

# Jurnal Pendidikan IPA Indonesia

## Indonesian Journal of Science Education



Science Education Studies Program , Faculty of Mathematics and Natural Sciences,  
Semarang State University collaborate with Perkumpulan Pendidik IPA Indonesia (PPII) /  
Indonesian Society for Science Educators

**JPII**

Volume 4

Number 1

Pages  
1 - 100

Semarang  
April 2015

p-ISSN 2339-1286  
e-ISSN 2089-4392

# SERTIFIKAT

Direktorat Penguatan Riset dan Pengembangan,  
Kementerian Riset, Teknologi, dan Pendidikan Tinggi



Kutipan dari Keputusan Direktorat Penguatan Riset dan Pengembangan,  
Kementerian Riset, Teknologi, dan Pendidikan Tinggi Republik Indonesia  
Nomor: 30/E/KPT/2018  
Tentang Hasil Akreditasi Jurnal Ilmiah Periode 2 Tahun 2018  
Jurnal Pendidikan IPA Indonesia

E-ISSN: 20894392

Penerbit: Fakultas Matematika dan Ilmu Pengetahuan Alam Universitas Negeri Semarang

Ditetapkan sebagai Jurnal Ilmiah

**TERAKREDITASI PERINGKAT 1**

Akreditasi berlaku selama 5 (lima) tahun, yaitu

Volume 7 Nomor 1 Tahun 2018 sampai Volume 11 Nomor 2 Tahun 2022

Jakarta, 24 Oktober 2018

Direktur Jenderal Penguatan Riset dan Pengembangan



Dr. Muhammad Dimiyafi  
NIP. 195912171984021091





[Submit a Manuscript](#)

[Home / Jurnal Pendidikan IPA Indonesia](#)



## Jurnal Pendidikan IPA Indonesia

Nationally Accredited based on the Decree of the Minister of Research, Technology and Higher Education, Number 30/E/KPT/2018

Jurnal Pendidikan IPA Indonesia (Indonesian Journal of Science Education) [p-ISSN 2339-1286 | e-ISSN 2089-4392] publishes a scientific paper on the results of the study and review of the literature in the sphere of natural science education in primary education, secondary education and higher education. Additionally, this journal also covers the issues of environmental education & environmental science. This journal collaborates with *Perkumpulan Pendidik IPA Indonesia (PPII) / Indonesian Society for Science Educators*

[Editorial Policies](#)

[Focus & Scope](#)

[Ethics Statement](#)

[Abstracting/Indexing](#)

Jurnal Pendidikan IPA Indonesia can only be accessed through our official webpage, other than this website, it is outside our responsibility.

Activate Windows  
Go to Settings to activate Windows.

This journal has been indexed in [Google Scholar](#), [DOAJ](#), [Dimensions](#), [ASEAN Citation Index](#), [SCOPUS](#), [SINTA 1](#)



## Editorial Team

### Editor-in-Chief

» [Dr. Parmin](#), (Scopus ID: 57193713986) Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

### Editorial Advisory Regional Europe

» [Prof. Dr. Hans-Dieter Barke](#), (Scopus ID: 8061598100) Universitat Hannover, Germany

---

### Editorial Advisory Regional Africa

» [Dr. Danjuma Solomon](#), Ibrahim Badamasi Babangida University, Nigeria

---

### Editorial Advisory Regional America

» [Prof. San Ping Jiang](#), (Scopus ID: 7404452780) Curtin University, Perth, Australia

Activate  
Gate Satti

## Editorial Advisory Regional Asia

» [Assoc. Prof. Mohamed Nor Azhari Azman](#), [Scopus ID: 36198028300] Sultan Idris Education University, Malaysia

---

## Editorial Board

» [Prof. Dr. Edy Cahyono](#), [Scopus ID: 56272286900] Chemistry Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Prof. Dr. Sutikno Sutikno](#), [Scopus ID: 18937265100] Physic, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Prof. Dr. Anna Permanasari](#), [Scopus ID: 57190941776] Universitas Pendidikan Indonesia, Indonesia

---

» [Prof. Dr. Sudharto P. Hadi](#), [Scopus ID: 16068457500] Environmental Science, Universitas Diponegoro, Indonesia

---

» [Dr. Wahono Widodo](#), [Scopus ID: 57191165275] Universitas Negeri Surabaya, Indonesia

---

» [Prof. Dr. rer. nat. Sajidan Sajidan](#), [Scopus ID: 24464557700] Universitas Sebelas Maret, Indonesia

---

» [Dr. Sigit Saptono](#), [Scopus ID: 57195054489] Biology Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

Activate '1

to Settin

JEMBER

» [Prof. Dr. Widha Sunarno](#), (Scopus ID: 57190938651) Universitas Sebelas Maret, Indonesia

---

» [Prof. Dr. Sri Ngabekti](#), [Scopus ID: 57195053485] Biology, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

## Administration

» [Prasetyo Listiaji](#), [Scopus ID: 57218101582] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Miranita Khusniati](#), [Scopus ID: 57196484003] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Novi Ratna Dewi](#), [Scopus ID: 57194041768] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Stephani Diah Pamelasari](#), [Scopus ID: 57194033052] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Erna Noor Savitri](#), [Scopus ID: 57196097401] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Andin Vita Amalia](#), [Scopus ID: 57200102009] Science Education, Faculty of Mathematics and Natural Sciences, Universitas Negeri Semarang, Indonesia

---

» [Anggie Febriyana](#), Universitas Negeri Semarang, Indonesia

---

» [Yoris Adi Mareta](#), [Scopus ID: 57192943122] Science Education, Faculty of Mathematics and

Active  
Go to Si

---

## Vol 6, No 1 (2017)

**April 2017**

DOI: <https://doi.org/10.15294/jpii.v6i1>

Available online since 30th April 2017

### Table of Contents

---

#### Articles

SHS Students' Difficulty in Solving Impulse and Momentum Problem

PDF

A. M. Saifullah, S. Sutopo, H. Widodo

Efforts in Improving Teachers' Competencies Through Collaboration  
between Teacher Forum on Subject Matter (MGMP) and Pre-Service  
Teacher Training Institution (LPTK)

PDF

A. A. Purwoko, Y. Andayani, M. Muntar, I. N. Diartha

Activate V  
Go to Setting

Improving the Visual-Spatial Intelligence and Results of Learning of Junior High School Students' with Multiple Intelligences-Based Students Worksheet Learning on Lens Materials

PDF

A. Gani, R. Safitri, M. Mahyana

The Development of Science Domain Based Learning Tool Which is Integrated with Local Wisdom to Improve Science Process Skill and Scientific Attitude

PDF

A. Dwianto, I. Wilujeng, Z. K. Prasetyo, I G. P. Suryadarma

Developing Science Learning Material with Authentic Inquiry Learning Approach to Improve Problem Solving and Scientific Attitude

PDF

A. Widowati, S. Nurohman, P. Anjarsari

Computer-Based Experiment of Free Fall Movement to Improve the Graphical Literacy

PDF

B. Subali, D. Rusdiana, H. Firman, I. Kaniawati, E. Ellianawati

The Development of Local Wisdom-Based Natural Science Module to Improve Science Literation of Students

PDF

B. Setiawan, D. K. Innatesari, W. B. Sabtiawan, S. Sudarmin

Setiawan  
Go to Set



Problem Solving Approach in Electrical Energy and Power on Students as Physics Teacher Candidates

PDF

C. Riantoni, L. Yuliaty, N. Mufti, N. Nehru

The Evaluation of Science Learning Program, Technology and Society Application of Audio Bio Harmonic System with Solar Energy to Improve Crop Productivity

PDF

D. Rosana, N. Kadarisman, A. Maryanto, A. Sugiharsono

Profile of Students' Creative Thinking Skills on Quantitative Project-Based Protein Testing using Local Materials

PDF

D. K. Sari, A. Permanasari, F. M. T. Supriyanti

Natural Science Big Book with Baduy Local Wisdom Base Media Development for Elementary School

PDF

E. Andriana, A. Syachruraji, T. P. Alamsyah, F. Sumirat

Student's Science Literacy in the Aspect of Content Science?

PDF

F. Fakhriyah, S. Masfuah, M. Roysa, A. Rusilowati, E. S. Rahayu

Activat  
Catala

Usability Testing Analysis on The Bana Game as Education Game  
Design References on Junior High School

[PDF](#)

F. Adnan, B. Prasetyo, N. Nuriman

Analysis of Students' Difficulties about Rotational Dynamic Topic Based  
on Resource Theory

[PDF](#)

I. Rahmawati, S Sutopo, S. Zulaikah

The Effect of Science Learning Integrated with Local Potential of Wood  
Carving and Pottery Towards the Junior High School Students' Critical  
Thinking Skills

[PDF](#)

I. P. M. Dewi, I. G. P. Suryadarma, I. Wilujeng, S. Wahyuningsih

The Importance of Training Needs' Questionnaire in order to Arrange  
Science Teacher Training Program

[PDF](#)

M. C. Tapilouw, H. Firman, S. Redjeki, D. T. Chandra

The Analysis of Students Scientific Reasoning Ability in Solving the  
Modified Lawson Classroom Test of Scientific Reasoning (MLCTSR)  
Problems by Applying the Levels of Inquiry

[PDF](#)

N. Novia, R. Riandi

Activate  
Go to Sett

The Development of Alternative Assessment Instrument in Web-Based Scientific Communication Skill in Science Education Seminar Course

PDF

R. D. Hardianti, M. Taufiq, S. D. Pamelasari

Physics Learning using Inquiry-Student Team Achievement Division (ISTAD) and Guided Inquiry Models Viewed by Students Achievement Motivation

PDF

S. H. Sulistijo, S. Sukarmin, W. Sunarno

Addressing an Undergraduate Research Issue about Normalized Change for Critical Thinking Test

PDF

S. P. Sriyansyah, D. Azhari

Undergraduate Students' Mental Model of Cell Biology

PDF

S. Saptono, W. Isnaeni, S. Sukaesih

Meta-analysis of Jelajah Alam Sekitar (JAS) Approach Implementation in Learning Procces

PDF

S. Ngabekti, S. Ridlo, E. Peniati, R. Martanto

Activate  
Go to Sett

Developing Science Process Skills and Problem Solving Abilities  
Based on Outdoor Learning in Junior High School

[PDF](#)

S. Wahyuni, I. Indrawati, S. Sudarti, W. Suana

Design and Implementation of Schoology-Based Blended Learning  
Media for Basic Physics I Course

[PDF](#)

W. Suana, N. Maharta, I D. P. Nyeneng, S. Wahyuni

Discovering Learning Strategy to Increase Metacognitive Knowledge in  
Biology Learning in Secondary School

[PDF](#)

Y. Herlanti, Y. Mardiaty, R. Wahyuningtyas, E. Mahardini, M. Iqbal, A. Sofyan

Effectiveness of Critical Thinking Indicator-Based Module in  
Empowering Student's Learning Outcome in Respiratory System Study  
Material

[PDF](#)

A. N. Khasanah, S. Widoretno, S. Sajidan

Discovering Learning Strategy to increase Metacognitive Knowledge  
on Biology Learning in Secondary School

[PDF](#)

Y. Herlanti, Y. Mardiaty, Retno Wahyuningtyas, E. Mahardini, M. Iqbal, A. Sofyan

Activat  
Go to Set



## DESIGN AND IMPLEMENTATION OF SCHOLOGY-BASED BLENDED LEARNING MEDIA FOR BASIC PHYSICS I COURSE

W. Suana<sup>1\*</sup>, N. Maharta<sup>1</sup>, I D. P. Nyeneng<sup>1</sup>, S. Wahyuni<sup>2</sup>

<sup>1</sup>Physics Education Program, Faculty of Teacher Training and Education, Universitas Lampung, Indonesia

<sup>2</sup>Physics Education Program, Faculty of Teacher Training and Education, Universitas Jember, Indonesia

DOI: 10.15294/jpii.v6i1.7205

Accepted: September 6<sup>th</sup> 2016. Approved: March 23<sup>th</sup> 2017. Published: 30<sup>th</sup> April 2017

### ABSTRACT

This research was conducted to: (1) design a Schoology-based blended learning media for Basic Physics I course on the topics of vector quantity, linear motion, and translational dynamics, (2) describe the validity of the product, (3) describe the product's effectiveness in enhancing students' conceptual understanding and problem solving skills, and (4) describe students' responses towards the media and blended learning model. The development procedures employed were ADDIE model which consisted of five stages: analysis, design, development, implementation, and evaluation. In development stage, the assessment had been conducted by two experts to assess validity of media both in content and construct aspects. The results showed that the validities in content aspect and construct aspect were "very good" and "good", respectively. The results from classroom implementation revealed the effectiveness of the product in enhancing students' conceptual understanding and problem solving skills. Students' responses towards the product's utility, attractiveness, and easiness as blended learning media were also positive. The conclusion was that the media was valid and effective as blended learning media of Basic Physics I course.

© 2017 Science Education Study Program FMIPA UNNES Semarang

**Keywords:** basic physics i; blended learning (BL); schoology

### INTRODUCTION

Facing the rapid development of globalization era in the 21<sup>st</sup> Century, teachers and educational institutions are demanded to be able to prepare their students to have competences or skills. Problem-solving skill, effective communication skill, decision making skill, collaborating skill, information literacy, information and communication technology (ICT) literacy are parts of the 21<sup>st</sup>-Century competencies (Binkley, et al., 2012). As a consequence, teachers should design learning activity which could fulfill the demands of those competencies. One of the ways is through integrating ICT with learning process to train students about information literacy and ICT literacy. In

fact, integrating ICT in Basic Physics I course at Physics Education Program University of Lampung is still poor. ICT especially the internet is only used as a source to look for learning materials and questions. On the other hand, the lecturer often feels the limited time for face-to-face meeting since this course covers extent topics. Because of limited time, most assignments given to the students were usually without feedback.

Meanwhile, from the survey about students' internet access, it is known that 90% of 59 students have internet access through laptop, PC or mobile phone. At campus, wifi access is also free. The students who do not have their internet access stated they could access it through internet cafes around the place they live. However, more than half students stated that the speed is not fast enough. The survey showed that the internet ac-

\*Alamat korespondensi:  
E-mail: wsuane@gmail.com

cess of students supports to integrate internet in learning process.

One of the forms in integrating internet in learning process is e-learning. Implementing e-learning in science learning by using problem-based learning model could improve students ICT literature (Eliana et al., 2016). Similar with e-learning, another integration is blended learning (BL). BL or also known as hybrid learning is a learning model which combines various presentation model at class with online learning (asynchronous and synchronous) (Wu et al., 2010). Graham (2006) more specifically stated that BL is a kind of learning model which combines two different learning environment: face-to-face meeting and online learning.

Some research showed that BL had many advantages like increasing flexibility (Pratt & Trewern, 2011), increasing effectiveness and students' motivation (Barbour & Reeves, 2009), growing students' independence in learning (Parkes et al., 2011), and improving students' ICT skill (O'Dwyer et al., 2007). Compared to the pure face-to-face learning or pure e-learning/online learning, BL is said to be more effective (Means et al., 2009) students joining BL model have better performance than those following traditional learning method (Yapici & Akbayin, 2012). The same result also reported by Poon (2013) who compared BL class with traditional classroom. The result was the class given BL method has higher test score than the class using the traditional method. A research by Kazu & Demirkol (2014) also found that students using BL method have higher average scores than those using traditional learning method.

The use of BL could stimulate students to be more active, creative, and independent in looking for information needed so they could learn independently and understand the concept well. The use of BL also could repair some weaknesses from conventional learning method, one of them is the lack of time in face-to-face meeting. Online learning could be used as an addition to improve students' understanding of the material who has not been explained by the lecturer in class. Besides adding knowledge, features from online learning also make students more enthusiastic and interested in learning since they could access many sources via online.

BL types that are usually implemented are online – face-to-face and face-to-face – online. In the former type, students follow online learning first before face-to-face meeting so that each student has the same initial understanding (Smart, 2006). Face-to-face session is usually used for

detail explanation and problem-solving (Smart, 2006) or to extend students' understanding and connect the concept to the further area (Collopy & Arnold, 2009). Whereas in face-to-face – online, the materials are given in face-to-face session then the students are asked to discuss and think critically via online (Aycock et al., 2002). Michinov & Michinov (2008) also supported this kind of BL to deliver togetherness (a sense of community) among students. Another purpose is to help students be familiar with the online class structure.

The two types of BL have their own benefits. BL does not have a standard type (Aycock et al., 2002). It was also emphasized by Helms (2014) who stated that there may be differences in the best way to schedule a course based on the discipline, course content, and other concerns". By the reason to have the benefits of both BL types, in this study the researchers used the format of online – face-to-face – online. The first online learning would be used to give initial understanding to students whereas the second online learning would be used to discuss concept application on the certain topic.

Nowadays, many applications could be used to create online learning freely. Those applications are called Learning Management System (LMS). LMS web based is referred to facilitate an access towards learning material and administrator anytime and anywhere (Black et al., 2007). The use of LMS brings good advantages for students or teachers. From the view of students, the advantage is in the increase of control they have wherever and whenever they involve in the learning process. From the view of teachers, the benefits are very structured tasks management, efficient, and safe (Fadde & Vu, 2014), and could grow students' critical thinking through discussion forum (Comer & Lenaghan, 2013).

One of LMS which has the basic version available freely and easy to use because it is similar to social media like Facebook is Schoology. The menu which Schoology has are Courses, it is a facility to create one course, Group, which is a facility to create community learning, and Resources, which is a facility to save learning material. In Courses menu, there is quiz menu which has many kinds such as multiple choice, true-false, matching, and short answer. Making questions in Schoology is equipped with tools Symbol and Equation. All questions with Figure, symbol, and equation could be written on Schoology. Besides, schoology has many features and an interesting layout like online assessment book, attendance list, the reminder of feature user from students

(Nugroho, 2015). Other benefits that Schoology has are mobile access, integration with Google Drive, tools to make content, and access to the library, etc. (Medved, 2016).

Based on the explanation above, this study was conducted to develop a product which is technology based BL in basic physics I course with main materials vector, straight motion, and translation dynamics. The developed BL media included handout, material for online discussion, and online questions uploaded in Schoology online class. Not to mention, this study also described the validity of BL content and construct based on expert assessment, the effectiveness in improving concept understanding and students' problem-solving skill, and students' responses towards its benefit, its attractiveness, its ease and its class model.

## METHOD

The study was conducted from March to October 2016 in Physics Education Program, Faculty of Teacher Training and Education, University of Lampung. This study referred to development model of ADDIE (analysis, design, development, implementation, and evaluation) (Peterson, 2003). ADDIE model as firstly used in the 1990s had a function as a reference in developing learning set and infrastructure which were effective, dynamic, and supportive (Sumarti et al., 2015).

In analysis stage, the researchers did literature study, field survey, and need analysis. A literature study was done to get information related to BL model and previous relevant studies results. A field survey was done to get the information of supportive facilities belonging to students. In the design stage, the researchers made BL media draft including handout, online discussion questions, online tests. In the development stage, the expert validated to assess the content appropriateness and product construct. In implementation stage, the product was implemented in limited class to test its effectiveness; the test used one shot case study design.

BL type used was "online learning – face to face – online learning" in every week (Figure 1). In every week, face to face class was done once to discuss the main topics. There were three main topics; they were the vector, straight motion, and translation dynamic. Before face to face meeting was done, the students joined online learning, and they also joined online learning after face to face meeting.

Online learning before and after face to

face meeting was done with discussion method. The students were given two to four problems to discuss with their classmates through lecturer guidance. Online discussion was done asynchronously, in which the students did not discuss at the same time, but it depended on their availability. Online discussion forum on Technology was organized so that students could answer first before using, reviewing, or studying their friends' answer.

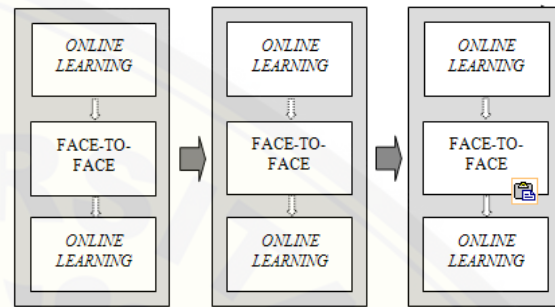


Figure 1. BL type used in the study

The data included expert validation from questionnaire, concept understanding data, and problem-solving skill taken the test, and students' responses taken from the questionnaire. Validation questionnaire was Likert scale with four responses, starting from 1 (invalid) to 4 (very valid). Students' responses questionnaire were also in Likert scale with five choices, from 1 (very disagree) to 5 (very agree). The instrument of understanding concept used was short essay questions consisting of 15 numbers with the allocation time 30 minutes whereas the instrument of problem-solving essay questions consisting of 6 numbers with time allocation 75 minutes. Students' responses questionnaire and two instrument tests were validated by the experts of content aspect and instrument construct.

All data taken were analyzed quantitatively and descriptively. The criteria of classification in experts validation data and students' responses were shown in Table 1. If the expert assessment showed product validity with category "good" the learning process could be continued in the next stages.

## RESULT AND DISCUSSION

BL media produced were Syllabus and Lesson plan, handout, discussion topic before face to face meeting, and online tests with main topics of the vector, straight motion, and translation dynamics. All those materials were uploaded on online Schoology made with Courses featu-

**Table 1.** Data classification of experts validation and students' responses

| Average score of validity | Category  | Average score of responses | Category      |
|---------------------------|-----------|----------------------------|---------------|
| 3.26 – 4.00               | Very Good | 4.20 – 5.00                | Very Agree    |
| 2.51 – 3.25               | Good      | 3.41 – 4.20                | Agree         |
| 1.76 – 2.50               | Less Good | 2,61 – 3,40                | Doubt         |
| 1.00 – 1.75               | Not Good  | 1.81 – 2.60                | Disagree      |
| -                         | -         | 1.00 – 1.80                | Very Disagree |

re. The layout of the online class could be seen in Figure 2. Every folder contained: 1) handout, made with *Add File/Link/External Tool* features; 2) discussion forum before and after face to face meeting, with *Add Discussion* feature; and 3) independent test, with *Add Test/quiz* feature.

Meanwhile, the example of the learning process with BL model for vector topics shown in Table 2. Online activity before face to face meeting was used to discuss sub material whereas online activity after face to face meeting was meant to discuss sub material that could not be finished during face to face class and give applied tests to finish some problem.

The produced handout contained material explanation for each discussion topics. The handout was written with emphasizing basic concepts as the reference of the usual textbook. Discussion material on face to face meeting contained questions about the problem related to the brief material of each discussion topics. Those questions were meant to improve students' understanding of each topic. Discussion material on face to face meeting was made to facilitate an online class in the last part of each discussion topics. The contain included concept application, last part of the discussion topic that could not be finished at face to face class, and wider explanation. The emphasize of discussion after face to face meeting focused on students' problem-solving skill. Question test was meant to facilitate students to do interactive exercise independently so that their understanding improved. The questions were made in multiple-choice by giving feedback in every wrong answer.

### Product Validity

The product assessed by some experts included handout, online discussion material, and online question test. The assessment of product validity done by an expert of Physics Education and an expert in education technology showed that the validity of product content had 3,48 in average with the category "very good" and the validity of construction aspect had 3,21 in average with category "good." In conclusion, the deve-

loped media could be said relevant to the purpose of development and appropriate to used in BL of Basic Physics I course.

With experts' assessment, the product was then revised by their suggestions. The suggestions given for handout revision were adding material explanation related to the similarity and the difference in vector, consistency in using terms on vector or scale such as distance, position, speed, and motion. In online discussion material, the suggestions were simplifying unclear questions and describing problem illustration. The suggestions related to online test were the consistency of feedback in directing students to answer correctly and adding the questions about problem-solving.

### Product Effectiveness

After revision, the product was then implemented in class with topics of the vector, straight motion, and translation dynamics for three weeks in the course of Basic Physics I. In the fourth week, the test was done to measure students' concept understanding and problem-solving skill. The data related to students' concept understanding and problem-solving skill were shown in Table 3.

By using minimum achievement (MA) score 66 (B as the minimum category at Lampung University undergraduate program), the percentage of students reaching MA was 80,6% for concept understanding aspect and 74,2% for problem-solving skill. Since the percentage of MA was greater than 70%, the product could be said effective as learning BL media on Schoology in the course of Basic Physics I.

### Students' Responses

At the end of the learning process, students were asked to answer questionnaires related to their responses towards the benefit, attractiveness, and ease of BL model with Schoology. There were 31 students responding. The result could be seen in Table 4. In general, students gave positive responses related to the developed media and BL model class in Basic Physics I course.



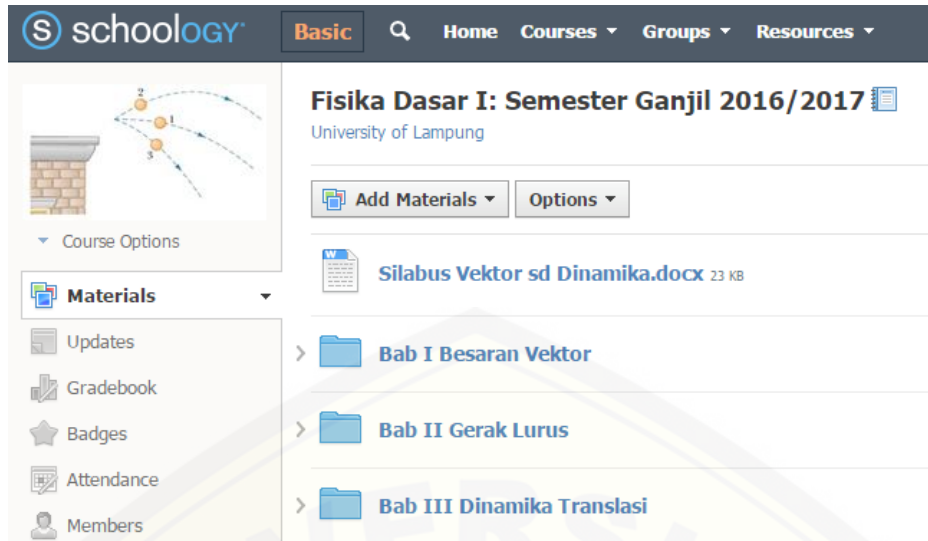


Figure 2. The layout of online class

Table 2. Learning activity sample in BL model with the topic of vector

| Standard Competence  | Material              | Learning Activity   | Mode         |
|--|-----------------------|---|--------------|
| Operating vector (addition, reduction, and product) with various methods | Vector sub material:  | Discuss the definition of vector, unit vector symbol, vector representation in graphic, vector component, and the similarity of two or more vectors | Online       |
|  | Vector representation |   |              |
|  | Vector unit           | Explain vector writing by using vector unit   | Face to face |
|  | Vector operation      | Explain vector writing by using vector unit   | Face to face |
|  |                       | Doing addition and reduction on vector by using graphic method and vector component method  | Face to face |
|  |                       | Doing product on vector, including dot product and cross product  | Online       |
|  |                       | Training to do applied addition and product on vector in the context of physics problem   |              |

Table 3. The data of concept understanding and problem-solving skill

| Score   | Concept Understanding |            | Problem Solving Skill |            |
|---------|-----------------------|------------|-----------------------|------------|
|         | Total                 | Percentage | Total                 | Percentage |
| ≥76     | 3                     | 9.7        | 1                     | 3.2        |
| 66 – 75 | 13                    | 41.9       | 9                     | 29.0       |
| 61 – 65 | 9                     | 29.0       | 13                    | 41.9       |
| < 61    | 6                     | 19.4       | 8                     | 25.8       |
| Total   | 31                    | 100        | 31                    | 100        |

**Table 4.** Students' responses related to media and BL model

| Aspect         | Score | Category |
|----------------|-------|----------|
| Benefit        | 3.85  | Agree    |
| Attractiveness | 3.72  | Agree    |
| Easiness       | 3.31  | Doubt    |
| Average        | 3.63  | Agree    |

Based on the table above, it was known that students' assessment towards product benefits and BL model class was considered to be useful. There were 8 items in the questionnaire related to the benefits; they were benefited for improving learning interest and motivation, understanding and problem-solving skill, and students' ICT skill. Besides, the students were also asked about their interest to join the next BL model class. The responses given on all question items were the "useful" category.

In similar with students' responses towards benefit, their responses towards attractiveness aspect were also good. In the questionnaire, there were 6 questions; these were about product attractiveness (handout, online class, online test), the attractiveness of online learning activity, and the attractiveness of BL model. Most students' responses towards each question were good, except for the question about the handout, they suggested that the attractiveness on handout was very good.

Different with two previous aspects, students' responses towards the easiness of BL model, in general, were in "doubt" category. They were not sure about the easiness in joining BL class. In the questionnaire, there were 7 questions, they were about the easiness in joining BL model class, the easiness in accessing the contain, the easiness in communicating via online, and the easiness in answering online test. The lowest response was on the easiness of online discussion. From the interview, the most problem faced was the slow internet connection and students' time management.

This research was conducted to produce a learning media that could improve students' experience and learning performance. Based on the implemented test in the class above, the purpose of this research could be said as a success. More than 70% of students reached the minimum standard 66 in both concept understanding and problem-solving skill aspects. It meant that the developed Blended Learning media could become alternative sources for students, they did not depend only on teachers/lecturers.

Through BL with online-face-to-face-

online format every week, students had more opportunity to interact with their lecturer and mates. Online discussion was done before and after face to face meeting. Face to face meeting was on Wednesday. Online class was done before it, Monday to Tuesday, and after it, Thursday to Saturday. Providing more opportunity to interact with students and lecturer was the main important factor to make a quality BL media (King & Cerrone, 2012). Through online discussion activity, students became more ready to join face to face meeting class (Aspden & Helm, 2004). It was thought to influence the performance of standard understanding and students' problem-solving skill.

Choosing online discussion could also influence students' activity in online learning. This online discussion was chosen because it gave more chances to students to search and write answers or opinions before presenting them in the discussion forum (Alim, 2007), and also make students stay interacting with the lecturer whenever they have time to Aspden & Helm, 2004). Also, based on the observation in class, the asynchronous online discussion also helped students who have limited internet connection. They could easily find the time when the internet access was fast. However, it' weakness was the lecturer needed a long time to gave feedback on their answers.

Providing handout and the online test could also improve students' concept understanding and problem-solving skill. By explaining the material in detail and providing answers of question examples, handout helped students learn course material. It was reflected in their responses towards questionnaire in which they evenly really agreed with handout attractiveness, related to online test; there were 15 multiple choice questions filled with feedback if their answers were wrong. With the existence of exercises that could be accessed many times, students were easier to learn course material. It was also reflected in their responses stating that online exercise could improve their understanding.

In line with product effectiveness, students also responded positively towards the developed product and BL model based in Basic Physics I course. Their responses indicated that learning with Bl model gave another benefit, it could improve their interest and motivation as it was said by Barbour & Reeves (2009), grow students' independent learning, as said by Parkes et al., (2011), and improve students' ICT skill, as stated by O'Dwyer et al., (2007).

The result of this research was relevant with previous researches about BL effectiveness.

Lim & Morris (2009) explained that traditional (face to face) class equipped with online material had the positive effect towards students' competencies. Applying BL was even more effective in improving their learning performance compared to face to face meeting only or fully online learning (Means et al., 2009). Kazu & Demirkol (2014), Poon (2013), Yapici & Akbayin (2012), and Uzun & Senturk (2010) researched revealing that the performance of students joining BL was greater than those following face to face meeting only.

Therefore, there were some obstacles faced during implementing Schoology based BL model at class. First was internet speed was not fast, so it became the main factor for students to join online learning. The second was students were difficult to write their answer containing mathematic equation, symbol or graphic, in Schoology discussion forum. Indeed there were symbol and equation tool facilities for students. But, they were not used to them, also, how to use them was different from Microsoft Office Word, the solution given by students was that they wrote their answers on paper and uploaded them on the discussion forum. Uploading and reviewing Figure answer took more time and needed fast internet access.

Other problems were the lack of students' activeness in discussing and their time management. In the discussion, they only gave the answer without asking or responding to others' answers. Indeed, in this research they were not asked to comment each other, they were only obligated to give their answers. Online discussion forum on Schoology could be set so that the students would send their answers before they could see, review, or learn each other answers. From the interview, there were two reasons why they seemed not to discuss with each other, first was they felt afraid, shame, or hesitate with their lecturer and mates. The second was they always met every day at the campus, so they felt easier and more comfortable to ask directly. About time management, most students tended to submit their answers on the late deadline. At the beginning of the discussion, some students even did not send their answer, and they also mistook the schedule.

Previous researchers had also stated problems found in this research. Kenney & Newcombe (2011) stated that some students wait for the last minutes to send and submit their answers on the discussion forum, submit tasks, sometimes they also face technical problem during online learning. From the researchers himself, the problem was more burdening work. Besides to design

and prepare learning sources took more time, preparing online discussion forum also need much time like stated by Kenney & Newcombe (2011). However, the students felt no meaningful learning burden in following BL model, as previous researchers explained it.

In this research, there were some limitations, not all facilities available in Schoology were used. The researcher did not use facilities like test or assignment (including project assignment) via online. It should be studied further, considering that in Indonesia online assessment is rarely done (Wijayanti & Basyar, 2016). Face to face meeting was also limited to lecture, discussion, and question session. This research also did not consider the quantity of BL media use by students, which could influence their learning performance (López-Pérez, 2011). Another limit in this research was the amount of topic discussion and time duration which was short. So, further research about this should be conducted.

## CONCLUSION

Based on the result and discussion, it could be concluded that it was produced Schoology based BL media in main materials vector, straight motion, and translation dynamic with the score of content validity 3.48 (very good), and the score of construction validity 3.21 (good) from the maximum score 4.00. From the result of implementation at class, it could be concluded that the BL media was effective to improve students' concept understanding and problem-solving skill where more than 70% students reached the standard minimal score. In general, the students also responded positively towards benefit, attractiveness, and easiness of NL media, with average score 3.63 from 5.00 as the maximum score.

About the result of this research, physics teachers especially should develop and apply blended learning at class. However, there were some problems found during the research like slow internet access, students' difficulty in writing answer containing mathematic equation, symbol, or graphic on Schoology forum, students' lack activeness during the online discussion, and needing much time to prepare online asynchronous discussion. So, it needs following researches related to field study in a bigger scale, developing BL for other courses, and optimizing other features on Schoology.

## ACKNOWLEDGEMENT

Thank you for the Institute of Research and

Community Service (LPPM) University of Lampung for funding this research through grant of DIPA BLU 2016 of University of Lampung with contract number: 550/UN26/8/LPPM/2016.

## REFERENCES

- Alim, F. (2007). Evaluation of a Blended Course from the Viewpoint of Constructivism. *Online Submission*. (Available online at <http://files.eric.ed.gov/full-text/ED500169.pdf>; accessed on January 12, 2016).
- Aspden, L., & Helm, P. (2004). Making the connection in a blended learning environment. *Educational Media International*, 41(3), 245-252.
- Aycock, A., Garnham, C., & Kaleta, R. (2002). Lessons learned from the hybrid course project. *Teaching with technology today*, 8(6), 9-21.
- Barbour, M. K., & Reeves, T. C. (2009). The reality of virtual schools: A review of the literature. *Computers & Education*, 52(2), 402-416.
- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). Defining twenty-first century skills. In *Assessment and teaching of 21st century skills* (pp. 17-66). Springer Netherlands.
- Black, E. W., Beck, D., Dawson, K., Jinks, S., & DiPietro, M. (2007). Considering implementation and use in the adoption of an LMS in online and blended learning environments. *Tech-Trends*, 51(2), 35-53.
- Collopy, R. M., & Arnold, J. M. (2009). To blend or not to blend: Online and blended learning environments in undergraduate teacher education. *Issues in Teacher Education*, 18(2), 85-101.
- Comer, D. R., & Lenaghan, J. A. (2013). Enhancing discussions in the asynchronous online classroom: The lack of face-to-face interaction does not lessen the lesson. *Journal of Management Education*, 37(2), 261-294.
- Eliana, E. D. S., Senam, S., Wilujeng, I., & Jumadi, J. (2016). The effectiveness of project-based e-learning to improve ICT literacy. *Jurnal Pendidikan IPA Indonesia*, 5(1), 51-55.
- Fadde, P. J., & Vu, P. (2014). Blended online learning: Benefits, challenges, and misconceptions. *Online learning: Common misconceptions, benefits and challenges*, 33-48.
- Graham, C. R. (2006). Blended learning systems. *The handbook of blended learning*, 3-21.
- Helms, S. A. (2014). Blended/hybrid courses: A review of the literature and recommendations for instructional designers and educators. *Interactive Learning Environments*, 22(6), 804-810.
- Kazu, I. Y., & Demirkol, M. (2014). Effect of blended learning environment model on high school students' academic achievement. *TOJET: The Turkish Online Journal of Educational Technology*, 13(1), 78-87.
- Kenney, J., & Newcombe, E. (2011). Adopting a blended learning approach: Challenges encountered and lessons learned in an action research study. *Journal of Asynchronous Learning Networks*, 15(1), 45-57.
- King, S. E., & Cerrone Arnold, K. A. T. I. E. (2012). Blended learning environments in higher education: A case study of how professors make it happen. *Mid-Western Educational Researcher*, 25(1), 44-59.
- Lim, D. H., & Morris, M. L. (2009). Learner and instructional factors influencing learning outcomes within a blended learning environment. *Educational Technology & Society*, 12(4), 282-293.
- López-Pérez, M. V., Pérez-López, M. C., & Rodríguez-Ariza, L. (2011). Blended learning in higher education: Students' perceptions and their relation to outcomes. *Computers & Education*, 56(3), 818-826.
- Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. *US Department of Education*. (Available at <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>; accessed on January 21, 2016).
- Medved, J. P. 2016. The Top 8 Free/Open Source LMSs. (Available at <http://blog.capterra.com/author/jpmed-ved/>; accessed on February 12, 2016).
- Michinov, N., & Michinov, E. (2008). Face-to-face contact at the midpoint of an online collaboration: Its impact on the patterns of participation, interaction, affect, and behavior over time. *Computers & Education*, 50(4), 1540-1557.
- Nugroho, E. F. 2015. 12 Free / Open Source Learning Management System (LMS) Terbaik. (Available at <http://bpp-tik.kominfo.go.id/2015/03/10/857/12-free-open-source-learning-management-system-lms-terbaik/>; accessed on January 29, 2016).
- O'dwyer, L. M., Carey, R., & Kleiman, G. (2007). A study of the effectiveness of the Louisiana Algebra I online course. *Journal of research on technology in education*, 39(3), 289-306.
- Parkes, S., Zaka, P., & Davis, N. (2011). The first blended or hybrid online course in a New Zealand secondary school: A case study. *Computers in New Zealand Schools: Learning, Teaching, Technology*, 23(1), 1-30.
- Peterson, C. (2003). Bringing ADDIE to life: Instructional design at its best. *Journal of Educational Multimedia and Hypermedia*, 12(3), 227-241.
- Poon, J. (2013). Blended learning: An institutional approach for enhancing students' learning experiences. *Journal of online learning and teaching*, 9(2), 271-289.
- Pratt, K., & Trewern, A. (2011). Students' experiences of flexible learning options: What can they tell us about what they need for success. *Computers in New Zealand Schools*, 23(2), 137-152.
- Smart, K. L., & Cappel, J. J. (2006). Students' perceptions of online learning: A comparative study.

- Journal of Information Technology Education*, 5(1), 20119, 201-219.
- Sumarti, S. S., Supardi, K. I., & Sumarni, W. (2015). The development of lecture model of chemical education management based on lesson study to improve chemistry teacher candidates' professionalism. *Jurnal Pendidikan IPA Indonesia*, 4(1), 11-14.
- Uzun, A., & Senturk, A. (2010). Blending makes the difference: Comparison of blended and traditional instruction on students' performance and attitudes in computer literacy. *Contemporary Educational Technology*, 1(3), 196-207.
- Wijayanti, A., & Basyar, M. A. K. (2016). The development of thematic-integrated e-portfolio media web blog based to increase the scientific literacy of elementary teacher education program's student. *Jurnal Pendidikan IPA Indonesia*, 5(2), 284-290.
- Wu, J. H., Tennyson, R. D., & Hsia, T. L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education*, 55(1), 155-164.
- Yapici, İ. Ü., & Akbayin, H. (2012). The effect of blended learning model on high school students' biology achievement and on their attitudes towards the internet. *TOJET: The Turkish Online Journal of Educational Technology*, 11(2), 228-237.

