

DEVELOPMENT OF DIGITAL STUDENT ACTIVITY SHEETS AS LEARNING MEDIA IN HYBRID LEARNING

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ARTICLE INFO

Article history:

Received June 20, 2023

Revised July 03, 2023

Accepted August 12, 2023

Available online August 20, 2023

Keywords: Digital Worksheet, Hybrid Learning, Microsoft Sway

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Abstract. This Research aims to develop a digital student worksheet for hybrid learning that is valid and practically reviewed based on student responses as users. Digital student worksheet can be used as teaching materials that help students in hybrid learning. This research and development consist of three stages, namely define, design, and develop. The research data was obtained through a validation sheet by two expert validators based on aspects of content feasibility, aspects of didactic feasibility, aspects of language feasibility, aspects of presentation feasibility and aspects of graphic feasibility with response questionnaire for digital worksheet users. Based on the results of expert validation, the percentage are 93.75% on content feasibility; 83.33 % on didactic feasibility; 89.58% on language feasibility; 83.33% on presentation feasibility; and 83.33% on graphic feasibility. The percentage as result of questionnaire for digital worksheet users is 89.47%. Students' responses as users show that digital worksheet is practical,

easy to access, and can increase interest in learning. So, the average of digital worksheet validity percentage is 86.66% and it can be concluded that the digital student worksheet for hybrid learning which is developed using the Microsoft Sway application is categorized as very valid and can be used as a learning media.

INTRODUCTION

Currently the advancement of digital technology has affected the way of learning and teaching. Even in the most traditional classroom setting, at least one component of learning or teaching is likely to utilize technology. In the 21st century, most students are expected to have digital literacy. On the other hand, they also expect the use of information and communication technology in the educational environment. Many universities have adopted various types of online learning to encourage learning to meet the diverse needs of both students and educators. There are many platforms that currently support learning activities. A Learning Management System (LMS) is available to support various educational activities for teachers (Lebeaux et al., 2021; Izquierdo & Macias, 2020).

With the help of technology, lecturers combine the learning system not only by conducting offline classes, but also adding online learning or called blended learning. There is a slight difference between blended learning and hybrid learning. Blended learning consists of

traditional face-to-face learning supplemented by online or offline technology, while hybrid learning consists of online and offline learning but the online learning process is used instead of traditional face-to-face. Therefore, hybrid learning is where synchronous online lessons are supported with fewer face-to-face lessons, enabling innovative approaches to scaffolding through multimodal communication (Mumford & Dikilitas, 2020).

There are several advantages of blended learning and hybrid learning for students including flexible scheduling, understanding the material, the ability to track learning, learning at students' own pace, and encouragement of self-learning motivation. Many studies have also shown the effectiveness of online learning in generating an increase in self-learning which allows learning activities to take place in various places with the availability of an internet connection (Firmansyah, 2021). Research by Madiya (2020) produced supporting findings that student learning motivation can increase due to the interactive learning media used during online learning. In addition to the benefits listed above, implementing online learning allows learners to enter the world of knowledge while acquiring the necessary skills for communication and interaction within the educational community (Vaksalla et al., 2019).

The COVID-19 pandemic has also accelerated the adoption of technology forcing educators to rethink and redesign tasks and activities to suit the available platforms regardless of the technological readiness of both learners and educators. To maintain higher education outcomes, many universities need to adopt some level of online learning. Therefore, learning designs and media that support the implementation of distance learning or hybrid learning are needed.

The use of technology supports the Indonesian higher education paradigm which emphasizes student-centered learning. Similarly, the use of learning media in its application also facilitates students to achieve learning objectives. One of them is the use of student activity sheets (LKM). LKM has material content, summaries, and directions for learning activities for students in printed sheets of learning devices. LKM is a teaching material designed with the intention of providing assistance for students (Purwati, 2019; Patresia et al., 2020). Students' understanding, skills, and attitudes can be achieved effectively in learning activities with the use of LKM during the lecture process.

Lecture activities by students can be carried out by following guidelines through the LKM so that they can explore concepts. Learning based on problem solving can also be supported by utilizing the use of LKM in learning. The tasks contained in the LKM can be in the form of questions and active activities that students must participate in during lectures (Irvan & Muslihuddin, 2020). Besides this, students can also find and study material and learning summaries on LKM teaching materials. Students' interest in learning individually and in groups can also be influenced by the quality of the LKM design that is attractive and systematic. The presence of LKM teaching materials in the learning process will lead to increased motivation which will affect the progress of the quality of student thinking.

Student activeness in thinking through the use of LKM is one of the things that can help students in building material concepts (Aldresti et al., 2021). Some of the advantages of using LKM in the lecture learning process are increasing student learning activities in the lecture process, providing an easier way for students to find and understand concepts, helping students find out more about each learning process, making it easier for educators/lecturers to arrange learning activities, and providing instructions for implementing lecture activities. The utilization of technology in the development of digital LKM shows innovation to

increase the practicality and effectiveness of learning activities. Digital LKM with its advantages is an alternative new facility for students as practical, easily accessible, and cost-effective teaching materials. Digital LKM is intended as one of the facilities owned by students in hybrid learning. Digital LKM also includes learning media that can facilitate the learning process. Digital learning media allows users to process, access, and distribute it through digital technology (Batubara, 2021).

Research found that web-based learner worksheets can be applied in the classroom as learning media. LKM with an easy way to use is a crucial thing that must be considered. Electronic LKM can support the collaborative learning process (Nuswowatu et al., 2019). A study conducted by Irvan & Muslihuddin (2020) showed that the development of e-LKM assisted by live worksheets can provide an increase in the effectiveness of learning outcomes categorized at a moderate level. The utilization of live worksheet technology in e-LKM presents various interesting features such as inserting music, video, drag and drop, multiple choice, check box, open answer, drop down, and matching features. Therefore, the e-LKM component becomes interactive, which can be dragged, pulled, and typed on gadgets/smartphones, laptops, tablets/notebooks through links sent by lecturers. Interactive features on digital LKM provide opportunities for users to conduct discussion and collaboration activities that can be accessed together with their devices. This also provides an opportunity for students to actively participate (Abrams, 2019).

Based on the explanation above, it is necessary to conduct research and development of learning tools in the form of digital LKM oriented to hybrid learning. The purpose of this research and development is to produce Digital LKM as a valid learning media for students in hybrid learning and determine the user response of digital LKM in hybrid learning.

METHOD

This research and development was conducted in the Fundamentals of Mathematics and Natural Sciences Education course in the Chemistry Education Study Program at FKIP Riau University. This research and development method uses the 4D method which consists of four stages, namely define, design, develop, and disseminate. However, the disseminate stage was not carried out because it refers to the research objective of producing a product in the form of a valid digital-based LKM. The stages of research and development of this hybrid learning-oriented digital LKM are as follows.

Define. This research started through the initial stage (define) which contains all data collection procedures for needs analysis. This stage is intended to determine and define the requirements for the development of digital LKM. This stage begins by specifying the learning outcomes of the DDPMIPA course implemented by the Chemistry Education study program, FKIP, Riau University. Furthermore, an analysis of the concepts to be presented is carried out, including the preparation of stages in a rational manner.

Design. In the design stage, the preparation of the initial product (prototype) of the digital LKM is carried out. Product design is carried out based on the content framework from the needs analysis results at the defining stage. Digital LKM products are arranged based on the stages of collaborative learning, namely the problem orientation stage, formulating hypotheses, collecting the information, analyzing data, and concluding data. The digital LKM was designed using the Microsoft Sway application through the website www.sway.office.com. Sway is an application from Microsoft Office that facilitates users in producing interactive documents. Microsoft sway can also be referred to as an online-based

presentation media equipped with features to allow users to insert text, images, video, and audio. Microsoft sway works similarly to power point. The difference is in the completeness of features, designs, and templates that are presented and can be combined to create interesting results (Veronika, 2021). The sway application is not a software that must be installed, but a web-based application. This application allows users to add images, videos, and information as desired with easy access. Digital LKM developed using Microsoft Sway allow lecturers to collect answers from students in real time.

Develop. The develop stage in this development model is divided into two activities, namely the expert validation stage and product trials. The validation stage is a stage that aims to obtain assessment results related to the feasibility of digital LKM design by expert validators. Comments obtained from expert validators will guide the improvement of the digital LKM product design. The trial stage is the next step for the product design carried out to the target subject. In this procedure, trials were carried out through one-on-one trials and limited trials.

In the first stage, one-on-one trials were conducted on three students who had abilities at different levels, namely students with high ability levels, students with medium ability levels, and students with low ability levels. This stage is intended to obtain assessment data related to the readability of digital LKM products. In the second stage, a limited trial was conducted which aimed to collect data on responses and input by students using digital LKM. After the trial was conducted, the digital LKM design was improved in order to obtain good results.

Based on the research procedures that have been described, the data in this research and development are collected using techniques in the form of validation sheets and digital LKM user response questionnaires. The digital LKM design will be validated by the validator using a validation sheet that has been designed by the researcher. Several aspects have been formulated to be presented in the digital LKM validation sheet. Indicators in the validation sheet were also developed from each aspect. A Likert scale of 1-4 was used for the rating scale in the validation sheet with intervals of disagree to strongly agree. In the product specification, it is explained that the validity of the digital LKM is assessed from the content feasibility aspects, didactic aspects, language feasibility aspects, presentation feasibility aspects and graphic feasibility aspects. The validity analysis of the digital LKM was conducted by two validators who are experts and experienced in their fields. The validity of the digital LKM is expressed in percentages using the following formula.

$$P = \frac{n}{N} \times 100\% \tag{1}$$

Description:

P = percentage score (%)

n = number of scores obtained

N = maximum score

The final results of the validity assessment by the validator will be interpreted into Table 1. (Riduwan, 2012).

Table 1. Validation Criteria

Percentage	Interpretation
81% - 100%	Very Valid
61% - 80%	Valid
41% - 60%	Valid Enough
21% - 40%	Less Valid
0% - 20%	Invalid

Analysis of student responses to digital LKM is based on the results of student response questionnaire data. The assessment of all student responses was averaged and percentaged. Data interpretation based on the assessment results is presented in Table 2.

Table 2. User Response Criteria

Percentage	Interpretation
80% - 100%	Very Good
60% - 79,99%	Good
40% - 59,99%	Pretty Good
20% - 39,99%	Less Good
0% - 19,99%	Not Good

RESULTS AND DISCUSSION

This development research produces a product in the form of digital LKM for hybrid learning by utilizing the Microsoft Sway application which is very valid, very practical, and can increase student learning interest. This digital LKM can be used with electronic devices such as Android, iPhone, iPad, laptop, and others without any time and space limitations. Details of the results of each stage will be described as follows.

Define. The defining stage begins with analyzing the problems found in the DDPMIPA course. Students have not been facilitated by LKM to increase active participation during learning activities, especially during online learning. In the DDPMIPA lecture process, an interactive LKM is expected to be able to encourage the role and participation of students in the implementation of learning. Furthermore, determining topics that require digital LKM in the learning process. Based on the analysis conducted, a digital LKM was designed for the topic of the Nature of Mathematics and Natural Sciences Education. The next step is to specify the learning outcomes that will be achieved through the application of the digital LKM and analyze the concept, including the preparation of stages to be implemented rationally. The results of the analysis conducted are presented in Table 3.

Table 3. Topic Determination, Objective Analysis, and Learning Steps

Topic	The Essence of Mathematics and Science Learning
Learning Outcomes	– Students are able to explain the essence of Mathematics and Science education
	– Students are able to describe the function and purpose of science and mathematics
	– Students can explain science as a product, process, and scientific attitude
Learning Flow	Discovery Learning Model

Design. The arrangement of digital LKM that fulfill the requirements based on the results of the analysis is compiled in the design stage. The digital LKM format designed consists of six components, which are title, identity, learning outcomes, work instructions, objectives, brief material, learning activities, and bibliography. The learning activities applied follow the flow of the discovery learning model so that students find the concept of material that becomes learning outcomes.

Product development using Microsoft Sway. Microsoft sway is a media that allows the combination of text with other media. The use of Microsoft sway in presenting internet-based material can be realized through the website www.sway.office.com (Wulan et al., 2021). Not only equipped with images and videos, the developed digital LKM also utilizes features from various Google applications (Google Docs and Google Slides). In principle, Google Docs is similar to Microsoft Word, but has the advantage that it can be used in real time. Google Docs allows users who have access to it to type, edit, add, and subtract content to be included in it directly through the online system. Research shows that Google Docs is effective as a medium used to complete tasks collaboratively without having to meet face-to-face outside the classroom (Fathimah et al., 2020). In addition, Google Slides is one of the software that can produce presentation slides and is easily accessed via laptop or smartphone (Purnamasari et al., 2019). Therefore, digital LKM are more interactive and students find it easier to collaborate with each other.

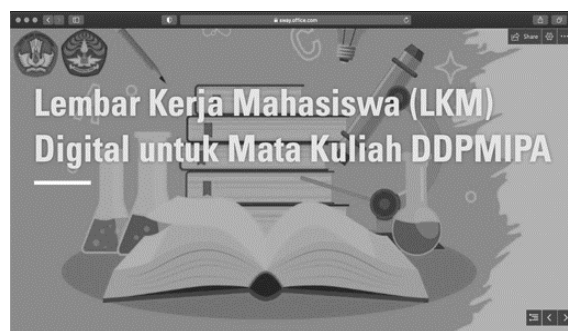


Image 1. Digital LKM

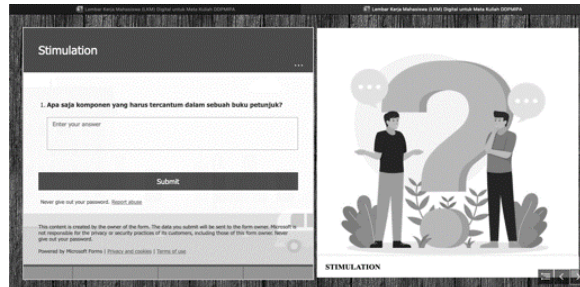


Image 2. Digital LKM interface using Microsoft Sway

Develop. Digital LKM that have been designed are validated by expert validators. Validation is carried out to determine the feasibility of digital LKM that have been developed from content feasibility aspects, didactic aspects, language feasibility aspects, presentation feasibility aspects and graphic feasibility aspects. Table 4 below presents data on the results of the digital LKM validation.

Table 4. Results of Digital LKM Validation

Assessed Aspect	Percentage (%)
Content Feasibility	93,75%
Didactic	83,33%
Language Feasibility	89,58%
Presentation Feasibility	83,33%
Graphic Feasibility	83,33%

Table 4 shows that the results of the validation of the digital LKM with aspects of content feasibility of 93.75% in the very valid category, aspects of didactic feasibility of 83.33% in the very valid category, aspects of linguistic feasibility of 89.58% in the very valid category, aspects of presentation feasibility of 83.33% in the very valid category, and aspects of graphic feasibility of 83.33% in the very valid category.

In the validation process, the validator team suggested several revisions to the digital LKM product. The suggested improvements are the learning instructions contained in the Digital LKM. There are learning activities that have not been accompanied by clear instructions in the Digital LKM. Thus, revisions will be made by adding instructions to the video that must be played by students in order to understand the context of the problem. In addition, the validator team also suggested revisions to the data collection table. In the Digital LKM, the data collection table should be filled in by students but the table cannot be accessed. From the suggestions given by the validators, revisions were made to the digital LKM product to make it better.

The revised digital LKM can be observed in Image 3 and Image 4. The data in Table 4 can be concluded that the average validation result of Digital LKM in hybrid learning is 86.66% with a very valid category.

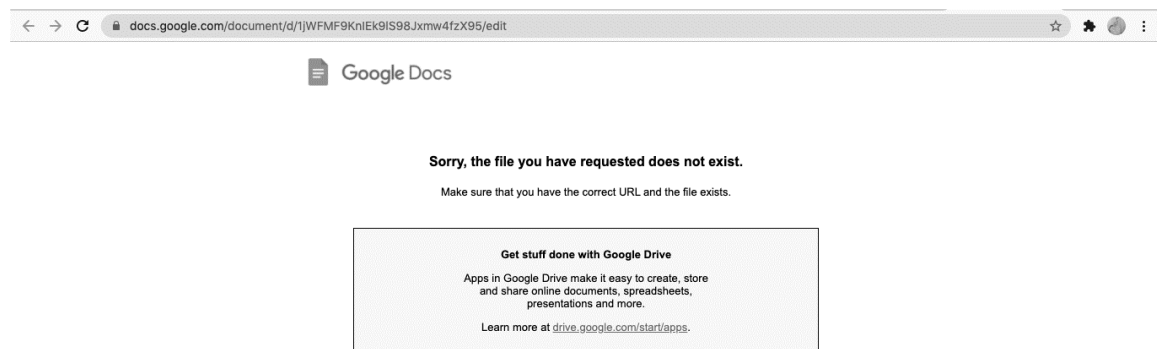


Image 3. Display of the table section of the Digital LKM that cannot be accessed

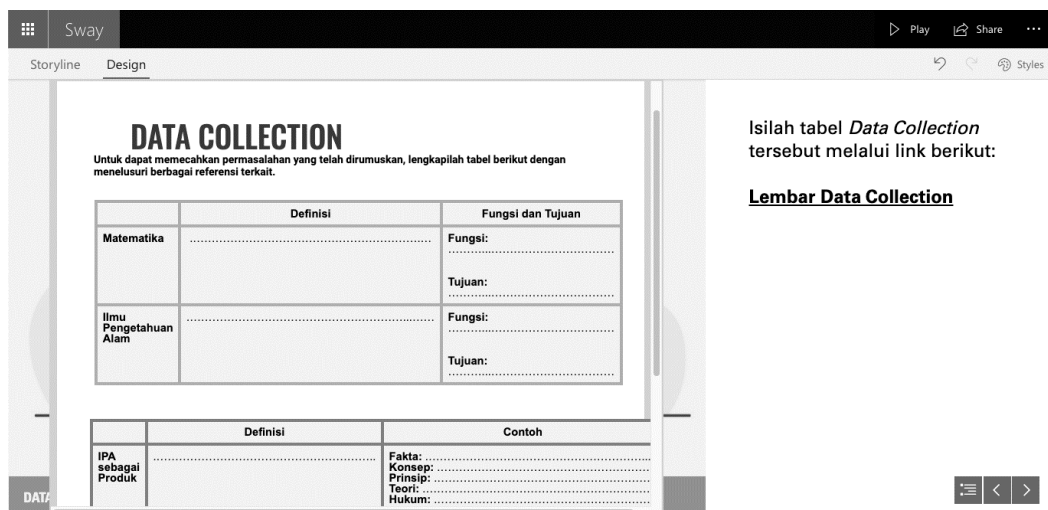


Image 4. Digital LKM Display after Revised

After the Digital LKM product was declared valid, the next stage was to conduct two stages of trials. The first stage, one-on-one trials were conducted on three students. This stage is intended to obtain assessment data related to the readability of digital LKM products. Students are asked to work on digital LKM, then give their responses regarding the readability of digital LKM products.

Students as users of digital LKM in the one-on-one trial offered some comments as a guideline for product revision. From the results of the one-on-one trial, it is known that there are several aspects that need to be revised. The table link on the digital LKM must be synchronized first so that it can be filled in by students from different devices. This is another advantage possessed by digital LKM using the Microsoft sway application is that synchronized files will be updated on each device used by the user (Azaly & Fitrihidajati, 2022). In addition, the disproportionate size of the table makes it difficult for students to work on the LKM. After the technical improvements were made, it was continued through a limited trial. This test is intended to collect data on student responses, reactions, or responses to digital LKM users.

The results of the limited trial showed that students gave positive responses to the digital LKM. Based on these results, the average percentage of the user response questionnaire was 89.47% with a very good category. Most students strongly agree about the digital LKM in hybrid learning which is very practical, easy to access, and can increase interest in learning. Digital LKM with its completeness in the aspects of study, features, creative design, and layout makes it easy for students to use. Research conducted by [Murtalib et al. \(2022\)](#) also supports this and found that the use of digital LKM is able to provide assistance to students in lecture activities. Thus, interesting material can increase student motivation and concentration to understand lecture material.

Microsoft sway that designs digital LKM provides an opportunity to present a more innovative content display than conventional LKM. The development of digital LKM using the sway application also makes it easier for lecturers to manage data related to student attendance and assignments. The utilization of Microsoft sway in developing digital LKM is very easy to do ([Rulviana, 2022](#)). Digital LKM are designed and created for students to help make the learning goal process more effective (Monica et al., 2021). Features of the Sway application make web-based Digital LKM more attractive and increase student learning motivation ([Itsnanayah & Lestyanto, 2021](#)).

CONCLUSION

Based on the results of research and development, it can be concluded that the Digital LKM for hybrid learning developed by Microsoft Sway application is categorized as very valid so that it can be applied as learning media. The validity of the Digital LKM is 93.75% in the content feasibility aspects with a very valid category; 83.33% in the didactic feasibility aspects with a very valid category; 89.58% in the linguistic feasibility aspects with a very valid category; 83.33% in the presentation feasibility aspects with a very valid category; and 83.33% in the graphic feasibility aspects with a very valid category. Based on user response, the average percentage of the results of the user response questionnaire was 89.47% with a very good category. In addition, the average percentage of validity of digital LKM is 86.66%. Therefore, the Digital LKM for hybrid learning in DDPMIPA course that has been developed is easily accessible, very practical, and can increase learning interest.

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