The effectiveness of instructional media based on lectora inspire towards student’s achievement

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Abstract. Physics is the most important branch of science, because it contains basic concepts that are also used in other branches of science. In this regard, students need to understand physics well. Instructional media is one way to simplify the process of teaching and learning physics as well as arouse students’ achievement. Instructional media has various forms, one of which is multimedia which is developed using information technology-based applications. Lectora Inspire is a multimedia development application that can be used by all groups. This research aims to find out the effectiveness of the instructional media based on Lectora Inspire on student’s achievement. The method used is a pre-experimental design consisting of four steps, namely identification of needs, design and development, expert validation, and implementation. The implementation is carried out using the one-group pretest-posttest method in the students of class X IPA-2 MA Al-Asror. The instructional media used has a material feasibility level of 84% so that it gets a very decent category, the level of media feasibility given by the media validator is 80% with a feasible category. The normality test from Shapiro-Wilk method shows that the data is stated to be normal, it means the statistic that suitable to test the data is parametric statistics. T-test paired sample as one of the parametric statistics is choosen to get the significance level from the experiment. The result proves that instructional media based on Lectora Inspire is effective to increase students’ achievement.

1. Introduction
Science is one of the oldest knowledge in the world that has existed since 3500 BC and continues to grow until now. Sir Isaac Newton, Marie Curie and Al Khawarizmi, are a handful of names who have a large role in the world of natural science thanks to their contributions in the form of their discoveries. Natural science has several branches in it, one of them is physics, which is the most important branch of science for humanity [1]. The reason for that is because physics underlies various other scientific disciplines in the world, from chemists who study molecular structures to paleontologists who try to reconstruct dinosaur life all involving the principles of physics.

Physics has become a milestone in various fields of progress, therefore, mastery of the concept of good physics is a necessity in the world of education that must be endeavored jointly by all parties concerned. However, the reality on the ground shows that the weakness on understanding concepts is one of the problems that causes students to experience difficulties in learning physics so that their achievements are still under expectation[2].

The role of instructional media is not just supporting or complementing the learning process, instructional media can be a source of information for students which also determine the outcome or learning achievement. Instructional media is a bridge between teachers and students in the learning
process [3]. This function becomes more important especially in certain subjects such as physics, subject that has many abstract concepts that are difficult to understand and even difficult to imagine, so that with the instructional media, it is expected to be able to assist students learning processes.

In the learning process, when students have labelled that a subject is difficult, usually they will feel not interested to learn or study it. That is why we need something that able to attract interest and increase students curiosity, and this is instructional media. The learning media also has some benefits, one of them is equating the conceptions taken by students in the classroom, by seeing one object that is the same and consistent [4]. Media is a tool to discuss a clearer and more concrete picture of an abstract concept, for example, when teacher explains the solar system, he may use the solar system picture or even video, so that students will find it easier to understand. Media also can be used to show objects that are difficult to bring directly into class, for example, while describing a lion as a wild animal, the teacher can play a video about a lion, it will attract students' interest and it is also easier than bringing a live lion into the classroom.

Lectora Inspire is a software developed by Trivantis, as one of the tools used to create instructional media. Lectora is still relatively new in Indonesia, so its development and utilization in education is still rare. This software is not complicated software, so it is easy to learn and use by various groups. In one of his books, Tompo mentioned some advantages of Lectora Inspire [5] which are;

1. Besides being used to create instructional media, Lectora Inspire can also be used to create website, e-learning content, and presentation;
2. Content created with Lectora Inspire can be published in various outputs such as single executable file, CD-ROOM, HTML, or even SCORM and AICC;
3. Lectora Inspire can work in various type of learning management system (LMS);
4. Lectora Inspire is very user friendly so it will be easy to use, even for beginners;
5. Lectora Inspire has many features that can be used to develop interactive learning media according to the needs of students;
6. Lectora Inspire has a lot of templates or themes that can be selected;
7. In Lectora Inspire there are many supporting applications for media development, such as Snagit, Camtasia, and Flypaper;
8. In addition to the subject matter as content in Lectora Inspire, we can also add quizzes as reinforcement for students.

Student achievement is related to seven abilities that they should have, which are interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining [6]. Those abilities will help students understand the subject matter which then becomes the determinant of student achievement. Since the role that seven abilities play is really important, they are used to arrange the test instrument that been used on this research.

2. Methods
The research method is pre-experimental design, which is a part of the quantitative research. This method is carried out in the form of an experiment but there are still external variables that also influenced the formation of the dependent variable [7]. There are four steps in experiment that been showed in figure 1. This stage is the initial stage in research, at this stage the identification of needs is carried out by finding information from the student achievement, textbooks, and student worksheets about the difficulties that student found. The data was obtained through an approach to students and direct interviews with relevant subject teachers. Design and development have purpose to create the learning media based on Lectora Inspire that suitable to students. This stage then continue with expert validation, where the learning media is tested, revised, and judged by two experts, which are two lecturers of physics education program at Semarang State University. The last step, which is the key step is implementation, in this step instructional media that has been developed is used in learning process to measure the effectiveness of it towards students achievement.
The research strategy is one-group pretest-posttest design. This design only uses one group as a controlled group and also experimental group. The group is a class of X IPA 2 in Al-Asror senior high school. Students of X IPA 2 have been taught the same material with the material in the instructional media. This class was given the pretest before they’ve been treated, then also given the posttest after they experienced the treatment.

| Table 1. One Group Pretest Posttest Design |
|--------------------------------------------|
| **Initial Condition** | **Treatment** | **Final Condition** |
| $O_1$ | $X$ | $O_2$ |

The treatment is a learning process using the media that has been developed. Those pretest-posttest results are then used as the data to be examined.

3. **Result and Discussion**

3.1. **Instructional Media Assessment**
The third step of research deliver the instructional media that has been judged by experts using an instrument that also has been validated, Table 2 and Table 3 show the result of the assessment.

| Table 2. Result of Instructional Media Validation by First Expert |
|---------------------------------------------------------------|
| **Rated Aspect** | **Maximum Score** | **Obtained Score** |
| Content eligibility | 50 | 42 |
| Feasibility of presentation | 20 | 17 |
| Total | 70 | 59 |
| Percentage | 84% |
| Category | Very Decent |

| Table 3. Result of Instructional Media Validation by Second Expert |
|---------------------------------------------------------------|
| **Rated Aspect** | **Maximum Score** | **Obtained Score** |
| Goodness of Software | 20 | 14 |
| Properness of Visual Graphic | 60 | 50 |
| Total | 80 | 64 |
| Percentage | 80% |
| Category | Decent |

Table 2 is the assessment from physics lecturer of Physics Education program related to the material inside the instructional media, while Table 3 is also the assessment from lecturer, but related
to the appearance of instructional media. Both assessments show that instructional media is decent to be presented and used in a learning process in the class.

3.2. Pretest-posttest result
The results of pretest and posttest is shown on Figure 2 bellow, then the statistical value of those datas are in Table 4.

| Statistic Value       | Pretest | Posttest |
|-----------------------|---------|----------|
| Mean                  | 58.28   | 75.14    |
| Highest Score         | 77.27   | 86.36    |
| Lowest Score          | 22.72   | 63.63    |
| Standard Deviation    | 13.2553319 | 6.60212516 |

![Figure 2. Pretest-posttest result](image)

Each posttest score is always higher than the pretest, it gives a good sign that the instructional media is effective toward the student achievement.

Standard deviation is a measure to know the distribution of data, in the sense that the higher the standard deviation, the more value per unit of data varies. From Table 3 we know that the standard deviation in posttest is way smaller than standard deviation in pretest, it means that scores obtained at posttest are more evenly distributed. This one indicated that the instructional media succeeds to equate understanding of students in a class.

3.3. Normality Test
Normality test is used to test whether the data distribution is normal or not. This needs to be done because if the data distribution is declared normal, then the average value of the data can represent the data in the data analysis process, but if the data is declared not normal, the average value of the data cannot represent the data [8]. The normal data is also one condition that must be fulfilled to do the parametric statistic test such as paired sample t-test.
There are various methods to test the normality of the continuous data, but there are two most popular among them, which are the Shapiro-Wilk test and the Kolmogorov-Smirnov test. The Shapiro-Wilk test is more appropriate for small amounts (n) of data (n<50) [8], while the amount of students that follow pretest-posttest is twenty-eight students, so the Shapiro-Wilk test is chosen to be used on the data. The Shapiro-Wilk test to the data using the SPSS program.

Table 5. Shapiro-Wilk normality test result

|       | Statistic | Df | Significance |
|-------|-----------|----|--------------|
| pretest | .938      | 28 | .099         |
| posttest | .902      | 28 | .013         |

The significance for both pretest and posttest is above 0.05, which means that the data distribution for both datasets (pretest data and posttest data) are normal. Since the test stated that the data is normal, the hypothesis can be tested using paired sample t-test.

3.4. Paired Sample T-test
When each one of independent and dependent data is paired, the best method to analyze the data is paired sample t-test. Samples T Test Paired samples are used to test the average difference between the two data groups that each one of the data in group is paired to the data on the other group [9].

Table 6. Paired sample t-test result

| Paired Differences | T     | Df | Sig. (2-tailed) |
|--------------------|-------|----|----------------|
| Mean               | Std.Deviation | Mean | Std.Error | 95% Confidence Interval of the Difference | Lower | Upper |       |
| Pair 1 pretest-posttest | -16.86464 | 11.52284 | 2.17761 | -21.332733 | -12.39655 | -7.745 | 27 | .000 |

Significance two-tailed (Sig.2-tailed) shows the significance between two variables, if the value is less than 0.005, it means that there is a significant difference between two datasets [10]; otherwise, it shows that there is no significant difference between datasets. Table 6 shows the significance value is 0.000, which means that there is a significant difference between pretest and posttest in this research.

4. Conclusion
The experiment shows that each score of posttest is always higher than the pretest, then the data need to be tested in normality test to know what the best method to measure the significance level. Based on the result of normality test using the Shapiro-Wilk test, the data is proven to be normal, so the suitable test is using parametric statistics to know the significance level. Paired sample t-test then used to test the data, the result shows that significance 2-tailed is 0.000 that means that there is a significance difference from the treatment on the experiment. From that, it can be concluded that the instructional media based on Lectora Inspire is proved to be effective to increase student’s achievement, even on other research using Lectora Inspire in a learning process proved to increase the critical thinking skills [11]. Lectora Inspire not only works for science education student, but also for those in social field [12], and not only for higher-level student, Lectora Inspire also works for elementary school [13]. Lectora also can be collaborated with other program to produce better multi-media learning [14]. Last but not least, Lectora Inspire is also a good tool to do the training, not only for student in the school, but for adults in the higher area [15].
References
[1] Hugh I, Freedman R A, Young A, and Hugh D 2016 *University Physics* (United States of America: Pearson Education)
[2] Arief M. K, Handayani L, and Dwijananti P 2012 *UPEJ Unnes Phys. Educ. J.* 15
[3] Sirna I W and Ersa R D P 2018 *J. Penjaminan Mutu* 4 115
[4] Nurseto T 2011 *Ekonomi dan Pendidikan* 8 19
[5] Tompo B 2017 *Membuat Aplikasi dan Media Pembelajaran Interaktif with Lectora Inspire 16 Seri Tutorial Mulai dari Dasar sampai Upload ke Playstore* (Yogyakarta: Penerbit Ikatan Guru Indonesia (IGI) DIY)
[6] Muhaimin A & Soeprianto H 2015 *J. Pendidik. Fis. Indonesia.* 11 59
[7] Sugiyono 2015 *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D.* (Bandung: Alfabeta)
[8] Mishra P, Pandey C M, and Singh U 2019 *Ann Card Anaesth* 22 67
[9] Ravis M., Muhammad G, and Arman M 2019 *J. SISFOKOM* 08 116
[10] Hasmyati and Arafah A A 2019 *1st Int. Conf. Adv. Multidiscip. Res. (ICAMR 2018)* *Adv. Soc. Sci. Educ. Humanit. Res.* (ASSEHR)
[11] Dewi L, Susilawati S, And Kurniawan W 2020 *Pengaruh Media Lectora Inspire terhadap Kemampuan Berpikir Kritis Siswa Pada Materi Difraksi Dan Interferensi Gelombang Mekanik Kelas XI SMA Undergraduate thesis* (Universitas Negeri Yogyakarta)
[12] Yustiana E 2019 *Pengaruh Model Pembelajaran Reciprocal Learning Berbantukan Media Lectora Inspire Terhadap Hasil Belajar Siswa Kelas X IPS SMA Negeri 1 Jatiwaras (Studi Quasi Eksperimen Pada Mata Pelajaran Ekonomi Kelas X IPS SMA Negeri 1 Jatiwaras Tahun Ajaran 2018/2019 Undergraduate thesis)* (Siliwangi University)
[13] Prahangi T, Hawa, S, and Toybah 2019 *Jambura Geo Educ. J.* 1 1
[14] Mardhia M, Normawati D, and Azhari A 2018 *J. Pemberdaya* 2 235