

Selected Screen for Engaging Students in Projectile Motion

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Abstract. Connecting physics concepts to activities that are interesting to students or what they encounter in everyday life will help students build a strong foundation. When there is an interesting activity for the student, it will result in the student responding, engaging, and enthusiasm in learning. Learning activities that are based on what students are interested in and regularly experience will enable students to understand the long and memorable experience. Both of these will enhance the student's learning experience. One of the activities that can be described in this research used the learning activity through movies, which is the application of the basic motion projectile for students to understand the characteristics of such movement. It also aims to further develop critical thinking skills of learners.

1. Introduction

Most students are trying to study from the teaching activities using common everyday instrument, scenarios, pictures, games, and videos, and animation. However, some researches have also been conducted on misconceptions, difficulty in studying, student's inattentiveness, using examples of everyday life such as throwing objects to demonstrate projectile motions in the class [1] However, it is interesting for the students to understand projectile motions format [2].

Comic books, movies and games will help attract students' attention in their studies resulting in the students being excited about studying physics. An easy way to use these media in the classroom is to let students see the images and specify the principles of physics event or events that are contrary to the physics principles [3] The teacher then teaches or adjusts students' understanding of the correct of physics by using images or video to explain [4], [5], [6], [7], [8].

There are currently media ready to be used in the school that the researcher is teaching to teach students how to visualize or see the actual events in the topic of teaching projectile motion in physics to train the students to have curiosity and hypotheses to explain the events seen from the perspective of the learner. This can be extracted from images or movie clips on the projectile movement based on physics principles and conditions. The instructor can use the student's event description information to validate the student's understanding by giving students an oral presentation. Learning in this form is also an interaction with friends, connection to daily life, create attraction, and keep students ready to learn other contents [9], [10].

For that reason, the researcher has designed learning method through the medium of film and scenes cut from the film. That is the basic application of projectile movement to understand the nature of the projectile motions.

2. Methodology

2.1. Sample

The sample used in this research was 6 high school seniors in the 2nd semester of academic year 2016 that were studying Physics selected by using (purposive sampling), the students study plan was science – mathematics with mediocre grades.

2.2. Teaching and Learning style

Physics is taught to high school seniors every Monday and Thursday for 1 hour, 40 minutes, starting with 15-minute lecture and the course content review with 10 minutes to explain and describe the objective of learning projectile motion and one student volunteered to select a video clip. The images are analyzed, summarized and 15 minutes for student grouping. It takes about a week to complete the course along with discussion on the physics of the projectile movement for the correct understanding of the principles of physics and able to be further applied. This was measured from the student's oral presentation with each having a clear role to play in analyzing the details to support the overall goal of the group. This can be written as a distribution of teaching style as the table.1

Table 1. Shows the learning patterns using movie composition.

Activity	(time line : Minute)
Review the content	0-15
Stating the purpose of the class	16-25
Group, select the clip motion projectile	26-85
Summary form and motion of the clip	
- Within the group (teacher responsibility is explain or make children understand) if the clip is not projectile, a new clip will be chosen	
- Joint study clip (moving patterns, moving style elements that cause the projectile)	
- Conclusion within the group	
Jointly concluded in class	86 - 100
- Presented by group representatives. (Group members and others to review and discuss)	
Jointly concluded by the whole class together	
- The teacher concluding correct principles of projectile motion	

2.3. Test of comprehension Projectile motion

The researcher create test on projectile motion comprehension with 3 questions two-tier. The first tier would be multiple choice questions with 4 choices. The second tier will be writing justification for the answer to the first tier questions, which would be conducted before and after the classes.

Teaching activities by using pictures and movies to reinforce projectile motion comprehension learning was designed by the researcher using materials and devices that are already in the classrooms such as computers. This would be done by designing activities with students viewing a total of 10 scenes from pictures and movies in the forms of animations, complete projectile, and projectile that are inconsistent with physic principles. Then the students are let to observe the motion and think on how many scenes were correct.

3. Result

The data of this research was separated into issues as follows:

3.1. Student progress

1st issue: students learning progress: average points testing results before learning (3.33 or 33.33%) and after learning (8.17 or 81.70%), respectively indicated that the average score after learning was higher than the average of before learning with the difference with statistical significance at .05 level with the value. $t = 7.39$ ($t_{0.05, 5} = 2.015$) When the learning progress was analyzed by means of Hake (1998), it was found that students who had been taught through film had average learning progress at a high level ($\langle g \rangle = 0.72$).

When the answers of students before and after learning management was considered, it was found that

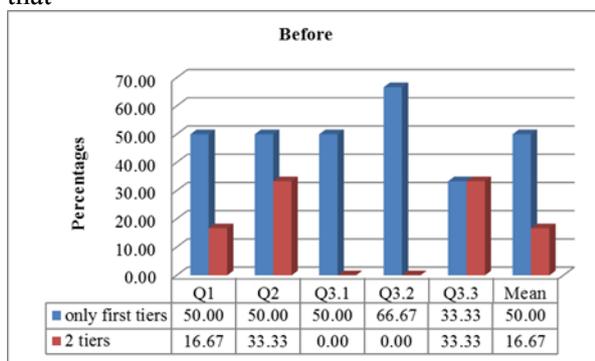


Figure 1. Graph showing the students' answers to the questions before learning

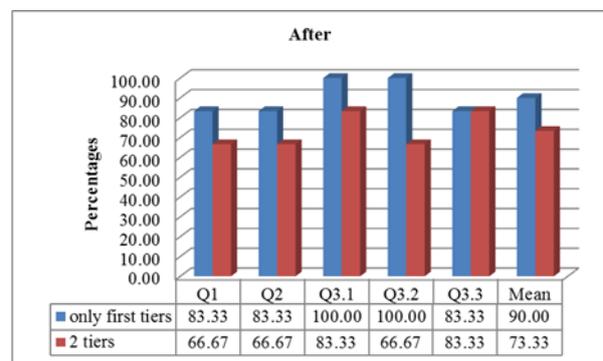


Figure 2. Graph showing the students' answers to the questions after learning.

From the graph students' answers to the questions before learning divided into two parts: the first part and the second part correct answers were 50.00% and 16.67% respectively.

From the graph students' answers to the questions after learning divided into two parts: the first part and the second part correct answers was 90.00% and 73.33% respectively.

When before and after the learning scores were considered, it can be seen that the students after the learning correct answer percentage on both parts was higher than before learning.

3.2. Analyze presentation and quiz results.

2nd issues when the results based on presentation and answered questions of students who view the images taken from the film were analyzed, it was found that:

Before the learning management when students have viewed pictures taken from a movie, the student would only be able to imagine what movie were the pictures from, how it would appear, and what would be next, which attracted the student interests but they could not correctly tell that the images convey projectile motions. They could simply say that each image had the same movement.

After learning the student presented the result of activities within the group and had the students see the pictures again, it appears that students could tell if an image conveyed and which ones conveyed projectile motions according to the principles at the average of 66.67%.

4. Discussions

Simple instructional activities with the activities of teaching by using pictures and movies as a supplemental teaching media on projectile motions was used in this research to develop knowledge and understanding of the students from the students lacking the understanding and ability to reason about the nature and form of projectile motions. When students have gone through the teaching using the images and movies added to learn about projectile motions, more students had a better understanding of the subject and able to explain the reasons. Additionally, the students were also able

to indicate that the projectile motion was correctly according to the principles. Learning from what students have found in their lives and are interesting to them will make students self-taught. It will also make learning meaningful to students and create long lasting knowledge in students

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