as references in numerous fields and disciplines of thought. They are not only pointed to the field of philosophy and linguistics but moreover to arts and literature, for example, music, drama, movie industry, and text exploration as well as communications, advertising, anthropology, psychology, archaeology, architecture, mathematics, and so on as stated by Yakin *et al.,* [47]. Besides, their methods are not restricted to their part of studies but have extended and formed substantial influences through other disciplines or on a multidisciplinary basis. Table 1 summarizes the semiotic icon theories and their concept based on the three semiotic theories. It summarizes the concept in three different theories of semiotics by Charles Sanders, Ferdinand de Saussure, and Roland Barthes.

Table 1
Analysis if Semiotic Theories

Theories	Findings	Dimension	References
Peirce's Theory of Semiotics via Charles Sanders Peirce (1931-1958)	Human thinker and sign borders, three-dimensional scheme triadic/trichotomy), and dependence on three classifications of signs (icon, index, and symbol). Represents signs with resemblance to the target object.	Sign: union of what is represented (object), how it is represented (representamen), and how it is interpreted (interpretant). Classified into icon, index, and symbol. Index: direct relation to the target object. Symbol: no relative to the target object, devoid of semblance and association, symbols are free statements.	Lin and Lin [27] Chandler [8] Yakin *et al.,* [47] AlNuwaiser and Buchanan, [1]

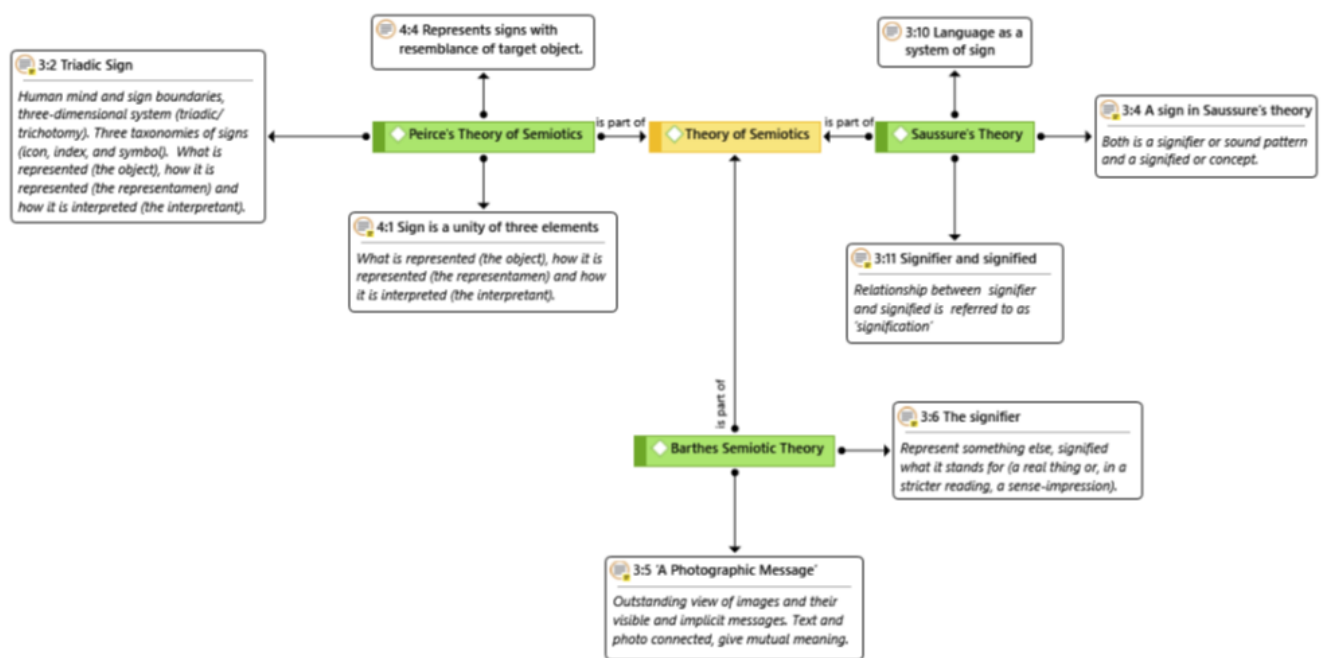| Saussure's Theory via Ferdinand de Saussure (1974)	Emphasized language as a system of signs. The relationship between signifier and signified is referred to as signification.	Both signs are a signifier or sound pattern and a signified or concept	Yakin *et al.,* [47]
Barthes Semiotic Theory via Roland Barthes (1964)	'A Photographic Message' provides an outstanding view of images and visible and implicit messages. Text and photo are connected and give mutual meaning.	Signifier: image utilized to denote somewhat different, indicated what its stances for (a real thing or, in a firmer reading, a sense-impression).	As cited by Najafi and Abbas [32]

Fig. 1. Analysis of Semiotic Theories - Network Diagram

Based on Fig. 1 and Table 1, Peirce emphasized representing the signs with the resemblance of the target object that involved three sign elements of object, representamen, and interpretant, and three taxonomies of sign namely icon, index, and symbol. Saussure emphasized language as a system of signs and the relationship between signifier and signified or what is referred to as signification. Barthes emphasized the signifier as the image used to represent somewhat different; it signified what it stands for (an actual object).

In Fig. 2, Peirce defined the semiotic as an act, or effect, or includes, a collaboration of three themes, for example, a sign or representamen, its object, and its interpreter. Peirce defined the three (3) elements of sign. Signs are physical things that can be taken by the five human senses, and a sign somewhat denotes (represents) something other than the sign itself. Peirce sign contains the Symbol (the pattern of the deal), Icon (the pattern of the physical depiction), and Index (the pattern of cause-effect connections) by Chandler [8], Lin and Lin, [27].
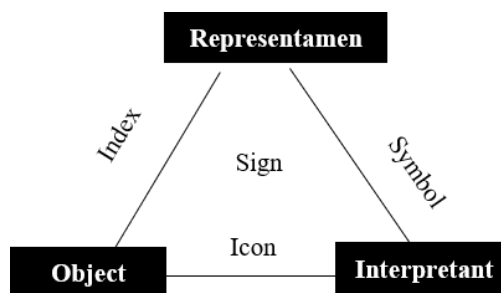
Source: Chandler [8]

Fig. 2. Peirce's Theory of Semiotic (Semiotic Triangle)

In this research, Peirce's theory of semiotics was selected as the underpinning theory. It is the most suitable theory for semiotic icon design and most related to the taxonomy of signs that consist of icons. This theory likewise emphasized signs using icons to convey the meaning of information. By viewing the sign of an icon, the denotation of signs could be implicit purely by the user. This approach is practical and widely used in many fields to simplify the meaning of the information and assist in comprehending the abstract information. Due to the capability of the icon, it motivates the people to comprehend the messages and therefore ease their work and activities. Applying the semiotic concept in icon design would be able to convey abstract information and enable an understanding of the meaning of the Surah genre in the Quran.

1.1.2 ARCS Model of Motivational Design

Motivation is a vital feature of the instructional approach. It confirms that the users retain on using the learning things after the first practice. Subsequently, the users of applications cannot be ordered like students of old-fashioned classrooms, thus motivation is desirable to withstand interest amongst users of the applications. Despite its significance, however, most established mobile applications have abandoned the motivation feature. This is even though motivation inspires retention between users particularly when the knowledge content is complex as stated by Khalid *et al.,* [25]. Some available models of motivational learning theories that are useful for motivation and design studies are the ARCS model of motivational design and Maslow's Theory of Motivation, Cognitive Evaluation Theory, and Self-Efficacy Theory (SET). Among the models of motivation, the ARCS model is chosen as it is widely used in education and information technology research.

The key objective of the ARCS model is to form, maintain motivation, and stimulate the motivation to learn among learners (Keller, 1983, 1984, 1987). It is established on a combination of motivational thoughts and characteristics into the four kinds of attention (A), relevance (R), confidence (C), and satisfaction (S) by Keller [23]. Keller [24] stated that various theories and models describe features of motivation, preference, and learning but most of them are inclined to stand alone as self-governing areas of inquiry.

ARCS is a recognized theory relating to motivation that offers a combination of motivational thoughts and philosophies and a motivational design procedure. It is also a problem-solving technique for scheming the motivational aspects of learning settings to arouse and withstand student motivation to learn as mentioned by Khalid *et al.,* [25], Keller [23]. It has been broadly used and endorsed by both educators and instructors in many learning establishments such as schools, colleges, and universities, and in mature learning surroundings in companies, government organizations, non-profit establishments, and military establishments. The model can enrich communication between the learning resources and the learners. It has likewise been used

everywhere in nearly every region and has been used broadly in Asia, Europe, and Latin America. The model has also been supported in various studies at all education stages and across a wide range of cultures, therefore it is of interest in this research.

Table 2
ARCS Model in Mobile Application

Studies	Field	Findings	Dimension	References
Four Motivation components	Psychological Motivation	Used in training and games. Confirmed in many studies in all education levels and diverse cultures.	Attention, relevance, confidence, satisfaction.	Derbali and Frasson [11], Keller [23]
Four factors of ARCS	Education	Achieve learners' attention, stimulate curiosity, offer surprises, brainstorming, and stance problems. Create content appropriate, clarify objectives, and let students deliver their samples. Displays positive prospects, offers chances, responds, and recognizes students. Offers pleasure, assistance, and credentials.	Attention, relevance, confidence, satisfaction.	Faryadi [14]
ARCS Questionnaire	Education	Usages of questions to stance problems (Attention), language and terms suitable to learners and their environment (Relevance), offers response on performance quickly (Confidence), makes declarations giving acknowledgement and recognition to learners as applicable (Satisfaction).	Attention, relevance, confidence, satisfaction.	Derbali and Frasson [11]
Factor in ARCS Model	Education	Four factors in ARCS model	Attention, relevance, confidence, satisfaction.	Ying and Yang [48]
ARCS Model	Education	Attention, relevance, confidence, and satisfaction	Attention, relevance, confidence, satisfaction.	Khalid *et al.,* [25]

Table 2 summarizes the studies applying the ARCS Model in mobile applications. Many studies applied the four elements namely attention, relevance, confidence, and satisfaction to improve the motivational design of the studies. In this research, the ARCS model of motivation was employed to provide implications in terms of motivational design for semiotic icon design for reciting the Quran. This is because the ARCS model is the ideal model for incorporating motivational features into the application to enhance youth motivation. The researcher applied the ARCS model of motivational design consisting of four key elements of attention, relevance, confidence, and satisfaction as the motivation elements for the design and evaluation of semiotic icon design application. The design of the Semiotic Icon Design Framework for Reciting Quran (SIDFQ) also integrated the motivation elements to sustain user interest and address the challenges faced by youth in Quran recitation, particularly the need to remain continuously engaged in understanding the meaning or message of Surah genre, thereby motivating them to recite the Quran more consistently. The ARCS model of motivational design is suitable because its primary goal is to build and maintain motivation, and it has been widely used in education and information technology research.

1.1.3 Usability Model

Usability is an essential principle of decision-making for end users, customers, product engineers, and software designers for their drives. Additionally, to the work of describing usability thoughts and measurements to be estimated and calculated, many usability evaluation approaches and dimensions have been established and suggested. According to Gupta [15], usability is assessed by the value of communication (communication) between a technological invention (application) and a user (who practices technological invention). Usability evaluation for icons is essential to evaluate the ease of use of mobile applications to the user. Table 3 provides the information related to the usability evaluation for an application.

Table 3
Usability Evaluation for Mobile Application

Studies	Model	Findings	Dimension	References
Study of usability principles interface design for mobile e-books	Nielsen (1993), Norman (2002), 3e indicator of Yeh (2010)	Unified usability by Nielsen (1993), design principle by Norman (2002), and 3e indicators of meaningful criteria for evaluation of interactive (Yeh, 2010). Suggested usability principles: Visibility: offers info conducive to communication and interaction; Ease (learnability): easy to learn, and quickly familiarize with system's tasks and processes, least time consumed on learning; Efficiency: after learning to use the system, easy to use tasks of the system at complete capability; Enjoyment (satisfaction): feel happy upon finishing a task in using the system.	Visibility (memorability, error), learnability (ease), efficiency, satisfaction (enjoyment)	Wang and Huang [43]
Digital Design in Action – Creative Solutions for Designers	Nielsen (1993)	Learnability: how easy to attain simple tasks the first time meet design. Efficiency: once users learn to design, how quickly perform tasks? Memorability: users return to the design after a period of not consuming it, Errors: How many faults do users make, how severe are the faults, and how simply do they improve from faults? Satisfaction: How pleasing to use design?	Learnability, efficiency, memorability, errors, and satisfaction	Jackcson and Ciole [20]
Usability Evaluation Framework of Mobile Application	People at Centre of Mobile Application Development (PACMAD)	Integrated by Nielsen (1998), International Organization for Standardization (ISO) (ISO/IEC, 1998). To overcome the limit, exist in present a usability model to measure the usability app grounded on three elements: effectiveness, efficiency, and satisfaction. Suggested adding four more attributes: Learnability, Memorability, Errors, and Cognitive Load. Found almost 23% measured cognitive load of the app under evaluation. Some two percent of research assessed Memorability, Effectiveness, Satisfaction, and Efficiency was contained in over fifty percent of research. Errors were evaluated in over thirty percent of the research. Context of use and user were reflected in less than ten percent of papers. Context of use differs extremely and is reflected in a significant element.	Effectiveness, satisfaction efficiency, cognitive load, learnability memorability and errors	Harrison *et al.,* [17], Saleh *et al.,* [37]

Usability Evaluation	Usability ISO9241-11:1998	Effectiveness (returns entirety and correctness of aim accomplishment); Efficiency (properties consumed to effectiveness); and Satisfaction (comfort, and positive user connection when using system).	Effectiveness, Efficiency and Satisfaction	Saleh *et al.,* [37]

From Table 3, there were few studies that utilized the usability model for mobile applications namely, the People at Centre of Mobile Application Development (PACMAD), Nielsen (1993), Norman (2002), 3e indicator of Yeh (2010), and Usability ISO9241-11:1998. The investigation of these usability dimensions for evaluating semiotic icon design mobile applications includes a comparison of the available usability dimension elements. Five elements have been found which presented in Table 3.

The common dimensions of usability evaluation found in most usability models are identified as satisfaction and effectiveness followed by other elements of learnability, efficiency, memorability, errors, and cognitive load. The common usability element discussed in mobile applications. These elements were mainly categorized for evaluating the usability of the mobile application from the perspective of the end user, which plays an important role in building user satisfaction.

In this study, the researcher applied the PACMAD usability models for usability evaluation which focused on effectiveness, satisfaction efficiency, cognitive load, learnability memorability, and errors as stated by Nielsen [34], Harrison *et al.,* [17], Saleh *et al.,* [37]. The researcher specifically employed the effectiveness and satisfaction elements from the PACMAD usability model for the evaluation of semiotic icon design applications to determine the effectiveness of the application and satisfaction with it. The satisfaction element was selected to determine the fulfilment of user's desires, anticipations, or desires, or the preferences emerging from this study. The effectiveness element was selected since it determines the degree to which something is successful in delivering the desired result for this study. This is due to the suitability of the elements for evaluating the semiotic icon design application in reciting the Quran. The evaluation of the semiotic icon design application does not focus on the elements of learnability, efficiency, error, and cognitive load elements. The two usability elements will be validated by the three (3) experts in Information Technology (IT) in terms of usability elements and their suitability for evaluating the semiotic icon design application in the Quranic field.

1.1.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) was mainly presented by Davis (1989), which is adjusted from the Theory of Reasoned Action (TRA) established by Fishbein and Ajzen (1975) and the Theory of Planned Behavior (TPB) by Ajzen (1991). These are mainly well-researched purpose models that have established success in foreseeing technology acceptance behavior by Alqahtani and Mohammad [2], Barry and Jan [5], Nasri and Charfeddine [33]. In current years, numerous studies have engaged TAM to explore user acceptance of new technology. Table 4 summarizes the Technology Acceptance Model for Mobile Application studies. Many studies use two key beliefs, i.e. perceived usefulness and perceived ease of use of the technology acceptance model to explore user acceptance of information technology by Lin [22].

Table 4
Technology Acceptance Model for Mobile Applications

Studies	Model	Findings	Dimension	References
App adoption and switching behaviour: applying extended Tam in apps usage	Extended TAM (TAM3)	Examine adoption of apps using technology acceptance model framework (TAM3 of Venkatesh and Bala, 2008) and subsequent effects of main TAM builds on behavioural and switching purposes. Discover effect of key technology adoption constructs (i.e. TAM3) on commercial app	Perceived usefulness, perceived ease of use, behavioural intention, subjective norms,	Roy [36]
User satisfaction with mobile websites: impact of perceived usefulness perceived ease of use and trust	TAM (Davis, 1989)	Discover influence of perceived usefulness (PU), perceived ease of use (PEU) and trust on mobile website satisfaction. Positive association among PEU, PU, and mobile users' satisfaction. PU positively related to trust and mobile users' satisfaction. Trust positively impacts users' satisfaction	Perceived usefulness perceived ease of use, trust on mobile website satisfaction	Amin, *et al.,* [3]
Aspects influencing use of m-commerce: extended technology acceptance model perception	Final version TAM Venkatesh & Davis, (1996)	Extends Technology Acceptance Model (TAM) in perspective of m-commerce by integrating privacy and security construct (PS). Reach a considerate of user acceptance of m-commerce in Malaysia.	Perceived usefulness perceived ease of use, privacy and security	Barry *et al.,* [5]

Based on the analysis, the common acceptance model adopted for mobile applications were original TAM and extended TAM. The original TAM model is a theoretical basis that has a robust capability to clarify the use of technology by users as stated by Davis [10]. In this research, the final version of the original Technology Acceptance Model (TAM) developed by Venkatesh & Davis (1996) was employed to investigate the acceptance of the new application of Semiotic Icon Design Application for Reciting Quran (SIDAQ) and it is the better choice while performing an approximate analysis of technology and application adoption. This TAM model is established to accomplish an understanding of user acceptance of semiotic icon design application for reciting the Quran.
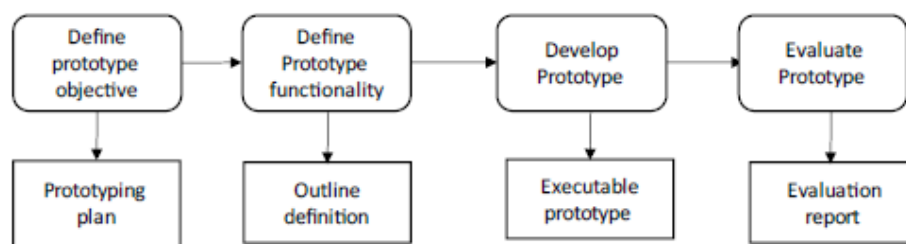
1.1.3 Prototyping Model

A prototype is a model that is not based on concrete planning but is a preliminary estimate of the final product or application. User can acquire an "actual feel" of the application when using this prototype, as the connections with the prototype can permit the user to better comprehend the essential of the anticipated application. The goal is to provide an application with overall functionality by Jordaan *et al.,* [21]. Nothing brings us closer to the final product functionality than prototyping. Prototypes assist in providing proof of concept. A prototype is a draft form of a product that permits us to discover the concepts and display the purpose behind the complete design concept to users before financing time and money in development as mentioned by Cao *et al.,* [7], Jackson and Ciole [20], and Mcelroy [29]. It is far inexpensive to modify a product early in the development process than to make any modification after developing the application.

Nielsen [34] has established that the major enhancements in user experience originated from collecting usability data as early as possible. He notes that it is inexpensive to make modifications before any code has been written than to wait till the implementation is complete. Hence, constructing prototypes early in the procedure should be considered. Prototypes are designed to

demonstrate how an application works in each situation. The prototype is typically not a comprehensive application and several of the details are not constructed into the prototype. The objective is to provide a system with complete functionality. Prototype production is a powerful tool that promotes integration, concept building, changes, and the success of application. Prototype development is very useful for discovering and satisfying user needs as stated by Fabil [13].

In this study, the choice of prototyping is because prototype production is usually a small scale that can indirectly act as a representative or model of working application. This study uses a different approach that combined the ADDIE model by McGriff (2000) and the Prototyping model by Sommerville [41] as a complete application development process. The prototype development process is shown in the following Fig. 3.

Source: Sommerville [41]

Fig. 3. Prototyping Model

The prototyping model consists of four steps namely define prototype, identify prototype functions, prototype development and prototype evaluation. An application prototype may be used while the application is being designed to convey out design trials and to check the viability of a suggested design. Overall, the application applied the four steps in prototyping the SIDAQ. The application was consequently installed on Android devices and tested for functionality in a real environment.

The fidelity of a prototype refers to how it conveys the look-and-feel of the final product (basically, its level of detail and realism). Fidelity can vary in the areas of visual design, content, and interactivity. A prototype can be anything from paper drawings (low-fidelity) to something that allows click-through of a few pieces of content to a fully functioning site (high-fidelity) by Cao, *et al.,* [7]. Table 5 summarized fidelity prototype and its advantages and disadvantages.

Table 5
Technology Acceptance Model for Mobile Applications

Studies	Findings	Advantages	Disadvantages	References
High-Fidelity	Allowing initial visualization of substitute design solutions.	Faster, better for product definition and estimates. Help prompt innovation improvement. Like real application Can test graphic element	Time-intensive, needs abilities with software or coding, tough to test big concepts	Zezovski and Hultgren [49], Cao *et al.,* [7], Mcelroy [29], Merdenyan *et al.,* [30]
Medium-Fidelity	To be able to explore design ideas further.	Photoshop can be used to create appropriate colour and effects for some icons and elements	More time-intensive, but not fully functional	Zezovski and Hultgren [49], Mcelroy [29], Cao *et al.,* [7]

	Take adjacent to a true depiction of user interface.	Great for quick collaboration and exploration. Sketches are quicker to create. Feel more comfortable suggesting changes using rough sketches. Fast, low-skill, cheap, prepared with existing materials. Less pressure on users. Less time to prepare a static prototype. Make design changes easier during test. Paper-based sketched icon can also determine icon recognition.	Often paper-based. Not allow user interactions. Evaluation more complex, unpredictable Abstractness and unclearness of images. Delay of reaction time. Narrow connections, tougher to test specifics and complete flows, slight context	Zezovski and Hultgren [49], Merdenyan *et al.,* [30], Mcelroy [29], Mustafa *et al.,* [31], Yatim *et al.,* [46]
Low-Fidelity	Much more effective in gathering true human performance data			

In this study, the research led to discussion of how to design the semiotic icon for Quran by low to high-fidelity prototypes that help the researcher do a more valid evaluation of the icon design. The low, medium, and high-fidelity technique was employed in the semiotic icon design. Each fidelity icon design needed to have the same icon interface, apply the same icon design elements, and involve user responses. Having paper-based low fidelity by sketching the icon is faster than the static prototype. Using the paper-based sketched icon can also determine icon recognition as mentioned by Yatim *et al.,* [46]. The process was followed by the digital design of mid fidelity prototype using Adobe Photoshop software. In the end, the final digital icon in high fidelity was designed and evaluated by youth and Quran experts. To enable design solutions, the icons were compiled in the mobile application platform as a working fidelity prototype of the application. Overall, these literature reviews assisted in designing the SIDFQ.

2. Methodology

This study has revised previous research on relevant theories, model, and icon design elements for mobile application. The researcher reviewed literature published between 2017 and 2022 from several online database, including Google Scholar, Scopus, Science Direct, and ProQuest, to identify the relevant articles, books, and reliable websites. The search terms used were: *"semiotic theory", icon design element", "icon design Quran", "usability model", "motivational design model," acceptance model", "prototyping model"," youth"* and *"reciting Quran".* The results were analysed and summarized to identify the suitable theories, models, and icon design elements for this study. The review identified the Theories of Semiotics, six elements of icon design for Quran, the ARCS Motivational Design Model, the PACMAD Usability Models, the Theory Acceptance Model (TAM), and the Prototyping model as key foundation. Finally, the study proposed both theoretical frameworks, and a conceptual framework for semiotic icon design for Quran.

3. Results
3.1 Theoretical Framework

The theoretical framework is the basis of the research structure which contains several theories that support the research conducted. The theoretical framework is also used as a guide to the whole study by Siraj *et al.,* [40]. Based on literature on the theory and model related to this study, the researcher illustrated the proposed theoretical framework for this research as in Fig. 4.
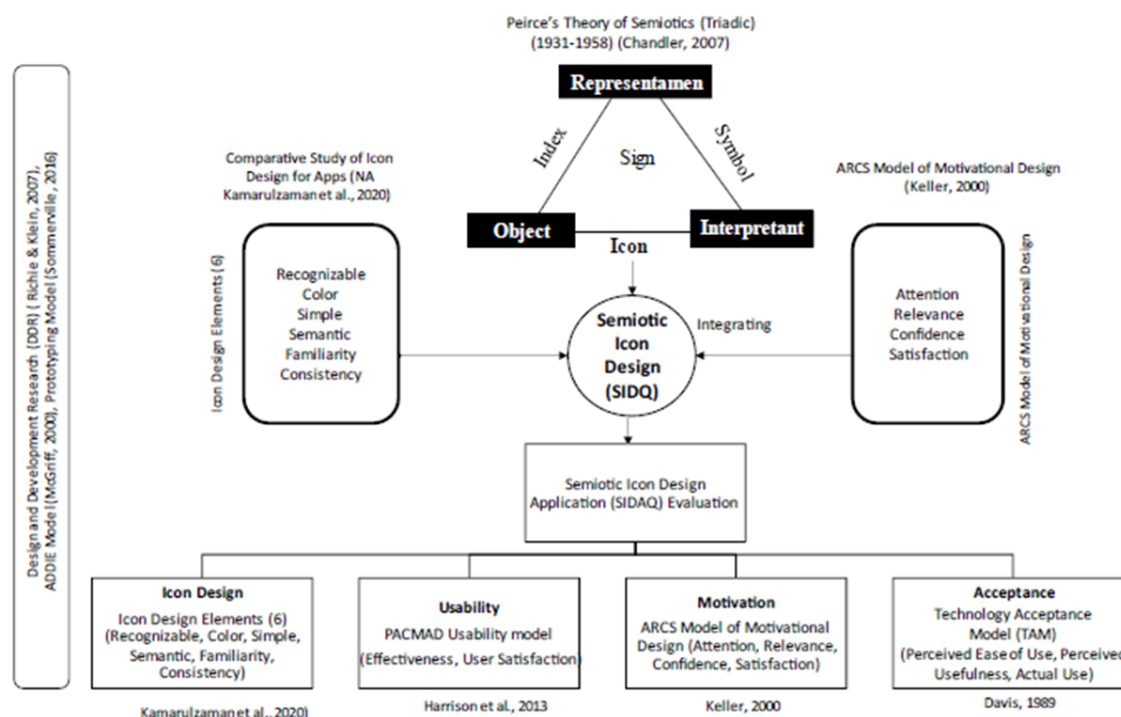
Fig. 4. Proposed Theoretical Framework for Semiotic Icon Design for Reciting Quran (SIDQ)

For its theoretical framework, this research employed Peirce's Theory of Semiotics (1931-1958) by Chandler [8] as the underpinning theory for this study. This theory was selected because it emphasizes visual icons as signs and is well suited to the focus of this study. This research adapted the proposed six icon design elements from comparative studies by Kamarulzaman *et al.,* [22] and the ARCS model of motivational design by Keller [24] to design the semiotic icon. The evaluation of semiotic icon design application proposed icon design element on icon design evaluation was based on the PACMAD usability model by Harrison *et al.,* [17] for usability evaluation, and the ARCS model of motivational model by Keller [24] for motivation evaluation and Technology Acceptance Model (TAM) by Davis [10] for acceptance evaluation. ADDIE model (McGriff, 2000) and Prototyping Model by Sommerville [41] were implemented throughout the phases. Fig. 1 illustrates the theoretical underpinnings of this research. The proposed framework will be validated during the Phase 1, the needs analysis stages of this research.

3.2 Conceptual Framework

The conceptual framework of the study is in the form of steps taken to conduct the entire research, along with the relevant theories and models. To explain the conceptual framework of the study, a diagram is required to show how the theory is related to the design of the study. This is such that the research we conduct will be better understood and more focused. Researchers will be able to see the whole process of conducting research in a more transparent and efficient manner Siraj *et al.,* [40]. Fig. 5 summarizes the conceptual framework for this study, demonstrating the overall process of carrying out this research.
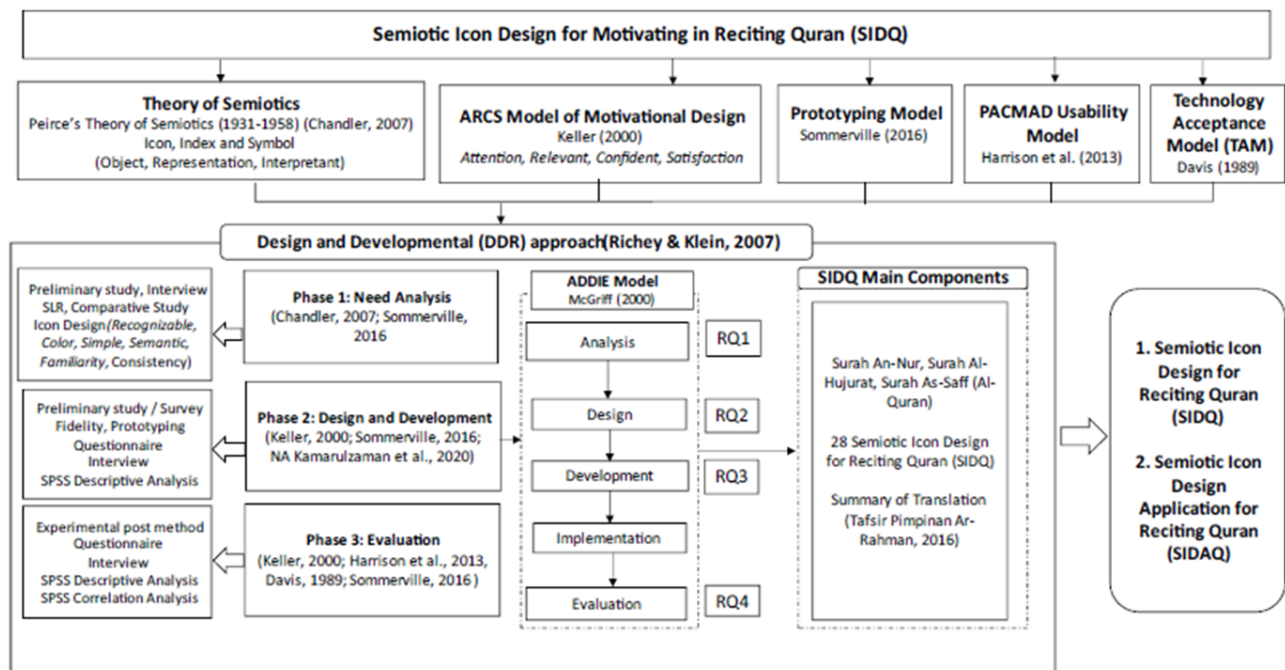
Fig. 5. Conceptual Framework for Semiotic Icon Design for Reciting Quran (SIDQ)

The conceptual framework aimed at illustrating how the objectives of the study were achieved by connecting the elements, theories, framework, and models to design semiotics icons for reciting the Quran and develop the prototype of semiotic icons design application. The design and development as mentioned were to serve as a technique and a supportive tool to visualize the Surah genre. The proposed framework will be validated during the Phase 1, the needs analysis stages of this research.

4. Conclusions

In conclusion, this study proposes the Semiotic Icon Design Framework for Reciting Quran (SIDFQ), integrating principles of semiotics, usability, motivation, and technology acceptance. Developed through literature review, preliminary studies, comparative studies, and expert input, demonstrates strong potential to guide the design of semiotic icons that represent Surah genres. By integrating the ARCS model of motivational design, PACMAD usability model, and Technology Acceptance Model (TAM), SIDFQ offers a structured approach to design and develop of the supportive visual tools that can assist to motivate youth in reciting Quran. Future studies should focus on empirical validation and refinement of the framework to further improve its adaptability.

Overall, this study serves as a theoretical and conceptual foundation for semiotic icon design in reciting Quran. This research makes a significant contribution to both the field of icon design and its application within the Quranic domain.

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