Wireframe of Mobile Web Applications as Digital Literature in Food Services

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Abstract. This study aims to assess the feasibility of the initial design of a mobile web application as digital literacy in the arrangement and service of dishes. The research method used is R&D (Research and Development) using a 4-D development model (Define, Design, Develop, Disseminate). Data analysis uses two ways, namely qualitative analysis for quantitative data and qualitative analysis. Validations result from the assessment by material experts, media experts and linguists. The results of the material expert's assessment, and the linguist said it was feasible. Based on the results of expert assessments, it was shown that the initial design of the mobile web application that has been developed is feasible to proceed at the stage of finalizing the mobile web application as digital literacy in the arrangement and service of dishes.

Keywords: Mobile · Web Learning · Wireframe

1 Introduction

Information technology is rapidly evolving and influencing every human life in the industrial revolution 4.0 era. The development of the internet, whose use has penetrated a variety of areas of people's lives today, marks the industrial revolution 4.0 era. Education is one area that is affected by technological advances. The challenges faced by educators in the era of the industrial revolution 4.0 include the inability of teachers to access and master technology, low media literacy, and the few educators who have access to information technology. It's possible that students or students participating in the learning process are directly interacting with robots specifically designed to replace educators in the field of education in the society 5.0 era, or that educators are controlling robots remotely. According to Zulkifar Alimuddin, Director of Hafecs (Highly Functioning Education Consulting Services), teachers must be more innovative and dynamic in the classroom during the society 5.0 era [1].

The application of technology as a learning tool can be a concern for universities to produce quality graduates and have competency-based education competencies which are one of the main missions of higher education. Each student possesses unique talents

and abilities, an information technology approach is required to assist in selecting the appropriate course of study based on those abilities. Utilization of (IoT) Internet of things in the world of education helps communication between lecturers, students in the teaching and learning process and to find out, identify learning needs needed by students.

However, the educational model of today is very similar to that of the past. Students may be involved in ineffective educational methods and may be distracted from their studies as a result of the characteristics of mobile devices and the lack of experience of educators and educational institutions. These educational models are being altered by the digital revolution, which involves students, teachers, and educational establishments [2]. The overall examination of the exploration shows understudies are inclined toward utilize their cell phones in the educating educational experience since they are know all about their use. In addition, the outcome of m-learning is exceptionally reliant upon the instructive foundation, the educators in question, and the understudies. Because of the actual attributes of cell phones, mechanical restrictions are one of the main pressing concerns this innovation has for its utilization in the instructive region [3].

The use of learning technology is to facilitate efforts to improve human resources and organizations in improving performance [4]. One of the learning activities that utilize more dynamic technology is known as mobile learning, mobile learning is part of online learning/e-learning, where the characteristics of e-learning specifically refer to learning that is personal, interesting, interactive, relevant and practical, and social, and focuses on aspects such as gamification, informal learning accreditation and lifelong learning. Mobile learning combines individualized learning with anytime, anywhere learning to utilize their free time [5].

The use of mobile learning in learning with covid 19 pandemic situations is very helpful in the knowledge transfer process and also provides near-real clarity for practicum material. One of the practicum materials that must first understand the theory is the types of services in restaurants where students must first understand the theory so that they can carry out the practicum. To provide students with independent learning and digital literacy, where digital literacy involves more than just "reading," but also improving their ability to analyze and use digital information [6]. This research focuses on developing wireframes of mobile web applications as digital literature in food services.

2   Methods

The R&D (Research and Development) method was utilized in this investigation. The scientific approach known as the "research and development method" is used to investigate, design, produce, and validate existing products. [7]. R&D is used to design new products and processes, and then apply research methods to field trials to evaluate and improve products and processes until they meet efficacy, quality, and standardization standards [8]. This research is research conducted to obtain new products resulting from the development of existing products with the 4D model. Define, Design, Develop, and Disseminate are the four main stages of the 4D Development Model. The research procedure carried out in this study is limited only to stage 3, namely the development process. The following are the research development procedures used in this study.

2.1 Defining Stage (*Define*)

The first procedure in this research is the defining stage which has the aim of determining the needs in learning and to gather various information in order to overcome existing problems state that the defining stage is done by: (1) analysis of front-end activities, (2) learner analysis, (3) task analysis, (4) concept analysis, and (5) specifying instructional requirements [9].

2.2 Design Stage (*Design*)

The second stage of this research is to design the wireframe of the application to be developed.

2.3 Development Stage (*Develop*)

The development stage is carried out after going through revisions based on input from material and design experts related to application wireframes. The steps taken at this stage are: Validation by experts (Expert Appraisal). The results of the development test include validity tests and readability tests.

2.4 Dissemination Stage (*Disseminate*)

It is a stage of disseminating wireframe mobile learning applications to students to assess application design and attractiveness for use as digital literacy.

When all of the data has been gathered, the data analysis technique and the data analysis process are carried out. Mobile learning products on American service that meet the criteria of validity, practicality, and practicality were obtained through data analysis. The explanation of each criterion is as follows. The steps of data analysis conducted in this research are as follows.

1) Data Tabulation

Using a rating scale and a measurement scale based on the validator's value, data tabulation is done by evaluating the assessment aspects. Teachers, media experts, and material experts are the in question's validators. The table below provides guidelines for evaluating the media validity assessment sheet (Table 1).

Table. 1. Assessment guidelines

Preferred Alternative	Score
Very Good	4
Good	2
Fair	3
Less	1

Table. 2. Feasibility scaled

Percentage	Criteria
81%–100%	**Very Decent**
61%–80%	**Feasible**
41%–60%	**Decent Enough**
21%–40%	**Not Decent**
0%–20%	**Very less worthy**

2) Calculation of Average Aspect Score

Expert validation sheets, educator response sheets, student response sheets, and Likert scale data analysis were used to collect the research data. The following is the percentage calculation formula:

$$xi = \frac{\sum S}{S_{max}}$$

Description:
S_{max} = Maximum Score
$\sum s$ = Total Score
Xi = Questionnaire eligibility value for each aspect
With the following feasibility scale:

Twenty-first-century learning has been defined by various opinions, this is important for everyone to understand. The definition of 21st-century learning according to Donovan & Green (2014: 15) is the recognition that every student needs to have knowledge and skills that can help them succeed in a diverse and more technology-centered global society so that students can master the content of knowledge and be able to demonstrate higher order thinking competence by using a creative and collaborative approach (Table 2).

Then Greenstein (2012) states that students living in the 21st century must master science, have metacognitive skills, be able to think critically and creatively and be able to communicate or collaborate effectively. While Morocco et al. (2008: 5) state that life and learning skills in the 21st century are characterized by high understanding, critical thinking, collaboration and communication skills, and creative thinking. Therefore, in 21st-century learning, the application of technology is the key to helping students achieve success in learning so that they can understand and have high-order thinking skills so that they can think critically, collaborate and communicate and think creatively to face global competition.

3 Result

The results of new product development are limited to wireframes of mobile applications by designing material features related to service and serving dishes presented in mobile learning applications which are the initial stages in making mobile applications, in order

to produce quality mobile applications so that they can be used as digital literacy for students. An instructional system known as distance learning features individualized lecture design, methods, and techniques in addition to a variety of independent learning environments. From letter learning to mobile learning, distance learning has improved [10]. These organizational, social, and cultural considerations must be taken into account when wireless and mobile education are implemented in higher education. They can be explicit and formal or tacit and informal, and they can be very different between and within institutions. Disciplines have their own distinct cultures and concerns within institutions, which are frequently strongly influenced by professional practice in the "outside world," particularly when it comes to part-time instruction and distance learning [11]. Any investigations into broader institutional issues are still tentative due to the fact that the majority of mobile learning work is still in the pilot or trial phase. Peters believes that human (or soft) systems can benefit from mobile technology's ability to provide synchronous communication and knowledge sharing [12]. Ragus (2004) found that m-Learning encouraged simultaneous personal development outside of normal working groups, such as networking and socialization—an unexpected but positive result of the m-Learning trials [13]. According to research on the use of ICT in education, it is only effective when developers comprehend the technology's advantages and disadvantages and incorporate technology into appropriate pedagogical practices [14]. Based on the mobile application wireframe feasibility assessment, we have obtained the following results:

At the Define stage, learning Restaurant Arrangement and Service the results obtained are still not optimal, this is known from the data on the average value of restaurant arrangement and service, the average value is 68 in odd semester and in even semester with an average value of 74.20. Based on the results of the needs analysis of the 2018-2019 Catering Education Study Program students using google form media from 28 students strongly agree that digital learning resources should be developed to make it easier and simpler to learn.

The target users of mobile learning as digital literacy in the Restaurant Arrangement and Service course are students of the Tata Boga study program. Users have mastered the basics of operating smartphones and computers and know how to use the m-leraning application.

At the Design stage, the approach taken in developing this mobile learning wireframe uses an application web page that contains material equipped with reading materials, images, video tutorials, and several practice questions, which can be accessed using a cellphone, computer or laptop either online. The format chosen is barcode because barcode can be accessed using a mobile phone or device and can be directly accessed with the device used. The barcode format was also chosen to make it easier for students to learn in class or study independently. The material design for database learning media includes (a) Explanation of service type concepts equipped with reading materials in the form of digital flipbooks; (b) Explanation of service preparation equipped with video tutorials; (c) Explanation of presentation and service equipped with video tutorials to strengthen understanding; (d) Practicum guidelines in the form of downloadable planning practicum; (e) Practice questions in multiple choice format with a certain time limit to test student understanding. In the menu design, the stages carried out are (a) Home Menu,

which is a menu to go to the main page/home page or commonly called the Home page. On the main page, there is a motivational slide show for users to be more enthusiastic about learning. This slide show is only available on the main page; (b) Introduction Menu, the introduction menu is a menu with preparatory content before heading to the database material. There are sub-menus for Table of Contents, Instructions for Use, SSP, and References; (c) Material Menu, the material menu is a menu that contains database material. This menu is the main content of the mobile learning application. In this menu there is a list of materials and practice questions; (d) Video Menu, the video menu is a menu that contains video tutorials related to the stages / service procedures that will be carried out during the practicum. This video is presented to provide real illustrations and strengthen understanding; (5) Download Menu, download menu is a menu to download the material contained in the mobile learning application so that users can study database material offline; (6) Forum Menu, forum menu is a menu where users can interact with each other to discuss database material or discuss how to use the mobile learning application itself; (7) Contact Us Menu, contact us menu is a menu for users to contact the admin if there are suggestions, complaints or questions.

Stage Develop, the develop stage begins to develop a design which in this case is a wireframe of a mobile application by developing (a) American service mobile learning application material/content, the material is prepared in accordance with the RPS and the results of the media needs analysis. Literature studies used in the preparation of mobile learning applications for American service materials come from books, journals, e-books, and the internet; (b) Conducting the process of making features contained in the application, the process of making content (RPS, flipbooks, video tutorials, evaluations) contained in mobile learning applications through three stages, namely the pre-production stage, the production stage, and finally post-production; (c) The pre-production stage, begins with concept processing based on the purpose of product creation and the material to be delivered. Through the purpose of the product and the material, it will then be processed into an attractive learning application display; (d) Wireframe, created to provide a rough picture of the storyline in the mobile learning application to be created, which will later be developed back into a mobile application display form.

At the develop stage, validation is also carried out by experts so that the application to be developed is more perfect so that it can be continued in the finalization of application development. Conducted with three experts, namely material experts, media experts, and linguists. Aspects validated by material experts are Information presented in the learning program is free from conceptual errors and direct explanation of the core material, Suitability of information with the applicable curriculum (up to date) and in accordance with Core competencies / Competency Standards / and Basic competencies, Clarity and suitability of the contents of the learning program with learning objectives, Material in learning has sufficient depth, not too deep or not too shallow, The references used are sufficient for user needs in learning the contents of the learning program with a total of 16 items (Table 3).

$$P = \frac{74}{80} \times 100\%$$
$$P = 92,5\%$$

Table 3. Material expert results

Total	74
Average	4,6
Percentage	92,5%
Media Quality Category	Very Good

The aspects validated by media experts are clarity of features, narration and suitability of language and communication styles with audience characteristics, attractiveness of application packaging, accuracy and attractiveness of the application as a whole with a total of 13 items. The outcomes of the feasibility of learning media that have been confirmed by media professionals are as follows:

$$P = \frac{64}{65} \times 100\%$$
$$P = 98,4\%$$

Based on the validation results, it is known that the score obtained is 64, with an average of 4.9 and with a percentage achievement of 98.4% which can be categorized as "Very Good". While the aspects assessed by linguists are Language Accuracy, the language used to convey messages is easy to understand, Writing accuracy, the writing used is easy to read with a total of 10 items. The following are the results of the feasibility of learning media that have been validated by linguists (Table 4).

$$P = \frac{45}{50} \times 100\%$$
$$P = 90\%$$

Based on the validation results, it is known that the score obtained is 45, with an average of 4.5 and with a percentage of achievement of 90% which can be categorized as "Very Good" Based on the results of validation by experts, improvements are made and then returned and declared feasible, then the student trial stage will be carried out (Table 5).

a. *One to one*

Tests conducted on 3 students obtained that all students stated that the wireframe mobile application had very good quality in the aspect of placing material features

Table. 4. Media expert results

Total	64
Average	4,9
Percentage	98,4%
Media Quality Category	Very Good

Table 5. Linguists results

Total	45
Average	4,5
Percentage	90%
Media Quality Category	Very Good

with a percentage of 100%; then as many as 3 students stated that the wireframe mobile application was of very good quality in the display aspect with a percentage of 100% and quality in the aspect of convenience with a percentage value of 89%. The average for the overall assessment is 96% which can be interpreted that based on one to one evaluation, the wireframe mobile application has very good quality which can be used as digital literacy in learning restaurant arrangement and service. There are numerous advantages and disadvantages to using mobile devices in education [15]. From a pedagogical point of view, the primary obstacle is clearly defining what should be learned outside of the classroom, what should be learned in the classroom, and how these two can coexist [16].
b. *Small Group Test.*

Researchers conducted a trial to a small group of Tata Boga students totaling 8 people following the theory of [17]. Students were given a wireframe mobile application, then students were asked to assess, based on the results of a limited group test (small group evaluation) conducted on 8 students, all students stated that the wireframe mobile application had very good quality in the aspect of placing material features with a percentage of 100%; then as many as 8 students stated that the wireframe mobile application was of very good quality in the display aspect with a percentage of 100% and quality in the aspect of convenience with a percentage value of 96%. The average for the overall assessment is 99% which can be interpreted that based on the limited trial (small group evaluation) the wireframe mobile application has very good quality with a very positive response to be used. Features related to the design of educational app content that give students real-world experiences [18] Due to the limitations of battery life, size, and input and output interfaces, the use of mobile devices necessitates the creation of very specific user interfaces [19]. The goal of m-learning should be to create a real learning environment and emotionally charged mobile applications that customers enjoy [15].
c. *Field Group Test*

The last user trial of this formative evaluation was a field trial with 30 Catering students. Students are given a mobile application wireframe, then students are asked to fill out a questionnaire. Based on the results of the field test conducted on 30 students, the average value of the developed mobile application wireframe was 4.45; the average display value was 4.28 and the convenience with an average of 4.39. The average for the overall assessment is 4.37 which can be interpreted that based on the large group test (field test) the mobile application wireframe is feasible to be developed into a mobile application that can be used as digital literacy in learning restaurant arrangement and service. An average percentage of 87.46% was obtained which can be categorized as "Good" quality with a very positive response. This shows that in the field group test, interactive multimedia is declared feasible with good quality, can be accepted and used

properly. The presence of m-learning is expected to be able to support the concept of lifelong education. Research conducted by Khomarudin et al., (2018) who get the results that the resulting android based m-learning media products get results in the category of very effective, feasible and can be used in learning artificial intelligence courses [20].

This is in accordance with the opinion of Fatimah & Mufti (2014), which states that the use of Android-based learning media produces very good quality criteria (SB) with a percentage of 89.09%. The limited test was carried out to 6 students and categorized in Very Good (SB) criteria with a percentage of 93.78%. While the extensive test is distributed to 30 students and the result of the test is categorized in Very Good criteria (SB) with a percentage of 96.30% [21]. The use of these learning media as a support for independent learning is expected to attract students 'interest and attention and can also improve students' mastery, because it can explain abstract material to students. This is very helpful for students to learn because they are no longer limited by space and time [22].

Open source mobile learning makes it possible for anyone to customize it to meet their individual learning requirements [23]. With its various benefits and advantages, m-learning is expected to be a new innovation in alternative learning sources that can promote the students' motivation, the efficiency and effectiveness of the learning process and increase students' learning outcomes in Indonesia in the future [24, 25]. Teachers can take advantage of mobile learning with an integrated approach so that students can use mobile learning for independent learning, do homework, repeat lessons and so on [26, 27]. Blended learning, which in this case is a combination of classroom learning and the use of mobile learning, can maximize face-to-face advantages in class and online methods, of course with interesting content and tailored to the students' needs. This raises many challenges in the development of m-learning which can really play a role in helping students in learning.

Mobile learning can also be used to create more student-centered learning. By being more student-centered, learning can be designed with attention to student interests and needs as well as human and computer interactions are another consideration where the \convenience of using mobile learning media can be designed with attention to the perspective of students as users so that it can be maximally utilized [28, 29]. The teaching materials contained in the application can be said to be practical after testing on simulation and digital communication subject teachers and after being used by students. The results of the assessment from both teachers and students show that mobile learning can be categorized as very practical [30].

4 Conclusion

Wireframe mobile application is a digital media that will be inputted learning features that contain a collection of media consisting of digital books, learning videos. The results of the validation trial by material experts obtained 92.5% with a very feasible category, 98.4% by media experts with a very feasible category, and 90% by language experts which means very feasible. With the results of one to one getting an assessment of 96% which can be interpreted that based on individual tests (one to one evaluation) wireframe mobile applications have very good quality that can be developed into mobile

applications as digital literacy in learning restaurant arrangement and service. The small group results obtained an average for the overall assessment of 99% which can be interpreted that based on the small group evaluation, the mobile application wireframe has very good quality with a very positive response, and the field test results obtained an average percentage of 87.46% which can be categorized as "Good" quality with a very positive response to the mobile application wireframe used. This shows that in the field group test, the wireframe mobile application is declared feasible with good quality so that it can be accepted and developed into a mobile learning application as a digital literacy for restaurant arrangement and service.

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