

# Developing Mobile Learning Activity Based on Multiple Learning Objects for the South Sumatra Local Wisdom Course

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**Submission date:** 20-Apr-2023 09:30AM (UTC+0700)

**Submission ID:** 2069910980

**File name:** Artikel\_AJUE\_Scopus\_Q2\_2023.pdf (1,001.48K)

**Word count:** 7708

**Character count:** 42355

## Developing Mobile Learning Activity Based on Multiple Learning Objects for the South Sumatra Local Wisdom Course

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<https://doi.org/10.24191/ajue.v19i1.21225>

Received: 17 September 2022

Accepted: 14 December 2022

Date Published Online: 31 January 2023

Published: 31 January 2023

**Abstract:** Mobile learning is a method of remote teaching and learning where both the teachers and students use mobile-based device to access the learning materials wherever and whenever suits them, in hopes of making the overall learning process easier and more accessible. This study focuses on the development and effectiveness of applying such teaching and learning method on the subject of local wisdoms of Palembang, based on multiple-learning object approach. This study is carried out around the ADDIE research model, beginning with analysis, design, development, implementation, and ending with evaluation. Participants in this study are fifth semester, undergraduate students of History Education program, Universitas Sriwijaya taking the course on local wisdom. The results show that the end product of this study is proven valid and ready for implementation in real-class settings. Evaluations of the end product show that the students see an improvement in their test scores after receiving the mobile learning product from this study. Initially, the majority of them got scores between 10-55 (12 students). Meanwhile, the post-test scores show that 9 of the students received scores between 86-100, and 7 of them between 70-85. None of the students got scores below that. This shows a clear improvement in their learning scores, showing how effective this mobile learning is towards learning materials on local wisdoms of Palembang.

**Keywords:** Development, Mobile learning, Local wisdom, Palembang

### 1. Introduction

*Merdeka Belajar* (Freedom to Learn) is a new teaching and learning approach suggested by the Minister of Education and Culture of Indonesia to improve the teaching and learning productivity, especially when it was first introduced during the Covid-19 pandemic era. At the time, massive temporary closure of schools and ceasing of their onsite activities were a mandatory from the government (Sihombing et al., 2021). One proposed solution was the implementation of Industrial Revolution 4.0, especially around the use of (new) technologies in classroom activities—be it offline or online. The utilization of technologies in the teaching and learning activities are hoped to bring big improvement in the information transfer process which later results in the students getting good outcomes (Nordin et al., 2022). One area of materials that is expected to see such good use of technologies in its delivery is a course on local wisdom.

Local wisdom is a cultural process as a direct result of our lives as a human being that belongs to certain ethnic groups obtained through communal experience (Widiya et al., 2021). In other words,

local wisdom is the result of certain communities through their experiences that are not necessarily experienced by other communities (Saparini et al., 2021). The values of local wisdom are strongly attached to the community and have gone through a long journey of time—as long as the community has existed (Supiyah et al., 2018). In character education based on local wisdom, the guideline for local wisdom values is a criterion that determines the quality of a child's actions (Kurniati et al., 2021; Ramdani, 2018).

The value of local wisdom has such high tendency to be a foothold for the development of character learning (Saputri et al., 2020). The meaning of learning with the local wisdom environment will present a learning dimension that spurs one's knowledge and make it dynamically contextual and friendly to regional culture (Kesuma, 2017). The forms of local wisdom that exist within a society are values, norms, ethics, beliefs, customs, laws, customs, and special rules that apply in the community with various functions (Affandy, 2017).

Palembang is one of the cities in Indonesia that has unique and diverse local wisdom (Hakimah et al., 2021). This city is known as the oldest city in Indonesia (Renaldi, 2021) and cannot be separated from the glory of the Sriwijaya Kingdom (670-1025) (Adab et al., 2020) and the Palembang Darussalam Sultanate (1659-1823) (Asmi & Putri, 2021). This view is inseparable from the role of the two kingdoms as once the center of world trade and civilization in the Asian region (Triacitra et al., 2021). Palembang's local wisdom cannot be separated from the great influence of the existence of these two great kingdoms (Darmawan, 2021). Conversely, the historical processes that have shaped Palembang later also gave birth to an increasingly diverse pattern of local wisdom (Nawiyanto et al., 2016).

The traditions and local wisdom of Palembang are more attractive to foreigners than the modernity of the city (Alimin, 2018). However, there are still many potential traditions and customs of Palembang that are not widely known in the community and must be preserved (Syah et al., 2017). Palembang culture is influenced by Malay, Chinese, and Arabic cultures (Arviansyah et al., 2020). In addition, there are several cultures that are influenced by Islam and some are influenced by the greatness of the Sriwijaya Kingdom (Tiffany et al., 2019). This cultural wealth includes traditional houses, traditional clothes, various types of dances, and Palembang's culinary specialties.

The historical basis and problems related to local wisdom have encouraged Universitas Sriwijaya through the History Education Study Program to make a breakthrough by presenting the South Sumatra Local Wisdom Course. This course is expected to bring back the knowledge on local wisdoms of Palembang which are now getting buried by the strong influence of globalization, as well as an effort by the campus to preserve it throughout younger generations. The role of students in this course is as a developer of cultural heritage (Abun et al., 2019), specifically in saving the lives of local communities such as in their religious, traditional and social elements (Li et al., 2020). Furthermore, student participation in the development of cultural heritage is important in increasing the development of local wisdom which is part of a long-term, sustainable cultural heritage. In order to support the role of Universitas Sriwijaya as the front guard to save the local wisdom of Palembang, this study aims at developing a learning media to help students maintain local wisdom contained in the learning of the South Sumatra Local Wisdom Course.

This study provides a solution to this effort by utilizing the power of the penta-helix relationship which includes elements of government, society, academia, entrepreneurs, and the media. In terms of academic elements, research in the form of innovation has been widely studied, but efforts to collect application-based Palembang local wisdom data have not been carried out. Therefore, this study will focus on problems in an effort to unite local wisdom data in a mobile learning activity based on multiple learning objects.

Development of mobile-based learning with multiple learning objects is packed by applying a contemporary learning model that is able to meet all types of student needs in online learning. Learning carried out with online scenarios requires innovation in the packaging of the learning devices, especially learning media in order to meet the achievement of learning outcomes in accordance with learning objectives. In achieving these learning objectives, the learning media uses mobile-based approach on multiple learning objects presented with three components of interesting learning media in it, namely audio visuals, textbooks and infographics with the content of the local wisdom of South Sumatra contained in it. Palembang's local wisdom is the main theme in this study. Palembang is known as a city that has a long history (Ardiansyah et al., 2020) with a diverse heritage of local wisdom. Palembang's local wisdom consists of (but not limited to) cultural heritage, religious buildings,

traditional houses, and museums. In addition, other cultural heritage such as culinary and cultural festivals will also become the sub-themes in this study.

Meanwhile, mobile learning is a learning model that uses mobile devices such as PDAs, mobile phones, laptops and other information technology equipment for learning (Martha et al., 2018). In general, the definition of mobile learning is learning through wireless technology devices that are usable anywhere and anytime, especially since the device can receive an interrupted transmission signal (Butler & Creed, 2020). Mobile learning helps people to get instant learning with just their fingertips and offers something new and interesting in education and pedagogy (Hendra et al., 2019). Mobile learning can also be interpreted as the intersection of mobile computing and e-learning in which resources must be accessible anywhere, rich in interactions, strong support for effective learning, and performance-based assessment (Simalango et al., 2018). Mobile learning technology is devoted to teachers who need a touch of technology when carrying out teaching activities (Senduk et al., 2016). Reasoning from discussions in mobile learning is a means of learning resources at this time (Efrianti, 2020). The main concern of this study is the development and investigating the effectiveness of applying mobile learning on the local wisdoms of Palembang based on multiple-learning object approach.

## 2. Methods

This study used research and development approach procedures as its guidelines (Amirullah et al., 2017) to produce the target multiple learning-based mobile learning product concerning the local wisdom of Palembang which was used as the base learning resource for the local wisdom course at Universitas Sriwijaya and with extension as general knowledge to the public.

This study was conducted at the Faculty of Teacher Training, Universitas Sriwijaya, with the subjects comprising of fifth semester students of the History Education of Undergraduate Study Program, at the campus. These fifth semester students in the History Education program were chosen simply due to them being the only recipient of this course on local wisdom. As such, there were no sampling method needed since the whole class of local wisdom of the fifth semester History Education students were taken (thus, the whole population) to get the most representative result. This study was conducted from March 2021, and was finished with the completion of the report being collected in November 2021.

The research model used in this study was the ADDIE development model (Arofah & Cahyadi, 2019) which had five stages of research, namely Analysis, Design, Development, Implementation, and Evaluation (Carolin et al, 2020), hence the name. Chart 1 below showed the detailed research process of ADDIE model.

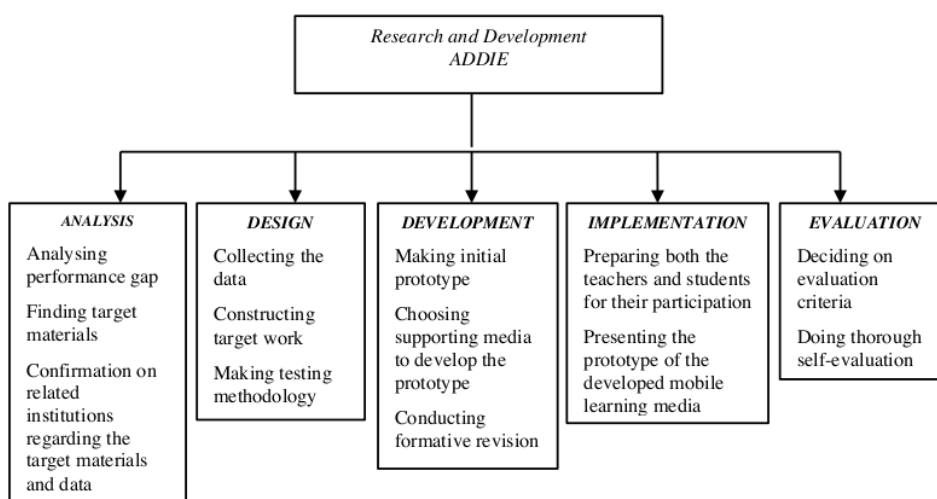


Fig. 1 Research process using the ADDIE model

As shown in chart 1 above and as the name suggests, the first stage in ADDIE development model is analysis, specifically analysis on the performance gap and what possibly lead to it. There are several possible procedures to carry the analysis stage out: (1) conducting a field observation to see the performance gap that occurs in the field between what was expected to happen and what actually did happen; (2) deciding on the target material; (3) confirming the field observation results to related institutions (e.g. Department of Tourism and Culture office); and (4) identifying the required data. These steps needed to be done with the same goals: finding, collecting, investigating, cataloging, verifying and compiling data and information which would later be incorporated in the end product (i.e. the multiple learning object-based mobile learning material) (Rohaeni, 2020).

The development stage of ADDIE development model included (but not limited to) the following general procedures: (5) compiling and unifying the data collected in previous stage, in this case information and resources regarding local wisdom in Palembang from various sources (e.g. archives and old documents, interviews with experts in related fields, as well as direct observation in the field); (6) arranging the target work goals; and (7) formulating testing strategies. At this stage, detailed measures that need to be taken during the prototype testing are laid out from the instruments, target results and the very activities that needed carrying out during the whole testing process (Rusmulyani, 2020).

As for the next stage in the ADDIE development model (i.e. the development stage), it involved carrying out the following procedures: (8) producing the actual prototype of the design stage which in this case included flowcharts and storyboards of the compiled materials that were to be put in the final product; (9) selecting and adjusting supporting media for certain portions of the materials, which might include pictures, videos, animations or 3D objects the prototype needed; and (10) doing formative evaluation on the prototype after all elements were put together according to their designs. The production and formative evaluation of this prototype were necessary before attempting to implement the target product in the testing ground (Asmayanti et al., 2021).

The implementation and evaluation stages of the ADDIE development model would better go hand-in-hand as they have a very intimate relation. After the target product go through the lengthy, detailed developmental and evaluative stages, it was ready to implement—that is, putting it in actual use in a real environment to see how it perform and to further perfect it. At this stage, both parties involved (i.e. students and lecturer) in the local wisdom course were given the first look of the multiple learning object-based mobile learning material along with initial introductions and instructions for it. Following the product implementation, it would go through the final stage in the ADDIE development model which is evaluation, together with summaries on how it performed in the field.

## 2.1. Research stages

Table 1 below showed the more detailed stages of the research following the guidelines proposed in the ADDIE development model.

**Table 1.** Research stages

	<i>Analysis</i>	<i>Design</i>	<i>Development</i>	<i>Implementation</i>	<i>Evaluation</i>
<b>GENERAL PROCEDURE</b>	Conducting performance gap analysis on students' learning processes	Verifying target work and method of presentation	Collecting, compiling and processing, and validating data	Preparing the target participants	Gauging the quality of the product with field trials with pre and post-test results
	1. Doing performance gap analysis on students' learning processes 2. Doing observations	1. Constructing work target 2. Organizing the data 3. Designing the target product	6. Making the prototype of the end product 7. Choosing supporting media for the	9. Conducting field trials to gauge the performance of the developed product	10. Conducting thorough self-evaluation

and interviews to relevant sources, some random students and the teachers alike	developed product 8. Doing revisions with help from experts of related fields		
<b>Needs analysis</b>	<b>Quick design</b>	<b>Prototype</b>	<b>Implementation strategy</b>
		<b>Evaluation plan</b>	

### 3. Findings

Based on the needs analysis carried out earlier, the online learning that had been carried out on local wisdom courses had been generally successful in terms of integrating the thought process or analyzing each local wisdom in various regions in South Sumatra to give students the understanding of historical values and processes of local wisdom's formation that were so unique and diverse. However, learning with online schemes still needed supports from wider reference sources regarding local wisdom in areas other than the city of Palembang alone (i.e. smaller, more remote areas of the region). Students needed learning tools in the form of websites and learning media in mobile format containing various types of learning methods and models in one platform.

Mobile learning could help students study together or collaborate with anyone by utilizing social networks or social media such as Facebook, WhatsApp, Twitter or other available platforms. Mobile learning also allowed students to create virtual groups as a place for them to discuss or exchange information to each other to increase and improve their knowledge on the matter (Musahrain et al., 2017). Development of this mobile learning based on multiple learning objects as learning media needed to be done for the needs of improving knowledge and information for students and the public community alike. One of the basic considerations for developing mobile-based teaching media was the flexibility in accessing the provided information anytime and anywhere (Aripin, 2018).

Selection of mobile learning based on multiple learning object was based on four important reasons. The first reason was that smartphone-based mobile learning was one of the solutions in developing representative learning media because nowadays people were very dependent and inseparable from their smartphones, whether it was for communication, business, or pleasure purposes—and even education. The second reason was considering the convenience of the public, especially students, in accessing this sort of mobile learning because the applications used via their smartphones did not require large storage space, inexpensive (or even free), and of course easily accessible by anyone. Furthermore, the third reason was the magnitude of the demands of the world of education today which indirectly required the learning process to always adapts to technological developments. The fourth reason was that the learning process that was considered boring would be more interesting if packed using mobile learning media by including features in the form of historical documentary videos, hero infographics (especially important figures) that were packed attractively through the use of digital technology.

Apart from being a medium for presenting various subject matter, mobile learning was also applicable as a means for students to get to know more about the material presented. One of the mobile learning development research that had been carried out is the development of Android-based mobile learning as an economical learning medium that sought to support students to utilize and maximize their smartphones in the learning process because the apps were easily obtainable, safely and freely, and that the smartphones themselves were easy to carry which allowed them to be used anywhere and anytime (Alhafidz & Haryono, 2018). In addition, I had also personally conducted a research on the development of Palembang and Surakarta local wisdom photography galleries (2020). The result of this study was a website developed on the topic, with good validity and effectiveness at improving students' learning outcomes. However, there were still a bit of shortcomings, one of which was the website not really

exploring local wisdom in Palembang because the website was divided into two focuses one for each city (i.e. Palembang and Surakarta).

Based on this analysis, the development and use of multiple objects-based mobile learning needed to be done. In mobile learning, there were various kinds of local wisdom to be explored, especially in Palembang—a feasible topic to be used as a learning resource. Mobile learning also allowed the materials to be more visually clarifying by means of using related photos and/or videos. It aimed to make it easier for students to find out about local wisdom simply by operating their smartphones in which there was knowledge, images and information about local wisdom, especially in Palembang.

#### 4. Discussion

##### 4.1 Form and Specification of the Developed Mobile Learning Product within the Flowchart

The following flowchart on this approach was made according to an algorithm showing symbols that had different explanations and functions. It described the mobile learning flow of the previously developed mobile learning material on Palembang local wisdom. It showed how the contents of the mobile learning media were laid out.

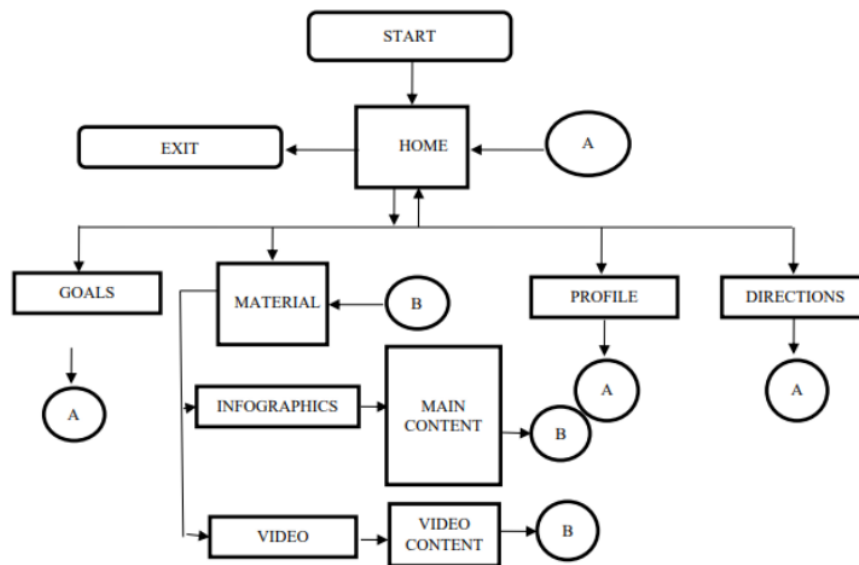


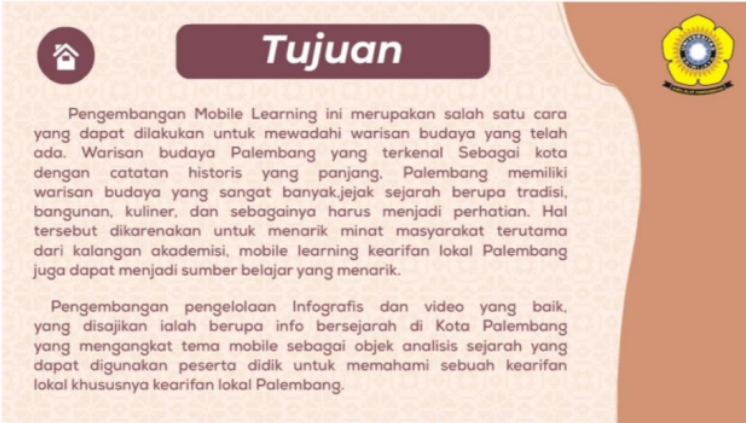
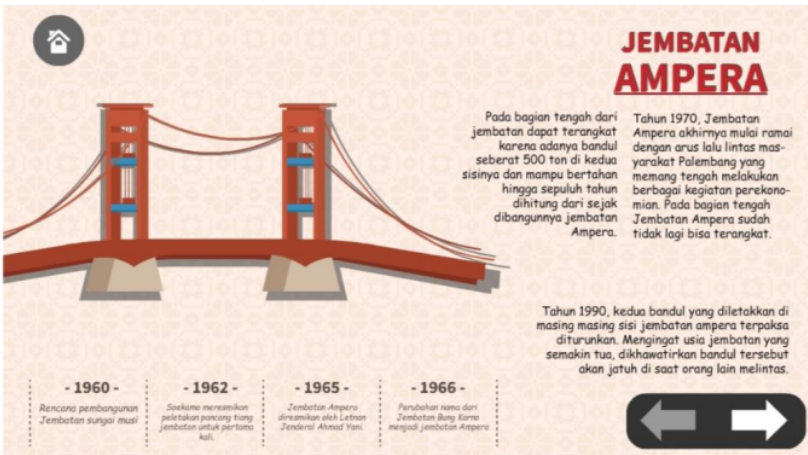
Fig. 2 Mobile learning flowchart

The next stage after the learning media was composed was presenting the final product to several experts in related fields for validation. There were three components of the learning media to be validated: material, media, and language. The material validation process was given to Teti Hestiliani, with results indicating that the material presented in the developed mobile learning media was clear and straightforward, making the content easily add new information and knowledge regarding Palembang local wisdom. In terms of media validation, it was carried out by Dwi Suseno Wati, a teacher at SMP Negeri 4 Talang Kelapa. Meanwhile, the language validator was Akhmad Rizqi Turama, a lecturer in the Indonesian Language and Literature Education Study Program, Universitas Sriwijaya. The three expert validators provided suggestions and comments which were then used to improve the developed mobile learning media. These experts said that the developed learning media was feasible for testing after following their given suggestions and comments.

#### 4.2. Evaluation Processes

The language evaluation process was intended to get feedbacks and corrections from the language expert regarding narrations, explanations, structures, coherence and the language presentations in general of the developed learning media. The person in charge of the language validation process was Akhmad Rizqi Turama, a lecturer in Bahasa Indonesia Education study program, Universitas Sriwijaya. The evaluation process was carried out through an interview with the returning results as follows:

**Table 2.** Results of the Language Validation Process

No.	Mobile Appearance
1.	
<b>Expert Comment</b>	
<p>The general structure of language use in the mobile learning material was good. However, there were some minor mistakes regarding punctuations, as in wrong use of punctuations and even a lack of one. In addition, proper capitalisations of certain words needed to be reconsidered.</p>	
2.	
<b>Expert Comment</b>	



The overall language use in this mobile learning material was correct and good already, even though words or structures in some areas weren't following the correct writing rules and principles. Please do another thorough checking on this matter. Besides, there were still wrong uses of punctuations or even lack of one, as well as wrong uses of capital letters in certain words.

3



#### Expert Comment

One aspect of the language structure and word choice that needed further attention was the use of proper words following the Indonesian dictionary, along with their correct collocation. For example, the phrase *“bagi masyarakat Palembang disebut menghadap kearah”* was better replaced with *“mengenal dua arah.”* The proper form of the word *“luasan”* (size of an area) is *“luas”*. *“Sekedar”* (meaning only) should be spelled *“sekadar”*, while the *p* in the word *“pondasi”* should be replaced with *f*, *“fondasi”*. Similar issues like these needed to be checked again with help of KBBI (the great Indonesian dictionary).

4.



#### Expert Comment

Some portions of the sentences in this section needed to be rewritten to make it more correct, clear and thus make them less prone to confusion or misunderstanding.

5.



#### Expert Comment

Some parts of the sentences in this section were wrongly written, making them less pleasant to read and might cause confusion to misunderstanding. For example, the sentence “*sebelum dinamakan pempek, dikenal dengan nama kelesan* (before widely known as pempek, known as kelesan)” was better written as “*sebelum dinamakan pempek, makanan ini dikenal dengan nama kelesan* (before widely known as pempek, people called this food as kelesan)”.

From the language validation process, it was safe to say that the language used in this developed mobile learning material was good in general. The photos and illustrations used were already accompanied by proper explanations. It was therefore deemed appropriate for the purpose of helping students' psychological development, in that besides providing new information, it also motivated the students to have a response of their own towards the materials that were presented in clear and easy-to-understand manner. In addition, in the way it was presented, the language use in this mobile learning materials provoked the students to have critical ideas, especially about the given topics. Symbols were already well and correctly used. One advice given in this regard was to add labels under the navigation symbols so that they were easier to use and to avoid confusion for those not knowing what the symbols mean, such as home, exit and back.

Material evaluation was taken to see comments and feedbacks from the expert in related field in terms of the acceptability and clarity of the developed mobile learning material to then be analyzed for necessary corrections and revisions to the learning material. The person in charge of the material validation process was Teti Hestiliani, a lecturer in a university in Palembang.

From the validation process, the materials presented in the developed mobile learning media were deemed clear and straightforward that they provided new information around the topics of local wisdoms in Palembang. In addition, photos and illustrations provided herein were seen appropriate in that they complemented the main, textual materials. They were also clear in their presentation and were accurate, even though there were still some mistypes in several words in the narration of Celimpungan culinary. The overall systematic of the delivery was deemed clear as well in that they were straightforward, concise and easy to understand.

Terminologies used were common ones, avoiding too technical terms that might lead to confusion and misunderstanding at the readers' end that the information or message of the developed mobile learning material was well delivered. The references used were relevant and supportive of the topic, but still needed additions to further support the topic and information to be delivered. The materials presented were able to attract interest from the student readers, making it a good means of achieving the set learning plans in the study program. However, as all developmental materials, this one also opened to further digging, exploration and development following students' developmental stages.

Media evaluation was taken to see comments and suggestion from the expert in related field regarding the photo gallery website of local wisdoms in Palembang. These comments and suggestions were then taken to further improve the developed website along with the mobile learning material. The person in charge of this media validation was Dwi Suseno Wati, a teacher in SMP 4 Talang Kelapa. The evaluation process was carried out through an interview with the returning results as follows.

**Table 3.** Results of Media Evaluation

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No.	Mobile Appearance
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1.



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**Expert Comment**

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The design, look and layout of the developed mobile learning were good for what it tried to do, but there were still some little things that need to be fixed such as the close button (x) that was not yet functional.

2.



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**Expert Comment**

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In this part, the pempek image would be better changed with an animation of it being poured in with its sauce to further gain interest and desire of the reader/viewer to look for and even eat it since the animation made it feel like they were looking at the real food.

3.



#### Expert Comment

In this part, a 3D representation of the Limas house would be a very good addition by showing the parts of the house from in and out of it, making the reader/viewer feel like seeing the real house. As for the image of the house, real photographs of it were better used compared to drawings or illustrations to show the real decorations, color and condition of the Limas house.

4.



#### Expert Comment

Feedbacks in this section were the same as that in the Limas house section, where real photographs of the building were better used as opposed to drawings or illustration of it to show its actual look and condition. In addition, as it is the last section to be explained, there was no need to put a next button or arrow.

The media validation process proved that its implementation in the developed mobile learning media was generally deemed good. The overall look of the media designs also received good impressions as it employed images and colors of Palembang, such as gold and red. The videos used were also considered relevant to the chosen topic as they represented the local wisdoms of Palembang, such as historical buildings, tourism, and traditional dances alike. Feedbacks were received in a few areas such as replacing drawings or illustrations of the local wisdom with their photographs to add realism and be more representative of the real thing. But overall, as in the chosen objects, angles and details, they were already relevant and representative of the main topic of the mobile learning media.

Readability of the messages delivered through these media were well received in that they were clear in the writing, and easy to read in their appearance (design). Color, brightness and contrast balance

were good too, as seen from the readers feeling comfortable looking at the mobile learning media for an extended period of time. Focus points set under the topic and supporting media are good in general with some minor revisions to be made regarding the realism of the images and videos (i.e. photographs of the objects are preferred over drawings or illustrations of them).

Some major revisions to be made in this developed mobile learning media fell under the technical aspects, such as fixing the nonfunctional navigation buttons and removal of unnecessary ones. Meanwhile, the layout of things in general was good, interesting and clear. The videos made for this mobile learning media received good comments as they show various angles and sides of the things shot in them, making them a good representation of the local wisdom being portrayed while also making them more interesting. The mobile learning media app was also easy to install and access as it only needed a small amount of device memory and low specification. And aside from some little technical mistakes mentioned above, the overall operation of the app was also easy and interactive, making the whole message well and easily delivered. All of this hopefully makes the main goal in developing this mobile learning media—promoting and providing information about local wisdoms in Palembang—fully achieved and thus successful.

The next stage was one-to-one or individual evaluation to 3 students and a small group evaluation to as many as 7 students. Students learned the topic by using the developed mobile learning on Palembang local wisdom and were then interviewed to get their suggestions and comments on the presented material. After getting suggestions and comments from these small number of students, the next stage was to make another follow-up improvements and changes. Suggestions and comments received from one-to-one and small group evaluations were as follows:

**Table 4.** Results of one-to-one evaluation

No.	Comments	Description
1.	Add animations on moving texts for the narration.	Had been added
2.	The font size needs to be made bigger for ease of reading by the user.	Had been revised

**Table 5.** Results of small group evaluation

No.	Comments	Description
1.	Provide a section of how to use the mobile learning application.	Had been provided
2.	Add a list of references and their corresponding links.	Had been added

Whole-class trial was conducted to 16 fifth semester students of the History Education Study Program. The learning process was carried out through Zoom cloud meeting. This last stage in the field trial process was carried out to see the projected effectiveness of the developed mobile learning media when applied to real-classroom environment. The effectiveness was expectedly observable through the implementation of the whole-class trial by distributing multiple choice questions through a Google Forms questionnaire to the 16 student participants. During the initial test or pre-test session, the students tried to answer multiple choice questions using the basic abilities and knowledge they already have, while at the post-test session their information absorption and overall knowledge were tested after being presented with the developed mobile learning media on the topic in hand (i.e. the local wisdom of Palembang).

The results of these two timely tests were compared to see the effectiveness of the implementation of the mobile learning in improving students' understanding of the material regarding local wisdom of Palembang. Based on the results of the pre-test and post-test, there was an increase in the students' understanding post exposure to the developed mobile learning media. The results of the pre-test can be seen in table 6 below:

**Table 6.** Pre-test results

No.	Score Range	Number of Students	Percentage	Description
1.	86-100	0	0%	Very Good
2.	76-85	0	0%	Good
3.	56-75	4	25%	Enough
4.	10-55	12	75%	Inadequate

Looking at the table above regarding the students' pre-test scores, none of them scored in the 86-100 range. Likewise, there were no students who got into the good category or obtained a score in the range of 76-85. Then there were 4 students in the sufficient category with a score in the range of 56-75. Meanwhile, the majority of students, as many as 12 of them, scored low in the range of 10-55. In contrast, the post-test results in table 7 below showed quite the opposite in terms of the students' scores range:

**Table 7.** Post-test results

No.	Score Range	Number of Students	Percentage	Description
1.	86-100	9	56.25%	Very Good
2.	76-85	7	43,75%	Good
3.	56-75	0	0	Enough
4.	10-55	0	0	Inadequate

Table 5 above showed 9 students in the very good category whose scores were in the range of 86-100. Furthermore, there were 7 students in the good category whose scores were in the range of 76-85. Finally, there were no students who got scores in either 56-75 or 10-55 range.

Based on the analysis of these data, there was a significant increase from the pre-test to post-test scores achieved by the students. The increase in scores from pre-test to post-test ranged from 20 to 85. There was a significant increase in scores because students were very interested in using the presented mobile learning material, especially on the photographs of Palembang local wisdom. The developed mobile learning media was able to help students obtain new information about Palembang local wisdom, especially compared to their previous learning material because of the difficulties experienced by students so far, more specifically difficulties in getting written sources about Palembang local wisdom.

After analyzing the post-test results, there were 56.25% of students who achieved a score in the very good category, and 43.75% of them achieved a score in a good category. Table 8 below showed the recapitulation and comparison of pre-test and post-test scores.

**Table 8.** Recapitulation and comparison of pre-test and post-test scores

	Pre-test	Category	Post-test	Category	N-Gain	Category
Total	685		1405		13.1	
Average	4,28%	Low	8,78%	High	0,79	High

Analysis on the pre-test result returned an average score of 4.28, and an average score of 8.78 at the post-test respectively. The average value of N-gain is 0.79 with high criteria. According to Hake (1999), for an N-gain of  $0.7 > g \geq 0.3$ , the result belonged to the high-score category. It meant that the effectiveness of mobile learning on Palembang local wisdom for students' learning outcomes belonged to the high category. In other words, the developed mobile learning on Palembang local wisdom had a positive improvement on students' learning outcome.

Looking at the data above allows conclusions to be drawn that would meet the SWOT analysis. SWOT analysis was one method to show the situation and test a problem, project or concept of an activity based on external factors and internal factors, namely Strengths, Weaknesses, Opportunities, and Threats in learning media in the world of education. The SWOT analysis carried out in this study was useful in identifying the advantages, disadvantages, strengths, and weaknesses of the developed

multiple learning objects-based mobile learning. The main advantages of this developed learning media were that it was accessible anywhere and anytime, it was also available offline, and it was rich in varied learning media offerings. Furthermore, the strength of the developed mobile learning here lied in its ability to become a learning medium that supported the learning and teaching process from home (also called remote or distance learning). However, realistically speaking, it not only had advantages and strengths, but also drawbacks and weaknesses, including the need for a certain portion of the device's storage to download and install, which is quite large. This application was also not yet publicly available or downloadable on the Google Play Store, and therefore only those who had the link can install the finished application.

## 5. Conclusion

The end product of this study, a mobile learning material based on multiple learning objects on the local wisdom of Palembang, had gone through extensive research and development processes to make it better overall and more suitable to use as a learning medium. The developed mobile learning also went through several expert validation processes to test and revise its componential aspects, specifically on its materials, media and language. All these three aspects returned with good validity scores from the respective experts with some comments and suggestions to make it even better in its implementation. Another key point this kind of learning medium presented was its ease of access from any place at any time, making it more flexible to use as a learning resource. However, all that did not mean that this developed mobile learning medium was free of flaws or drawbacks. One major disadvantage of the produced application was that it required quite a lot of the device's storage to install, on top of it not being publicly available to download from the Google Play Store, meaning that it was only accessible to download via a direct link. Future studies on similar topics might need to see these shortcomings as something to improve later.

## 6. Acknowledgements

Praise and gratitude for the presence of God Almighty because of the abundance of His grace, researchers are still given the blessings of health, the favors of reason, the blessings of knowledge and the blessings of body and mind so that researchers can finish writing this article properly. The researchers also express their gratitude to all parties involved in competitive grant research from FKIP UNSRI DIPA (Budget Implementation List) No. SP DIPA FKIP 5504-9074-4481-7911 Dated November 23, 2020 in accordance with the Letter of Agreement for the Implementation of Competitive Leading Research Grants, Faculty of Teacher Training and Education Number: 0951/UN9.FKIP/TU.SB5/2021 dated May 25, 2021, which has funded this study. We also express our gratitude to those involved in supporting and providing direction in this study, especially to the Palembang Historians, validators of media, material and language experts and not to forget the researcher's thanks to students of history education who have followed the stages in this study starting from needs analysis, one to one, small group, and field test for the help and direction that has been given to researchers during the writing process.

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