UNDERSTANDING PHYSICS USING INTERACTIVE SCIENCE SIMULATIONS.

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ABSTRACT

This research the purpose of this study is to compare the interaction of scientific simulation learning physical knowledge. Data collection and analysis before and after the experiment. Percentage, mean, standard deviation and t-test were used for statistical analysis. The results of the study showed the academic achievement of students, faculty of Science and Technology. Suan Sunandha Rajabhat University, which was studied using Interactive Science Simulations (ISS) Pre-test and Posttest, has a significant difference in statistical 0.05 both first half and second half- semester. The posttest scores were higher than the pre-test scores. The Physics achievement of Midterm and final has a significant difference in statistical 0.05 and the final scores higher than the midterm score. The Physics achievement of the students studying using ISS and the normal has a significant difference in statistical 0.05, the academic achievement of students using ISS is higher than usual.

Keywords: Interactive Science Simulations (ISS), Learning Physics, Achievement

INTRODUCTION

Science and technology is an important factor in the development of economic and social growth, as well as enhancing the ability of international competitions. Thailand has seen the importance of science and technology, as technology advances have come to more people's daily life and are an important tool to help raise the standards of people's living. To promote science and technology development, it is required to place a quality educational foundation. Therefore, there is an urgent necessity to raise the development of science education. To ensure that all Thai people know science and technology to become the foundation of their lives on time and lead to sustainable development.

Inquiry-based learning the concept of four levels of diversity in management learning is Confirmed Inquiry, Directed Inquiry, Guided Inquiry, and Open Inquiry. Physics in higher education is regarded as one of the important subjects of learning. Teaching in Undergraduate Especially for students from the Faculty of Science and Technology, which requires knowledge of basic physics and accurate to be useful to study specific subjects on the higher levels. Teaching in Undergraduate Especially for students from the Faculty of Science and Technology, which requires knowledge of basic physics and accurate to be useful to study specific subjects on the higher levels. But the problem today is that although the physical infrastructure is very important to teach, the attitude towards learning physics tends to be negative due to factors such as the nature of physics as subjects. the use of mathematical skills Students with the basic knowledge and skills in physics from relatively low levels. The achievement in physics at the University of inferior. Therefore, simulation physics teaching is necessary. Classroom simulation Realism Rules or conditions A gathering of students. Learners will learn about the problem and they decide to use their intelligence to interact with the situation. Simulation is a fully understood knowledge content. A PhET

interactive simulation project from the University of Colorado Boulder's website, www.phet.colorado.edu has prepared a well-tested scientific and mathematical simulation. There are scientific and mathematical simulations of up to 157 sims and a physics simulation of up to 106 sims, an application that works on Android and iOS PCS, provides access to and a variety of learning applications. A team of researchers believes that using effective simulations will learn to seek to create self-cognition. The researchers saw such significance to have developed a research program of cognitive literacy, using Interactive Science Simulation, to study the achievement and the student's physical attitudes by using PhET (ISS) interactive simulations, aiming to guide the development of further physics teaching.

OBJECTIVES

1. Study of Cognitive Learning physics by using the Interactive Science Simulation.
2. Comparison of cognitive learning physics using Interactive Science Simulation.

RESEARCH HYPOTHESIS

Cognitive Learning physics by using the Interactive Science Simulation different from Normal study physics.

METHODOLOGY

1. The research is divided into three phases: experimental simulation interactive physics using Interactive Science Simulations 30 minutes of activity, discussion and conclusions lead into lessons pre-test before learning and posttest after learning the sample of students studying science and technology are enrolled 2nd semester 2561 academic year.

2. The variables used in the research. Variables can be used in the research were as follows:

    2.1 The achievement before and after learning

    2.2 Achievement mid-term and end of the term.

3. The tools used in this study are the Interactive Science Simulation and achievement test. Physics class

4. Researchers analyzed statistical data using a computer to calculate the statistical software packages. The procedure is as follows:

    4.1 Data analysis with descriptive statistics Use stats, frequencies, and percentages to describe the demographic characteristics of students. Academic Achievement Analysis Use the average and standard deviation

    4.2 Analyzing data using predictive statistics in comparison, students with different demographic characteristics have a pre-and post-study achievement and a different school and school achievement, using a pair of t-test statistics and one-way analysis.

RESULTS

1. Students of the Suan Sunandha Rajabhat University who studied most of the physics as a 72.22 percent by the student's academic achievement prior to school and post-study scores using Interactive Science have found that the academic achievement before and after the student's physics has a significant difference in statistical significance. 0.05, as a result of higher education after school as shown in Figure 1.

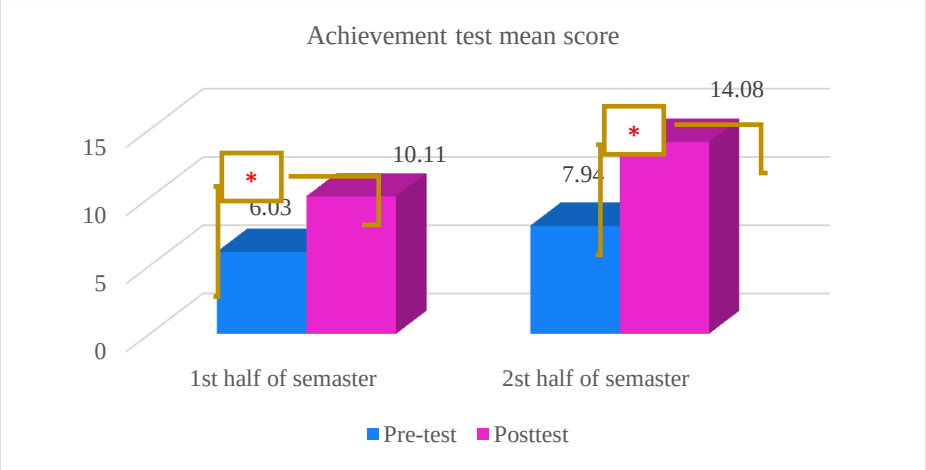

Figure 1. Physics achievement of students before and after class using ISS first half and second half of the semester.

2. Students of Suan Sunandha Rajabhat University who study physics through interactive scientific simulation have different academic achievements. The results show that the achievement of interactive science simulation physics posttest scores is higher than pretest scores.

Table 1. Compares the achievement of students in the university. Physics with Interactive Science Simulations before and after school first half-semester.

achievement of students	$\bar{x}$	S.D.	t	df	p-value
Pre-test	6.02	2.37	-4.08*	35	.000
Posttest	10.11	2.82			

* Significance level of 0.05

3. Students studying physics using Interactive Science Simulations achievement before learning achievement after learning differences are statistically significant. 05. The posttest score higher than Pre-test.

Table 2. Compare the achievement of students in university. Physics with Interactive Science Simulations before and after the 2nd half semester.

achievement of students	$\bar{x}$	**S.D.**	**t**	**df**	**p-value**
Pre-test	7.91	2.25	-6.13*	35	.000
Posttest	14.08	2.69			

* Significance level of 0.05

4. Students studying physics using Interactive Science Simulations achievement mid-term difference to final, a significant achievement at 0.05 by the mean of final score higher than mid-term score.

Table 3. Compare the Physics achievement of students using Interactive Science Simulations mid-term and final examination.

Physics Achievement	$\bar{x}$	**S.D.**	**t**	**df**	**p-value**
mid-term examination	12.97	5.40	-7.44*	35	.000
final examination	20.42	4.61			

* Significance level of 0.05

5. Achievement of physics students using Interactive Science Simulations and normally different. Significant at 0.05 by the achievement of students using the Interactive Science Simulations higher than normal.

Table 4. Compare the Physics achievement of students using Interactive Science Simulations mid-term and final examination.

Teaching Method	$\bar{x}$	S.D.	t	df	p-value
Normal Method	12.93	5.15	6.40	78	0.00
ISS Method	20.00	4.73	*		

* Significance level of 0.05

CONCLUSION AND DISCUSSION

Research has found that physics-based achievement using Interactive Science Simulations (ISS), before and after classes, has a significant difference in statistics .05 both the first half of the content classes in the region. Classes and content in the second half of the semester, with the achievement after the study of the higher the achievement before the study and find out that the intermediate achievement differs from the statistically significant achievement. .05 to the end of class. The academic achievement of the students who study using ISS and a normal, different statistical significance at 0.05 by the student's academic achievement using ISS is higher than normal, showing that using Interactive Science Simulations affects learning. Knowledge of the subjects, particularly the physical content, complies with the research of Garry Falloon (2015) The study concludes simulations can be effective for introducing young students to simple physical science concepts, and for providing them with opportunities to engage in higher-order thinking processes. And the research of Ersin Bozkurta, Aslan Ilika (2010) It is seen that the courses with interactive simulations have a positive effect on students ' beliefs about physics and physics achievement. The PhET Interactive Science simulations can be used in a wide range of learning activities. The efficient use of ISS enables learners to learn to understand themselves. The university should encourage learners to take real-life experiments in conjunction with the use of models to produce the highest possible learning. In the event that a trial is dangerous or scarce, the device can use ISS to help teach instead of real trials.

SUGGESTIONS

1. The university should promote and encourage PhET ISS to help provide a part of scientific and mathematical teaching processes.

2. Education-related departments should develop and utilize ISS and online learning.

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