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The iSpring Ebook Learning Media for Online Learning Physics: In Case for Improving Student Conceptual Understanding

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ABSTRACT
This study is aimed to determine the effect of learning media, an iSpring e-book, on online learning physics. There are 61 science students of Noemuti State High School participated in this study. The research was used the R&D method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). In the implementation stages, two classes were used in the design quasi-experimental method. Students in the model class are not used iSpring e-book media, while a student in the implementation class used iSpring e-book media. The data in this study were judgments of the feasibility analysis of e-book media using the reproducibility coefficient (Cr). Analysis of differences in concept understanding and interest using N-Gain and effect size d'Cohen. As for the analysis of success indicators using SPSS version 25.0. The results of the validity of the e-book media instrument are feasible with Cr > 0.90. The result of paired sample t-test for both model and implementation classes is the value of t table > t count so that the hypothesis is accepted (Ha) there is a difference between the pretest-posttest values. The results of the analysis of the concept understanding indicators for the implementation class show the interpreting dimension of 91.30 and exemplifying 82.61 with a very good category, while the dimension model class interprets 47.36 with a sufficient category and gives an example of 60.53 good. The results of the analysis of learning interest in the implementation class for the dimensions of feeling happy are 3.56 (high) and involvement 3.69 (very high), while the model class for interest in learning for the dimensions of feeling happy is 3.21 (enough) and involvement is 3.07 (enough). Even though the facilities are constrained, Noemuti High School students are still enthusiastic about taking physics lessons online.

INTRODUCTION

Physics is one of the natural sciences that studies visible and invisible natural phenomena. Real concepts are very easy to understand with teacher explanations, but there are abstract concepts that are not easily understood by students. Many students can be a misconception about abstract concepts. Misconceptions in physics learning are easy to find with the material in communication between humans that involved thinking process [1]. Conventional learning systems with high social interaction in modern times are not relevant to be applied in modern education, students must be free from teacher dictation and consider teaching materials as discoveries in students [2].

This matter can study with some method as discussion and practice. Some students feel enjoy learning physics, but there is the student not easy to understand learning physics. How to learn in pandemic situation Coronavirus Disease (COVID) 19? This is still applying distance working and learning models based on the general rules of Work from Home (WFH). Covid-19 Online Learning (CoOL) is a global emergency in the learning process [3]. Learning that is not directly Face To Face (FTF) in class. Students learn independently at home with parental supervision, however, the role of the teacher is still needed [4]. Online learning has a very good effect, the program is right on target, and the learning objectives can be achieved [5].

The online learning system cannot be avoided in plain sight. Teachers as agents of change must design online learning models taking into account students' backgrounds, parents' economics, and learning needs during the COVID-19 pandemic [6]. The role of the physics teacher is very important in online physics learning because physics is built through a teaching and learning process that involves basic knowledge with new experiences with the teacher [7].

Online physics learning is a physics learning activity that is carried out online through electronic learning facilities. teachers and students do not meet face to face in class, but use electronic media such as google meet, zoom meeting, and video call. The online learning process can improve critical thinking skills through visual and auditory [8]. Electronic media can help them to understand the lesson easily and achieve learning goals [9]. The use of the android application in the learning process is proven to be more effective in improving students' conceptual understanding but several things should be revised when using the android application in the learning process. For example, it was found that some students did not study, they used to play a game [10].

CoOL in East Nusa Tenggara with minimal internet access and devices learning have a different perception. Other students gave positive responses if it was properly implemented and prepared [11]. Many children cannot access online learning at home, because some areas lack adequate internet connectivity or because not everyone can afford to pay for it [12]. However, there are some households have television and computer can access online learning but not complete. Media online learning is very effective to improve students' understanding of concepts Development of the e-book in learning has a positive effect through pictures, simulations, videos, and audio that can make it easier for students to understand concepts [13].

The use of virtual laboratory media through the PhET application as a substitute for offline practicum [14] There are differences in understanding the concept by using PhET application media and practical teaching aids. The application of virtual laboratory practicum is slightly better than the teaching aids in the laboratory. The unfamiliarity factor in using virtual laboratory media and learning facilities also affects the level of conceptual understanding. PhET simulation is less boring, more relaxed, and easier to understand the concept through an attractive menu display.

Application e-book iSpring can be used in physics learning subject matter that is still abstract through audio, video, YouTube, and interactive quizzes. An attractive display can make it easier for students to understand the concept of learning well [15]. The use of e-book iSpring software is also very practical anytime and anywhere that students can access it. The results of student and teacher responses to the practicality of iSpring-based e-book show very good responses in learning [16].

Conceptual understanding is a sequence of behavioral actions to know very well [17]. Conceptual Understanding can be seen through learning outcomes which can be indicated through some indicators. Indicators of Conceptual Understanding based on taxonomy Bloom revision consist of interpreting, imitating/exemplification, classifying, summarizing, concluding, comparing, explaining [10] [18].

Student learning interests will affect student learning outcomes. High interest in learning will improve a good understanding of concepts [19]. Analysis of student interest in learning can be seen based on indicators of interest, namely happiness, curiosity, attention, involvement [20]. Interest indicators consist of the dimensions of feeling happy, interested, attentive, and involved. For a student who has a feeling of pleasure towards a subject, there is no feeling of being forced to learn. Interesting lessons will stimulate their curiosity about the subject matter. Attention in participating in learning will encourage involvement in completing learning tasks [21].

Based on the background above, the researcher saw that in the COVID-19 pandemic situation one of the learning strategies that was carried out was online. The use of electronic media in online learning is very much needed in teaching and learning activities. In this article, the author conducted a study to analyze the use of learning media based on the iSpring ebook application in high school physics learning, especially in disadvantaged and remote areas in East Nusa Tenggara affected by covid 19. The purpose of this study was (1) to determine the effect of applying online physics-based learning media. ebook iSpring (2) to determine the level of understanding of the concept and interest of students in online learning on the material. simple harmonic vibration.

METHOD

This research method is quasi-experimental design research with model class and implementation class. The research subjects involved the 10th-grade students of Noemuti State High School Student for the academic year 2020/2021. The number of samples for the model class is 23 students and the implementation class is 38 students. The research model refers to Dick & Carry's research and development [22], ADDIE model with five stages, namely (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation.

The analysis stages start from surveys, observations, interviews, and academic analysis of students in dealing with limited learning during Covid 19. Analysis of simple harmonic vibrations on physics teacher learning devices. The results of the analysis are used as the basis for developing e-book-based learning media with the help of the iSpring application to answer the challenges of learning Covid 19 online.

Design of learning device instruments such as lesson plans, worksheets, and physics ebook media assisted by the iSpring application. Furthermore, the preparation of the assessment instrument for the conceptual understanding test and student interest in learning in the form of multiple-choice questions and interest questionnaires. The instrument sheet is validated by material experts and education practitioners from lecturers and teachers in schools. The product feasibility analysis uses the Reproduction Coefficient (CR) [23] in equation (1) below.

$$C_r = 1 - \frac{e}{n} \quad (1)$$

Information:
Cr = Coefficient of reproducibility
e = Number of wrong answers (0)
n = Number of correct answers (1) (correct answers x number of respondents)

The eligibility limit for the accepted e-book media product is Cr > 0.90. The implementation design

uses a pretest-posttest control group design with groups selected based on the availability of android mobile facilities that can access e-book media. The treatment design for the model class and implementation class is as shown in Fig 1.

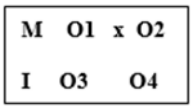


Fig 1. *Control Group Pretes-Posttes design*

In Fig 1, M is a model class with offline learning without physics e-book media, while I is an implementation class with online learning using physics e-book media. O1 x O2 is the pretest-posttest for the implementation class, while O3 x O4 is the posttest-posttest for the model class. Between the model class and the implementation class, a pretest was carried out to determine the ability to understand concepts and students' interest in learning before treatment. The model class uses conventional learning media sources with face to face directly in class, while the implementation class applies the physics e-book media based on the iSpring application online via google meet.

The data were analyzed using a comparative analysis of two correlated samples. The statistical test procedure for both the treatment modeling class and the implementation class is the hypothesis (Ho) there is no difference in pretest and posttest scores and the hypothesis (Ha) there is a difference in pretest and posttest scores on the test of understanding the concept and interest in learning. The statistical formula t table < t count accepts (Ho), and t table > t count accepts (Ha). Hypothesis testing was analyzed by statistical paired t-test of sample t for the control class and the implementation class. While the normality test uses the Kolmogorof-Smirnov test [24]. Differences in the ability to understand concepts and interest in learning using the N-Gain [25] test can be seen in Eq. 2.

$$\mathrm{N-Gain\ Score} = \frac{\mathrm{Pretes-Posttest}}{100-\mathrm{Pretest}} \tag{2}$$

The criteria were used to interpret the normalized Gain scores in Table 1

Table 1. Criteria for N-Gain Value

N-Gain Values	Criteria
G > 0.70	High
0.30 < G < 0.70	Medium
G < 0.30	Low

The estimated amount of effect on the use of media e-book physics-assisted iSpring applications on understanding the concept and learning interest was analyzed using the size D'Cohen effect formula. The value of D Cohen uses the average posts for the implementation class (M_1) and modeling class (M_2) and standard deviations (SD^2) from both groups [25]. The D'Cohen formula can be displayed in the Eq. 3 bellow.

$$d = \frac{M_1 - M_2}{\sqrt{\frac{SD_1^2 - SD_2^2}{2}}} \tag{3}$$

Size effect intervals are divided into several categories that show the effects of the application of e-book physics assisted by the iSpring application. The estimated amount of the effect of D'Cohen's value is at least 0.00 and a maximum of more than 1.00. The Size effect category can be seen in Table 2.

Table 2. Category Effect size

D Value	Category
d > 0,8	High
0,5 < d < 0,8	Medium
0,2 < d < 0,5	Low

The percentage of conceptual understanding is on a scale of four as shown in Table 3 below.

Table 3. Category of Conceptual Understanding

Percentage	Category
70 – 100	High
30 – 69	Medium
1 – 29	Low

The assessment of students' interest in learning towards the iSpring e-book media is based on several indicators of learning interest. The indicators consist of 1) feelings of pleasure, 2) student involvement, 3) student interest, 4) student attention. The student interest questionnaire consisted of twelve statements of interest, then four items of interest questionnaire were selected that met the criteria of validity and reliability. Each item of the learning interest questionnaire was analyzed to determine the level of student interest after using the iSpring e-book media. Data analysis used the product-moment correlation coefficient Correlate Bivariate [24].

The analysis of the value of the interest in learning uses a four-scale norm reference guide with categories as shown in Table 4.

Table 4. Category Interest

Interval	Category
3.68 – 4.00	Very High
3.18 – 3.68	High
2.68 – 3.18	Enough
1.00 – 2.68	Low

The implementation phase is carried out through online and offline learning activities. The model class uses offline conventional learning, while the implementation class uses online physics e-book media through google meet. Learning begins with a pretest and posttest at the end of the learning activity. At the evaluation stage, an analysis of differences in concept understanding and student learning interest was carried out in the Covid-19 pandemic situation.

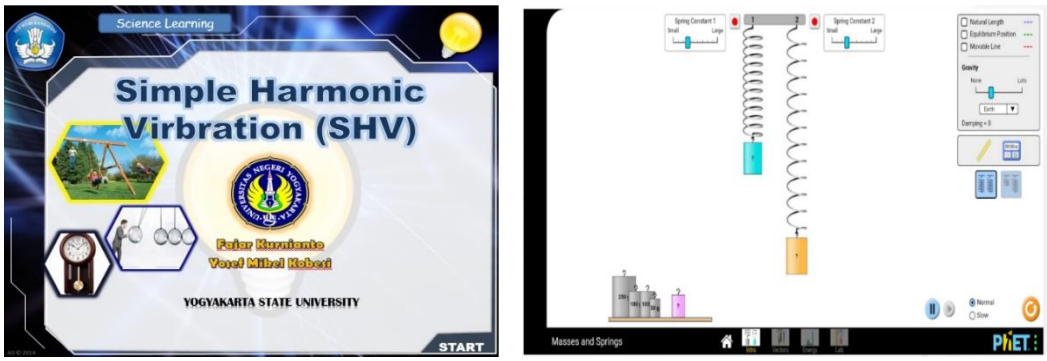
RESULTS AND DISCUSSIONS

The results of the analysis of instrument validation by media experts and education practitioners are as shown in table 5. The validity of the instrument consists of physics ebook media assisted by the iSpring application on SHV material, lesson plans and student worksheets. Analysis of the feasibility of the instrument using the Guttman scale yes and no. The yes answer indicates the instrument is suitable for use in research, while the no answer indicates that it is not suitable for use. The validation results show that the reproducibility value is above 0.90, this is in accordance with the criteria required by Guttman [23].

Table 5. Instrument Feasibility Validation

Instrument	Validation Result	Description
E-book Media	0.93	Feasible
Lesson Plan	0.95	Feasible
Student worksheet	0.95	Feasible

Table 5 shows that the physics e-book media instrument is feasible to use in online learning. Dynamic design models with SHV materials and attractive displays such as images, animations, and videos. This model has never been done by teachers before and is a new thing in CoOL. The learning steps in the lesson plan consist of initial activities, core activities, and closing is adjusted to learning. The activity begins with greetings, apperception, motivation, delivery of learning objectives, core, and closing activities. While the student worksheet is compiled in two versions, online and offline. The online version uses a virtual lab assisted by a *PhET* simulation application, while the offline version is carried out directly through limited face-to-face meetings in the laboratory. The display of the iSpring e-book model on the simple harmonic vibration material can be seen in Fig. 2.



(a) (b)

Fig 2. (*a) iSpring Physics E-book Model (b) PhET Simulation Application*

Fig 2. (a) describes the design of the physics e-book model assisted by the iSpring application. This iSpring e-book model is designed with a menu display of images, animations, and videos, students can start and finish just by pressing the menu button in and out. It is easier and interesting for students to learn. The main menu consists of simple harmonic vibration introduction materials, practice quizzes, and student experiments. Fig.2 (b) is a PhET simulation application for students learning to do simple vibration experiments. The main menu consists of material concepts, practice questions, animations, pictures, videos, and student worksheets.

Based on the results of observations and interviews with students and teachers at SMAN Noemuti, it was found that in the face of the COVID-19 pandemic, learning did not run normally. They are faced with the intersection between technology and learning. Technology as a result of learning, but the situation and condition of teachers and students who are not yet technology literate will have an impact on online learning. The results of observations in class show that only 25% of students have online learning facilities while 75% of students who do not have android phones can use them interchangeably or borrow. While teachers generally have cellphones and laptops, but have not mastered the technique of making online learning media. The results of the same study conducted by Simanjuntak showed that 70% of students did not like online learning because they did not have smartphone facilities [26]. In addition, the time provided is very limited, so the learning methods used are lectures and assignments. This has a bad impact on improving understanding of the concept and interest learning.

This condition is different from the research conducted by Supriyatin [27], that online learning readiness can be seen from the indicators of skills using smartphones or laptops, understanding of technology, readiness to face online learning and attitudes towards learning technology. Perspective of teachers at SMAN 20 Jakarta in learning in the pandemic era becomes more relaxed and there is more time for to study at home.

The results of this study compare two classes of models and different implementations in the use of online learning media based on the physics ebook application iSpring on SHV material. Analysis of

pretest-posttest value using SPSS version 25.0 application with analysis of compare means paired samples T-test with a confidence level (α = 0.05%) and degrees of freedom for model class (df = 37) and implementation class (df = 22). The results of hypothesis testing are accepting (Ha) there is a difference in the value of understanding the concept of learning between the model class and the implementation. The results of the analysis are shown in Table 6.

Table 6. Pretest-Posttest Score Conceptual Understanding

Modeling Class	N	Mean	SD	T count	T table	N-Gain	SE
Pretest	38	25.79	11.06	-19.390	2.026	0.50	3.84
Posttest		63.03	8.09				
Implementation Class							
Pretest	23	41.09	18.39	-12.794	2.073	0.54	1.97
Posttest		72.61	11.76				

In Table 6, it can be seen that the value of $t_{table} > t_{count}$, so that the hypothesis accepts (Ha) there is a difference between the pretest-posttest values between the model class and the implementation. The difference in the average posttest value in the model class is lower than the implementation class. The implementation class is slightly better by utilizing e-book media in online learning. Increasing the value of understanding concepts in line with research Nanda, that the use of online learning media can improve understanding of concepts [10]. The N-Gain value category for the two research classes is still classified as moderate. The influence of e-book media on concept understanding has a very high effect. The results of Irwanto's research also shows that there are improve understanding of physics learning concepts are included in the medium and high categories [28].

When viewed from the dimension indicators of understanding Bloom's Taxonomy concept [29], it is found that between the model class and the implementation class there are differences in values. The value of the concept understanding indicator for the model class: 1) interprets 47.36% (medium), 2) exemplifies 60.53% (medium), 3) presents in the table 55.26% (medium), 4) explains 47.36% (medium) and 5) applies 36,84%. As for the implementation class with indicators: 1) interpreting 91.30% (high), 2) exemplifying 82.61% (high), 3) presenting in the table 60.17% (medium), 4) explaining 57.78% (medium) and 5) applying 47, 83% (medium) as shown in Fig. 3 below.

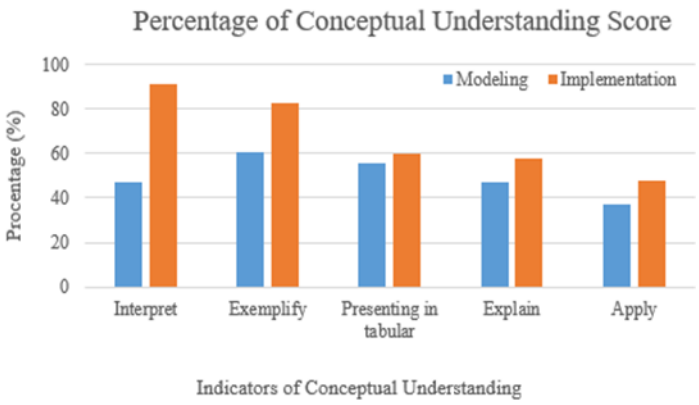


Fig 3. *Percentage Value of Conceptual Understanding*

In Fig. 3, it can be seen that the acquisition of a concept understanding score for the implementation class is much better than the model class. Differences in learning media in the form of e-book applications with attractive displays such as images, animations, and videos can improve understanding of the concept of simple harmonic vibrations. This study shows that there is an increase in student learning outcomes that are better in the implementation class using the iSpring ebook learning media. The results of this study are also in line with research conducted by Dasmo, that iSpring media can create a pleasant learning atmosphere and the concept of material is easy to

understand through pictures, animations and videos. The display of iSpring media can stimulate students to improve their understanding of physics concepts [30]. The difference in values between the two model classes and implementation in the use of mobile-assisted learning media with the iSpring application can increase the value of understanding concepts [10]. The results of Hake's previous research also showed that almost 65% of students had a score range between 50 – 75 [25]. Result research of conceptual understanding indicators can be seen in Table 7 below.

Table 7. Category of Level Conceptual Understanding

C.U Indicators	Model Class		Implementation Class	
	%	Category	%	Category
Interpret	47.36	Medium	91.30	High
Exemplify	60.53	Medium	82.61	High
Presenting	55.26	Medium	60.17	Medium
Explain	47.36	Medium	57.78	Medium
Apply	36.84	Medium	47.83	Medium

Analysis of student interest use paired samples T-test with a sample class of 38 students and an implementation class of 23 students. The mean values for the pretest-posttest model class were (3.04 and 3.07), while in the implementation class the pretest-posttest scores were (3.16 and 3.30). Hypothesis testing shows the value of t table > t count as in Table 8 below.

Table 8. Pretest-Posttest Score Analysis of Interest

Modeling Class	N	Mean	SD	T count	T table	N-Gain	SE
Pretest	38	3.04	0.13	-0.888	2.026	0.03	0.21
Posttest		3.07	0.15				
Implementation Class							
Pretest	23	3.16	0.232	-2.338	2.073	0.17	0.60
Posttest		3.30	0.230				

Differences in students' interest in learning before and after treatment had an effect size of 0.21 in the model class and 0.60 in the implementation class. Students' interest in learning was tested on a four-scale range, namely 4 = very happy, 3 = happy, 2 = not happy, 1 = very dissatisfied. The hypothesis test accepts (Ha) that there are differences in students' interest in learning before and after treatment. Students' learning interest in the model class with N-Gain 0.03 while the implementation class N-Gain 0.17.

Analysis of students' interest in learning indicators on physics e-book media assisted by the iSpring application with four indicators of interest. The average indicator of class interest in the model (1) feeling of pleasure is 3.21, (2) student involvement is 3.07, (3) interest is 3.05, (4) attention is 3.23. While the average indicators of interest in the implementation class are (1) feelings of pleasure 3.56, (2) student involvement 3.69, (3) interest 3.47, (4) attention 3.65 as shown in Fig. 4 below!

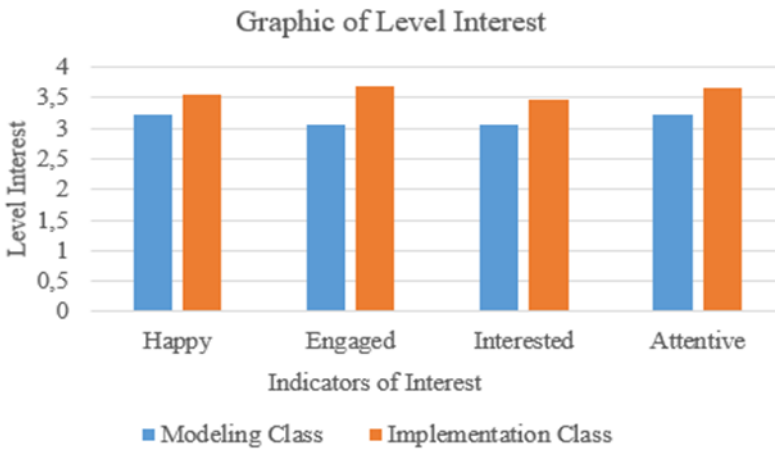


Fig 4. *Percentage Value of Interest*

The categories of students' learning interest in the simple harmonic vibration material for the model class and implementation class can be seen in Table 9 below.

Table 9. Category of Level Interest

Interest Indicators	Model Class		Implementation Class	
	Level	Category	Level	Category
Happy	3.21	Enough	3.56	High
Engaged	3.07	Enough	3.69	Very High
Interested	3.05	Enough	3.47	High
Attentive	3.23	High	3.65	High

table 9, the highest level of student interest in learning is in the implementation class in the interest indicator. Students become happy, engaged, and attentive in learning using an online physics e-book. Despite the lack of smartphone facilities, SMAN Noemuti students who are in the disadvantaged area category have the ability to understand concepts and high interest in learning to learn physics using online media. In general, students' interest in learning in the implementation class has a high interest in learning during the Covid 19 pandemic. The results of this study are in line with research conducted by Anwar, that the application of iSpring media can increase student interest in learning by 0.704 in the high category [31]. A similar study by Tani found that the iSpring learning media also provided independent learning for Generation Z who was running in the midst of the COVID-19 pandemic [32]. So, the role of the teacher as a designer of learning media greatly determines interest in learning.

CONCLUSION

The general conclusions that can be drawn in research on physics learning innovations during the COVID-19 pandemic, especially in the Noemuti State High School, East Nusa Tenggara are (1) Development of iSpring-assisted physics e-book media is appropriate for teachers to use in online physics learning by taking into account the characteristics and availability of online learning facilities; (2) The display of physics e-book with content in the form of attractive images, animations and videos can improve the ability to understand the concept of Simple Harmonic Vibration material in online learning; (3) The ability to interpret and exemplify the concept of Simple Harmonic Vibration material is very good when using e-book learning media which contains interesting images, animations, and videos. Although there is an increase in the ability to understand concepts, there are still students who experience misconceptions about the indicators of explaining and applying the SHV material in both the implementation class and the model class. (4) Students' interest in learning physics e-book in the indicator of interest in interest is very high in the implementation class, although there is still a

shortage of learning facilities for android mobile phones; (5) The ability to understand concepts can be increased if the learning media used by the teacher is interesting and can generate long-hidden interest in learning. Teachers are creators and facilitators of improving the ability to understand the concept of subject matter. (6) This research is only to describe the effect of using physics e-book media in online learning. Teachers or prospective teachers can use this article as a reference for improving the quality of education in East Nusa Tenggara.

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