

Interactive Digital Maps for Early Childhood Islamic Learning

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DOI: <https://doi.org/10.30880/mari.2021.02.03.023>
Received 05 September 2021; Accepted 05 October 2021; Available online 15 December 2021

Abstract : The capability of displaying the infographics and visualizations methods represent the significance of this system in illustrating a story using pictures, text, or voice in a manner that kids can understand and be attentive. The infographics can help the kids to understand the information more easily. The web-based system provides a new way of learning Islamic education by providing relevant age-appropriate knowledge for kids or lower primary school children. The content portrays the journey of Prophet Muhammad in an interesting and attractive manner supported by the geographic infographics design. Digital maps were chosen to construct the infographics knowledge. The purpose of this study is to develop an interactive digital map web-based system for young kids. The system can be a support tool for kids, particularly in addressing problems related to learning boredom. The children learning progress will be affected if they cannot comprehend complicated material. The system was developed using the Prototyping methodology. The system requirements were evaluated by primary kids, teachers, and parents using a questionnaire. The results indicate positive feedback and signify that the Salam Muhammad website is user-friendly and beneficial. The system offers an interactive platform that can improve children's thinking and learning skills.

Keywords: Digital Maps, Islamic Education, Web-Based, Children.

1. Introduction

New technologies in the 21st century, such as language mapping, are readily adopted. A digital map is an interactive version developed by combining electronic information graphic elements with graphical user interfaces (GUI). A map can be generally defined as “a visual representation of an environment” [1]. The enhancement of the available digital information requires respective tools that can help students and teaching staff to organize and integrate e-resources effectively and in achieving learning and education goals [2]. Many researchers argued that the digital maps concept met the needs of students and teachers in organizing digital content. However, by combining the web geographic and multimedia tools, the capacity of storytelling and audience has increased. In addition, there are many

platforms available for experts as well as non-experts [3]. The transmission of spatial information via the web involves multimedia, such as graphics and photos or videos. This mapping method can improve one's attention in reading and looking for something new in knowledge. Interaction is a human–map communication system [4]. Besides, some research has used a map as a storytelling platform in the field of journalism. Thus, helping the geo-visual stories or maps to grow. These stories can be used to explain data using maps, texts, photos, and graphs [5, 6]. However, the popularity of using story mapping has risen in the form of maps and atlases. Atlases tell history through a collection of topics illustrated by maps, charts, diagrams, and images together with explanatory text [7]. Teachers perceived history maps as effective educational instruments [8]. According to [9], education is a sector with a greater potential for technology incorporation in the world. Early childhood education is particularly important, since the foundations of the environmental culture of individual child have been laid during that period [10].

2. Materials and Methods

There are many models and methodologies for developing a web application. Models and methodologies define the entire development process cycle, including usability achievement, release, and maintenance. For this system, the Prototyping Methodology from [11] was adopted. This methodology can significantly reduce the number of unknown application issues in the future. Figure 1. shows the phases of the Prototyping Methodology, which include planning, analysis, design, and implementation.

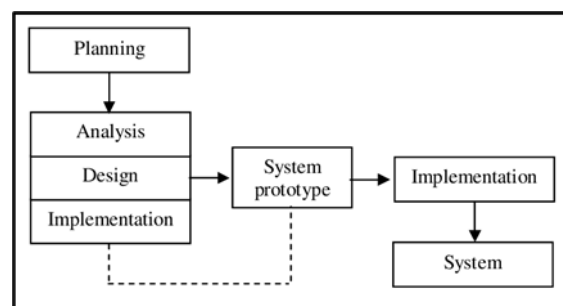


Figure 1: Phases of Prototyping Methodology

The planning phase started by identifying the goal, scope, and possible solutions. In the analysis phase, various requirements such as system capabilities, conditions, and user characteristics were defined in detail. For example, the system must be available in a web-based design and opened 24 hours per day, except during the occurrence of some issues or errors. The system can also display story and play voices for the users. The design phase concentrated on the functional and non-functional requirements of the system and system interfaces. The four functional requirements include “Search a story”, “Explore Map”, “Give feedback”, and “View feedback”. The non-functional requirements include “Accessibility”, “Reliability”, and “Usability”. The Unified Modelling Language (UML) was used to model and visualize the requirements. This model used the structural diagrams known as use case and class. The StarUML was used to draw the models. The class diagram shows the relationship between the attributes and operations of the system. The three main classes are “websitepage”, “browser page”, and “user”. The system interface utilized the map application or software to display the map of Saudi Arabia. The infographics were then added to the interface as well as voices to read the story. Furthermore, a low-fidelity prototype was developed to reflect a simple design that will provide an idea to the user about the proposed system. Next, the high-fidelity prototype was constructed. The initial evaluation was presented to the supervisor to identify the reliability and weaknesses of the proposed model. Field-testing was also conducted among selected respondents to obtain feedback on their experience using the system. This phase is important as the comments and suggestions help to improve the system. If improvement were required, the current prototype has to be refined. Lastly, in the implementation phase, the operational system was developed based on the final prototype that has been

approved after the Interactive Digital Maps had been tested by the supervisor. At this stage, the Interactive Digital Maps named as Salam Muhammad was launched.

3. Results and Discussion

In this work, NetBeans and MyPhpAdmin were used as the integrated development environment (IDE) tools and for handling the database and data storage, respectively. The homepage interface of the Salam Muhammad website is displayed in Figure 2. The contents include map, logo, name of the website, and navigation menu on the top left side. This website employed Google Maps that focuses on Saudi Arabia. The maps also consist of icons that users can click to read the story related to the location.

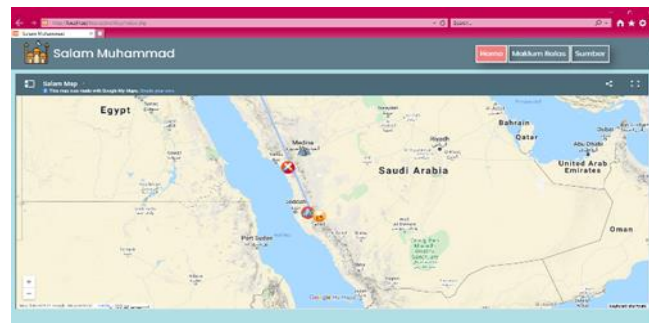


Figure 2: Homepage of the system

A questionnaire was used to evaluate the system. The usability testing was conducted through online (unmoderated). The quantitative-based survey was distributed to the selected respondents using google form. The targeted respondents comprised lower primary and preschool children, teachers, and parents. Before answering the survey, instructions were given to the respondents in the google form. They will then clicked on the link to explore the website once they have read and agreed to the consent form. The collected responses were analyzed to conclude the results. The main purpose of the evaluation was to gather opinions from the respondents' experience while using the Salam Muhammad Website. Most importantly, to distinguish the collected feedbacks and understand the implementation of Islamic education through the website. The analysis results of the first section (demographic) depict that 73.0% of the respondents are students, 21.0% parents", and 6.0% teachers. Most of them (44.1%) haven't heard about the Interactive Digital Maps, followed by 35.3% maybe, and 20.6% yes. Similarly, majority (41.2%) have used other Islamic education web applications whilst 35.3% may have, and 23.5% no.

The second section (Section B) of the questionnaire focuses on the system functionality and user satisfaction. This section measures the usefulness, ease of use, and satisfaction of the Salam Muhammad website using several Likert-scale questions. Table 1 lists the responses according to the individual scale as rated by the respondents.

Table 1: Responses for ease of use of the Salam Muhammad website

Post-task questionnaire	<i>Strongly disagree</i>	<i>Disagree</i>	<i>Neutral</i>	<i>Agree</i>	<i>Strongly agree</i>	<i>Total respondents</i>
This system is easy to use.	0	0	8	12	5	25
This system is user friendly,	0	0	8	11	6	25
The interface of this system is pleasant.	0	0	9	10	6	25
I can easily remember how to use it.	0	0	9	11	5	25
It is easy to find the information I needed.	0	0	11	8	6	25
I can recover from mistakes quickly and easily when using the website.	0	0	9	13	3	25

The results of Section B signify that the website is user friendly and useful for the respondents. In addition, the interface and information provided in the system are delivered well to the respondents. They also perceived that the website can give them more knowledge and would certainly recommend it to their friends. Salam Muhammad also helps them to save time and is pleasant to use. Lastly, the system's interface, content, and navigation need further improvements. Some additional features were also suggested such as more stories, a chat box, and better design.

4. Conclusion

This paper describes the process of designing and developing the web-based Islamic education system using interactive digital maps. This system represents the supporting tools for the teaching/learning processes of lower primary and preschool children. Children have to be constantly encouraged to love reading to foster brain growth, imagination as well as language and emotion development. Therefore, the children need alternative support since some books might be boring. For future work, this system can be applied to other subjects such as geography and history by including more features in various languages. It is also hoped that this system can help more people to learn and understand the journey life of other Prophets.

5. Acknowledgement

The authors would like to thank Innovative Research, Invention and Application Exhibition (I-RIA) 2021 organized by School of Computing, Universiti Utara Malaysia for its support.

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