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USER-CENTRIC MOBILE APP INTERFACE DESIGN FOR LEARNING MALAY SIGN LANGUAGE

a chapter by

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Introduction

As technology continues to advance, there is a growing demand for user-friendly interfaces that cater to diverse needs. This study focuses on the interface design of a mobile application aimed at teaching sign language to a wide range of users. The interface design is crucial in ensuring an inclusive and accessible learning experience for individuals with hearing impairments. In this paper, we will explore the key considerations for designing an intuitive and effective sign language learning app interface, including visual elements, navigation, and interactive features. The goal is to provide a comprehensive guide for designers and developers to create an engaging and accommodating platform for learning sign language.

Designing a learning application is a crucial aspect of developing effective teaching aids. Application design can be categorized into two types: static design and dynamic design (Inukollu, Keshamoni, Kang, Manikanta, & Inukollu, 2014). In the referenced study, researchers utilized a dynamic design, which can significantly influence students due to its interactive nature incorporating five multimedia elements. The application design is grounded in a constructivist theory, elucidating how the learning method relies on the incorporation of five design elements that can profoundly impact learning through mobile applications. Teaching methods employing constructivist approaches in the design of technology-based educational materials, such as mobile devices, have demonstrated a more substantial impact compared to existing approaches (Hairiah, 2012).

The development of a teaching aid depends on several design aspects. Sumin, Roziati, Bilal Ali, and Mohamad (2004) asserted in their study that the evaluation of an aid is based on two aspects: screen design and interface design. Screen design incorporates five multimedia elements, namely text, graphics, audio, video, and animation (Junaidi et al., 2006). Interface design is grounded in aspects such as consumerism, interactivity, reinforcement, and navigation. Shamsul Anuar and Siti Mashitah (2015) emphasized that application design should be tailored to the user's needs, considering content design, interface design, and usability.

Mobile app design comprises two types: static design and dynamic design (Othman, 2010). According to Hendron and Fernandez (1983), one of the key considerations in developing a mobile application is the choice between static and dynamic design. Therefore, in the technical context, the proper selection of design is a crucial initial step towards the successful development of mobile applications.

Static Design

A static design is a fixed or non-moving design, characterized by its static nature, comparable to an image (Inukollu et al., 2014). Static design is often associated with conventional learning methods where the design is static and less engaging (Rio Sumarni Shariffudin, Abdul Hafidz Omar, & Dayang Hajjah Tiawa Awang Haji Hamid, 2007).

The design of static applications does not rely on a connection to the server or online database (Deka et al., 2017). Applications developed in this manner are downloaded only once, typically receiving periodic updates, and can operate offline using the devices on which they are installed. Static application designs can also be installed on other devices on a large scale. Since this type of application is easily accessible through simple download links, it can be distributed to millions of users without encountering issues related to internet access speed.

However, due to the same reason, the process of updating static design applications is at the discretion of the designer. To receive good service, users must enable a few personal settings to install this application. This exposes the user to the risk of potential security threats. Therefore, it is crucial for static application design to undergo thorough security testing to ensure the protection of users' personal data (Zhou, Sun, & Lu, 2018).

Dynamic Design

Dynamic design is a fluid and action-oriented design that incorporates the supportive properties of static design (Inukollu et al., 2014). Dynamic design integrates multimedia elements to create applications that offer an enhanced learning experience.

An application with a dynamic design relies on the server or online database (Money, Chen, Song, Lan, & Parsaei, 2017). Ahmad, Gani, Hamid, Xia, and Shiraz (2015) emphasized that internet-accessible applications maintain a direct connection to the central server, ensuring users receive any recurring changes to the application. The updated design or functionality is simultaneously applicable to all devices.

In the context of development, Hallsteinsen, Hinchey, Park, and Schmid (2008) stated that the development cost for applications with dynamic design is higher due to the need for consistency with new content, ensuring users always receive updates. The costs of dynamic application design can be optimized by ensuring suitability for all types of devices (Zhang, Kunjithapatham, Jeong, & Gibbs, 2011). Dynamic application design also requires adaptation to new features on devices since the development is not limited to a designated device.

Summet (2010) highlighted among the advantages of an application with dynamic design is providing a platform for interaction between users. This enables users to interact with each other not just using phone lines but through the app. However, this development should be scrutinized in terms of different content and designs based on a designer. Specialized guidelines for application design should be established to ensure specific standards are met.

Mobile Application Design Elements

According to Arhippainen and Tahti (2013), Zaidatun, Jamalludin, and Nurul Syazwani (2013), and Zulkifli Ahmad (2012), three key elements in application design are interactive design, information design, and interface design. However, interactive elements need to be applied in application development design (Arhippainen & Tahti, 2013; W. Weeks, Lyne, & Mosely, 2011) because interactive elements make app design more dynamic. In addition, usability should also be applied in mobile application development (Kangas & Kinnunen, 2015) as mobile app-based learning is more geared towards student-centered learning.

The usability element is also important to ensure that students can use it unattended, and they don't need specific training related to the app to use it (Kangas & Kinnunen, 2015). Links or navigation should also be applied to allow students to access information, and it is applied to open the space for students to access learning materials or references (Siti Zaharah Mohid, Muhammad Hazizy Mohd Joha, Azfi Zaidi Mohammad Sofi, Noorfadzilah Ab Rahman, & Nurkhaliza Khalid, 2015).

The basic elements of learning using mobile apps are students, teachers, environment, content, and assessment. The figure below shows the basic elements in learning based on an effective mobile application approach.

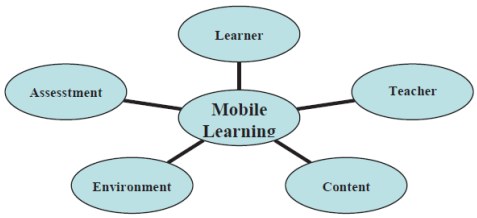

Figure 1: Basic elements of mobile app learning, Ozdamli and Cavus (2011)

Students are the primary elements of teaching and learning activities, while other elements serve students in the learning process. According to Henrie, Halverson, and Graham (2015) and

Oyelere, Suhonen, Shonola, and Joy (2016), mobile learning builds on students' interests, experiences, and needs. It is noted that the approach to learning using mobile apps positions students as crucial elements in teaching and learning, with an active role throughout the learning process up to the assessment stage.

Furthermore, the teacher serves as the person conveying information to students based on books and other media components in both conventional and digital learning environments. In the digital learning environment, information is stored for students to access. According to Brown, Dehoney, and Millichap (2015), the digital learning environment has introduced a new dimension in teaching and learning, significantly influencing the role of teachers compared to conventional learning in terms of information access.

Content is also a vital element in teaching and learning. Learning content development should involve all stakeholders, including students, teachers, parents, and others (Kearney, Burden, & Rai, 2015), ensuring that the created learning content meets the needs of students. Ozdamli andCavus (2011) state in their study that the details and extent of the content provided to students may vary depending on the students' needs.

Another element of mobile learning is the environment, where a positive environment can enhance the learning experience (Sarrab, Elgamel, & Aldabbas, 2012). In the context of learning using mobile apps, the environment is where students access information. According to Garcia Penalvo and Conde (2015), a good learning environment should improve interaction between students and teachers.

The last element in learning with mobile apps is evaluation. Some mobile applications use assessment methods such as check-ins to databases, software packages, online exams, online quizzes, project assessments, and so on. Wiliam and Thompson (2017) describe assessment as a method of identifying students' capabilities, pinpointing weaknesses, and providing formative guidance to help students achieve success. According to Schmoker (2018), assessment helps students identify shortcomings in a specific learning activity. A well-designed learning activity can provide instant feedback, enabling students to assess how well they understand the content in their learning.

Conclusion

To achieve favourable learning outcomes and maximize students' performance using mobile learning in education, each element of mobile learning should be meticulously prepared, and mobile learning features should be designed and provided with an understanding of the teaching medium, learning environment, and learning activities. Otherwise, positive results cannot be expected from the mobile application. Good design contributes to an increase in the level of achievement and skills of students in sign language learning. However, the development of a mobile app needs systematic and well-organized planning in presentation and design. Additionally, good design can enhance students' motivation, skills, and achievement.

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