

Title : The Benefits of Using Lens Kit in Learning The Process of Formation of Image

Nadhratulhidaayah Ismail , Nur Nadhrahtul Nafis A.Rahman
School of Education, Universiti Teknologi Malaysia, 81310 Skudai, Johor.
nadhratulhidaayah@gmail.com , nadhrahnafis@gmail.com

Dr Mahyuddin Arsat , Dr Muhammad Abd Hadi Bunyamin
School of Education, Universiti Teknologi Malaysia, Skudai, Johor
mahyuddin@utm.my, mabhadi@utm.my

Highlights: This profile contains the details on 'de Lensa' Kit which uses 3D ray diagram model to show the formation of image through convex lens. This product was built to increase the students' understanding on the Lens subtopic which is in abstract form and difficult to be understood without using demonstration. This product is specially designed according to the ray-diagram concept. Instead of having the 3D ray diagram model, there will be a set of flash card which contain the additional notes related to lens topic.

Key words: Demonstration; Image Formation; Physics Education

Introduction

'de Lensa' Kit is a learning tool which is developed to assist students in learning Physics Topic: Light. This is one of the most extreme topics for students who are taking science stream in secondary education. The difficulty is due to the abstract form which is quite confusing to be learned. However, it can be easier for students to understand the learning by representing the topics using visual or demonstration of real objects.

The simulation of ray diagram is difficult to be done since it requires a dark room condition to see the characteristics of light. Here we focus on the subtopic of lenses and the formation of images of the object. Hence, we come out with a product which can help student to understand well in this topic which is 'de Lensa' lens kit. This product aimed to assist student in understanding the concept of formation of image using the demonstration of real object. And it is easily accessible by student so that they have more time engagement with the 3D diagram.

Therefore, this lens kit will act as a tool which help teacher in their teaching instead of using textbook alone. For students, this is a new way to attract their attention, increase their motivation and make the learning process more enjoyable.

Content

1. Background of Innovation

According to M. Nor et al. (2007), the overall understanding of students in secondary school about the Light topic is in moderate level. It is very important to have a deep understanding in the concept of lens because this is one of the subtopics that are usually tested during SPM examination. Students have difficulty in solving problem regarding the concept of lens. There are a few factors which contribute to this problem.

- Students cannot differentiate the types of lens
- Less interaction with physical object
- Students are unable to determine the formation of image by each lens

2. Advantages of innovation towards education

- Students are able to understand the process of image formation using convex lens.
- Provide an interactive learning environment in classroom.
- Acts as a teaching tool for Physics Teacher in demonstrating the ray diagram.

3. Methodology

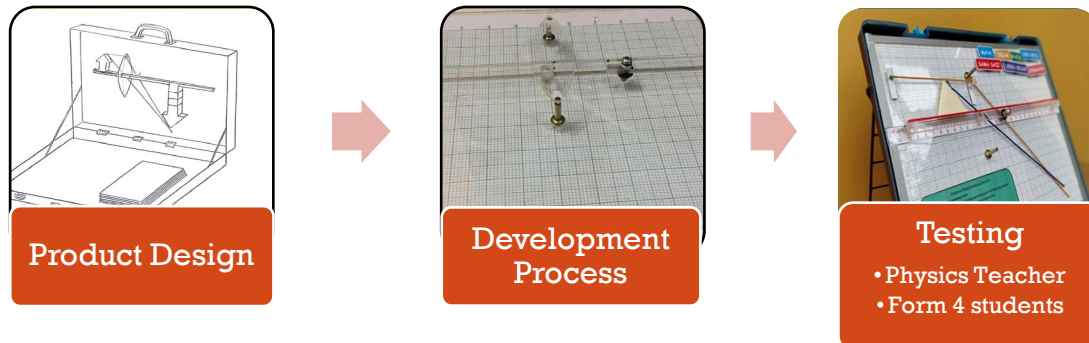


Figure 1 : Process of project development

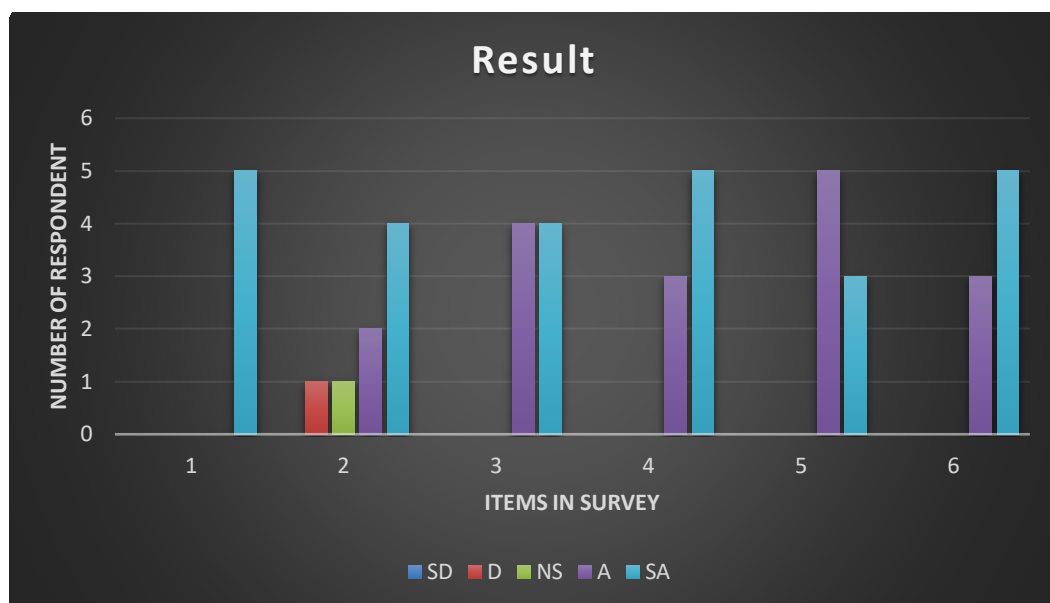


Figure 2 : Data Analysis

37.5% of respondent agree and 62.5% of respondent strongly agree with the item 1, 4 and 6.

- Item 1 - "This product follow the conceptual learning of a ray diagram"
- Item 2 - "This product really can show the characteristics of the images formed"
- Item 3 - "This product consists of all the important components that are needed in representing light ray"
- Item 4 - "This product can help teacher in teaching and help student in learning lens topic"
- Item 5 - "This product suitable to be used during teaching and learning process"
- Item 6 - "This product can make the class more interactive and able to increase students' motivation"

4. Product images

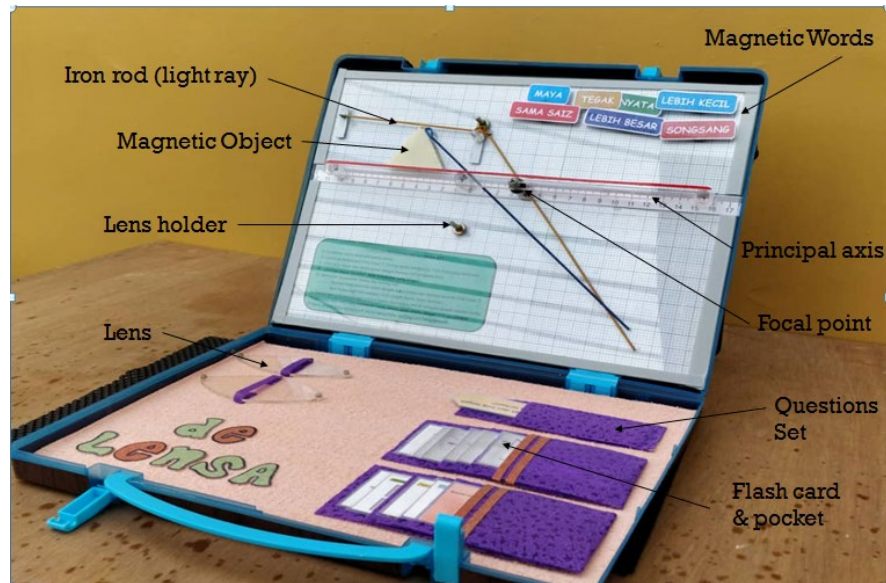


Figure 3 : de Lensa

5. Commercialization Potential

- Can be commercialized by promoting the lens kit to Physics teacher in secondary school as well as the Physics Lecturer in university.
- This product can be commercialized by collaborating with the local university for innovation purpose and learning kit.

References

- Basheer, A., Hugerat, M., Kortam, N. and Hofstein, A. (2017). The Effectiveness of Teacher's Use of Demonstrations for Enhancing Students' Understanding of and Attitudes to Learning the Oxidation-Reduction Concept. *EURASIA J. Math., Sci Tech.* **13**(3):555–570.
- Farooq, U. (2013). Demonstration Method of Teaching Meaning, Advantages & Disadvantages. Retrieved from <http://www.studylecturenotes.com/curriculuminstructions/demonstration-method-of-teaching-meaning-advantages-disadvantages>.