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Research Article

SW-Blend: Student worksheets for blended learning based on case-based learning model

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Abstract: Blended learning is learning that is a mixture of online and offline in class that must improve with innovation. Blended learning can be implemented using various learning tools that are integrated with learning models, one of which is the case-based learning model. This research aims to develop student worksheets for blended learning (SW-Blend) based on the case-based learning model. The method used in this research is research and development (R&D) with an approach using the ADDIE development stages. The implementation of this research will be in future research. The results of this research are that according to the results of the initial analysis, 90% of respondents have used a learning management system, 38.57% have not used problem-based student worksheets, and 42.57% still rarely use case-based learning. The validation results of the SW-Blend that have been developed are categorized as very valid so they are suitable for use in learning. Learning using blended learning is very important to be implemented using learning tools, in this case, SW-Blend based on case-based learning to improve students' critical thinking skills.

Keywords: blended learning,;case-based learning; student worksheets

1. Introduction

21st-century learning that uses technology has developed very rapidly. One of the causes is the existence of various technological developments in this case such as websites, Android applications, and animated videos. Technology-based learning has given rise to a new concept of learning called blended learning. In general, blended learning is a learning method that combines online and offline methods which are implemented in a mixed manner (Hariadi et al., 2021; Mccutcheon et al., 2015; O'Brien et al., 2020). Blended learning has several advantages, namely, it saves time, a lot of material can be delivered and does not require any physical meetings, but for difficult learning material, it can still be done face to face. The problem that often arises in implementing blended learning is that teachers only focus on using online and offline learning, but do not develop and integrate it with other models. Integration of blended learning models is needed to make learning better, so development of integration of blended learning models and other models needs to be carried out.

Development efforts that can be made to improve learning are student worksheets as a form of integration with learning models, one of which is case-based learning. The

case-based learning model that can be integrated is by integrating it into a student worksheet containing the blended learning model. In general, the blended learning model is a new form of learning that combines direct learning in class and online. Student worksheets used in learning must continue to be developed following the need to develop learning materials in class. Student worksheets are a learning tool that can be used to create new innovations to foster critical thinking skills (Agnesa & Rahmadana, 2022; Setya et al., 2021).

Several previous studies related to the development of online learning carried out the development of websites for learning for students. Other research is carrying out the development of various learning media in the form of augmented reality and virtual reality (Marquet et al., 2018; Morenilla et al., 2016; Panagiotopoulou et al., 2021). This development is very beneficial for the continuity of better learning in the future. Online learning is carried out by utilizing various existing platforms such as Zoom, Google Meet, and WhatsApp. The use of applications on this platform can be very beneficial if it continues to be maximized in learning (Alrawili et al., 2020; Sesen & Tarhan, 2010; Winarni et al., 2020). Based on various previous studies that have been carried out, there are research limitations that have been experienced and cannot be resolved, namely those related to integrating blended learning models with cased based learning. Much previous research has been carried out related to media development and the use of digital platforms for learning, so there is a lack of analysis that has not been carried out in this research activity.

The use of online learning also helps when there are a relatively large number of students whose homes are far from the campus location. Developments that can be carried out for learning must refer to 21st-century abilities consisting of critical thinking skills, creative thinking skills, communication, and collaboration (Fitrianawati et al., 2020; Sadiqin et al., 2017; Saputri et al., 2019; Zaid et al., 2018). These skills are very in line with the needs of the 21st century which requires tight competition between students at the tertiary level. Online learning has several obstacles that often occur, such as the difficulty and high cost of internet access to be able to access various information about the learning material being studied. The use of online learning in developing students' thinking skills is very important, namely related to critical thinking and creative thinking skills. The various problems that occur in the use of online learning are certainly material for consideration and improvement in the future. Online learning makes it easier for students to study material remotely, but face-to-face meetings offline are also needed so that students can understand problems more comprehensively. The obstacles experienced by students must be overcome by developing various models that are integrated with learning tools. The various developments carried out will help in developing student abilities (Arifin et al., 2022; Maryani et al., 2021; Udompong et al., 2014). The innovation that has not been done much is integrating learning models with student worksheets used in learning, of course in this case blended learning.

Blended learning needs to be improved in learning by developing student worksheets that are integrated with certain learning models. One learning model that can be integrated is case-based learning (Ballard & Mooring, 2021; Rae, 2016; Suwono et al., 2017). This model is a model that prioritizes solving cases in learning that can be solved by students. Case-based learning is very useful for being able to train students' critical thinking skills on an ongoing basis. Case-based learning is a way to overcome problems by looking at a case for students to solve. The cases that can be solved in case-based learning can vary from cases related to natural sciences, social sciences, economics, religious sciences, and other current topics in various fields. Based on this description, this research aims to develop student worksheets for blended learning (SW-Blend) based on the case-based learning model.

2. Materials and Methods

The research method used in this research is the research and development (R&D) model, which in this case uses the ADDIE development stages approach. The

development stages according to the ADDIE stages consist of the Analyze, Design, Development, Implement, and Evaluate stages (Branch, 2009). The first stage is analyzing data which is the basis for development in the field. The data analyzed comes from the results of a survey of respondents who are students in the Jakarta area and its surroundings. Respondents filled out surveys related to questions according to needs for educational product development. The measurement indicators in this initial survey include several indicators such as the availability of a learning management system, the use of problem-based worksheets, and problem-based learning in blended learning. Questionnaires were distributed via Google Forms to 350 respondents who were randomly selected students.

The next stage is to create designs related to student worksheets which are designed according to the analysis results obtained in the first stage. This second stage is the process of creating a design that suits the needs of the student worksheet product that will be created. The third stage is the development of student worksheets for blended learning (SW-Blend) which are based on case based learning. Meanwhile, at this development stage, student worksheets are validated by education experts with indicators in terms of aspects of worksheet presentation and language use. The validation scores that have been carried out are then interpreted in the following categories, can be seen in Table 1.

Table 1. Categories and validation interval scores for student worksheets

Interval Score	Category
$3{,}25 < x \leq 4{,}00$	Very Valid
$2{,}50 \leq x \leq 3{,}25$	Valid
$1{,}75 < x < 2{,}50$	Less Valid
$1{,}00 < x < 1{,}75$	Invalid

Based on Table 1, student worksheets can be categorized as suitable for use in learning with a validation category of at least valid. The fourth stage is implementation and the fifth stage is evaluation. This research was not carried out because it focused on the process of developing student worksheets. Student worksheets that have been developed and are categorized as appropriate can be used in learning.

3. Results

The results of the first stage of research SW-Blend, namely analyzing the situation in the classroom, the results show that 90% of students already have an LMS account for learning. Only 10% don't have an LMS account. This shows that the implementation of blended learning using LMS has been widely carried out, can be seen in Table 2.

Table 2. LMS availability

No	Criteria	Amount	Percentage
1	Already have	315	90
2	Do not have yet	35	10

As for the use of case-based student worksheets, as many as 61.43% of respondents have used case-based student worksheets. The percentage of respondents who have not used case-based student worksheets is 38.57%, which means that student worksheets need to be developed in this research, Complete results can be seen in Table 3.

Table 3. Use of problem-based student worksheets

No	Criteria	Amount	Percentage
1	Already Using	215	61.43
2	Not Using Yet	135	38.57

The implementation of case-based learning in blended learning courses has generally gone well. The survey results showed that 14.86% answered always, 33.43% answered often, 42.57% answered rarely, and 9.14% answered never. Complete results can be seen in Table 4.

Table 4. Implementation of case-based learning in blended learning lectures

No	option	Amount	Percentage
1	Always	52	14.86
2	Often	117	33.43
3	Seldom	149	42.57
4	Never	32	9.14

Meanwhile, student involvement in solving problems in class learning was 44.57% less active. The number of passive students is also large, namely 16%. Meanwhile, very active students were 39.43%, for details, see Table 5.

Table 5. Involvement in problem-solving

No	Option	Amount	Percentage
1	Very active	138	39.43
2	less active	156	44.57
3	passive	56	16.00

The largest percentage of obstacles experienced by students in hybrid learning are internet technical obstacles (44.86%). Meanwhile, the obstacle with the smallest percentage is the difficulty of dividing study time. The complete answers can be seen in Table 6.

Table 6. Obstacles in Hybrid Learning

No	Option	Amount	Percentage
1	Access to information is confusing between online and print	18	5.14
2	technical problems with internet connection	157	44.86
3	difficult to understand the material	122	34.86
4	Difficulty allocating study time	10	2.86
5	other obstacles	43	12.29

The results of this research show that the student worksheet validation scores are in the very valid category for all experts. The learning experts who provide this assessment follow the category of standard learning experts. The complete results of this research can be seen in Table 7.

Table 7. Validation results from learning experts

Validator	Score	Category
Learning Expert 1	3.90	Very valid
Learning Expert 2	3.90	Very valid
Learning Expert 3	4.00	Very valid

The results of the analysis that has been carried out are then depicted in the form of a design for the student worksheet SW-Blend product that will be created. The contents of the SW-Blend designs that have been created include aspects of content, instructions, and integration of the case-based learning model. The results of developing SW-Blend can be seen in Figure 1.

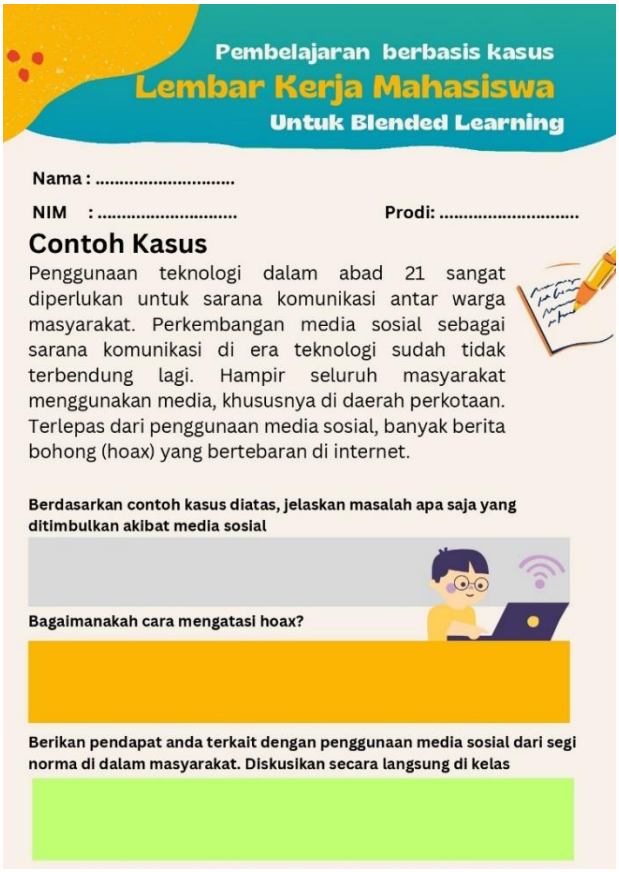

Figure 1. Developed SW-Blend Product

4. Discussion

Based on the validation results, it can be concluded that the student worksheets SW-Blend developed are categorized as very valid and suitable for use in learning. The categories obtained in this case are the basis that student worksheets can be used in class lectures, although in this research no further implementation was carried out regarding student worksheets. The use of SW-Blend in this case is very useful for improving students' critical thinking skills. Students' critical thinking skills must be integrated with case-based learning models in the form of case-solving activities. Case-based learning can be seen in the case section displayed on the student worksheet at the top. The cases presented in this section must be studied first as material for case-based learning which can be done using blended learning. The advantage of SW-Blend being developed is that this worksheet is integrated between blended learning and cased based learning. The advantages of SW-Blend will make it easier for students to train their critical thinking and creative thinking skills. The disadvantage of SW-Blend is that this worksheet cannot be integrated with other more complex learning media such as learning videos, animated videos, and e-modules. Integration between students worksheet and media can enhance students skills in future (Bakri et al., 2019; Fitriyah et al., 2020; Yuanita et al., 2021).

The results of this research confirm the findings that student worksheets can be developed with various learning models related to efforts to solve problems. In this case cased case-based learning can be integrated with student worksheets which can be used for learning. The activity stages in SW-Blend start from identifying problems around students, then the second stage of SW-Blend is related to case solving, namely by finding solutions to these problems. In this second stage, students are asked to provide solutions that can be done to overcome the problem being discussed. The second stage will train students' abilities in critical thinking and creative thinking in solving problems with out-of-the-box solutions. The third stage is related to presenting arguments from students for the case they want to solve. Students need to express arguments accompanied by correct logic. The integration carried out involves various activities that can be presented in

student worksheets (Andrejevic & Selwyn, 2020; Aris et al., 2017; Dwyer et al., 2014; Rizou et al., 2022). The activity usually carried out in case-based learning is to start by presenting a case to students so that students can then study and understand it together in a discussion forum. After that, an assessment process was carried out by identifying problems that could be solved by students, in this case, the case raised was related to the use of social media. The next stage is to further identify the use of social media about norms in society.

The form of blended learning that exists in modern times requires that students use worksheets to adapt to the needs of the 21st century. One way is by providing conditional instructions that can be done directly in class and can be done in online learning. This is to accommodate the nature of blended learning which focuses more on combining online and offline learning methods. Blended learning is very useful for students to carry out because the current learning pattern is implemented in a mixed manner (Mccutcheon et al., 2015; O'Brien et al., 2020). Learning carried out using the blended learning method tends to prioritize the use of 21st-century learning innovations, in this case including student worksheets.

Case-based learning is a learning model that cannot stand alone. The case-based learning model is usually used for students to train critical thinking skills to be able to solve problems. Critical thinking skills must continue to be trained in order to improve the ability to solve problems in the environment (Angelaina & Jimoyiannis, 2012; Bruehl et al., 2015; Kivunja, 2015; Urbani et al., 2017). The case-based learning model in the context of this research is integrated with student worksheets and blended learning which will make it easier for students to train students' critical thinking skills. Critical thinking abilities in students can be trained simultaneously with students' creative thinking abilities. Critical thinking and creative thinking skills can be trained together to be able to solve problems in the 21st century creatively. The part of SW-Blend that improves students' abilities and makes learning easier is the cased based task instruction section which consists of 3 stages of instruction. This part is what makes the difference between the SW-Blend worksheet and other worksheets.

Learning that prioritizes critical thinking and creative thinking skills will be able to make learning more competitive. The important point in developing worksheets based on case-based learning is the relationship between the cases discussed and the various questions asked to students (Fujii, 2016; Mokhtar et al., 2020; Suwono et al., 2017). The questions asked must be relevant to the student's condition and student characteristics. Several things can be raised in the case including the connection with current topics that are currently being discussed by the public. Some examples of cases that can be used for case-based learning are as follows (1) the influence of technology in the modern era (2) environmental damage (3) natural disasters (4) demographic changes and their impact on poverty in society. These various topics can be raised as cases that can be studied to be solved together between students and their groups (Lo & Feng, 2020; Motallebzadeh et al., 2018; Rathberger et al., 2022; Ritter & Mostert, 2017; Tajudin & Chinnappan, 2016; Veselinovska et al., 2011; Vidergor, 2018; Wu et al., 2023; Yan et al., 2023). The abilities that will be trained in case-based learning are related to critical thinking skills and creative thinking skills.

5. Conclusions

Based on the research results, it can be concluded that the student worksheets SW-Blend developed are categorized as very valid and suitable for use in learning. Student worksheets developed in blended learning using a case-based learning approach are very useful for improving students' critical thinking skills. Suggestions for future research are to be able to develop learning media based on various learning models. The limitation of this research is that this research only covers case-based learning and has not carried out massive trials so its effectiveness in learning has not yet been seen. Future research should be able to carry out the implementation of the student worksheets that have been developed in this research.

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