Impact of Animation in Prezi.Com Software among Undergraduate Students at School of Applied Physics, National University of Malaysia

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ABSTRACT

The aim of this study is to determine the evaluation level of animation in learning and teaching process and the effect of animation on academic achievement among undergraduate students in School of Applied Physics (PPFG), National University of Malaysia (UKM) by using contemporary Prezi.com software. For the purpose of teaching material, 4 animation models was designed which included 4 core subjects of 1st year students; electric and magnet, thermodynamic, wave and mechanics by using Flash 8 software which was then integrated as hypermedia presentation slide by using Prezi.com software. Lecturer and students can easily access the slide by entering the keywords in the searching engines like Google, Yahoo, Bing and ect. The sample of study involves 61 of 1st year students and 20 of 2nd year students at semester 2 academic session 20132014. Collected survey data forms 81 undergraduate students in PPFG, UKM showed an average of 98% interested in using of animation for learning and teaching. On the other hand 38% of them feel hesitate and worry about the implementation and the use of animation. However, 99% of them still believe that the use of animation can improve their academic achievement. This was proven by the results of tests 1 and 2, pre-test and post-test from the workshop organized which showed an increment in mean average of 3.6 to 7.5 and 2.7 to 5.5.

Introduction

In the era of the 21st century, Malaysia is not left behind in efforts to strengthen the strategy to the goal of archiving status of the developed countries. Malaysia Education Development Plan 2013-2025 is a nearly shift in the realization of that dream. Najib (2012) stated that new approaches and strategies required in the process of education transformation for students to master the skills needed in the 21stcentury. Thus, the transformation should also lead to an effort to understand and improve the teaching and learning process. One of the action plans in the education transformation is leveraging information communication technology (ICT) in education where ICT is the future of innovation in pedagogy. Thus, this study emphasizes the use of multimedia elements as animation is one of the components in ICT. O'Connor and Brie (1994) describe that the use of multimedia technology can support learning, especially those involving problem solving, hypothesis testing, evaluation based on the capabilities and increase creativity.

Animation is also a teaching tool that can be categorized as a modern tool that can attract the students to understand the topics taught more easily and quickly. Park and Gittelman (1992) hypothesized that animated visual display will be more effective than static visual display animations in support of specific learning needs of the given task. Animated visual effects in enhancing the effectiveness of the presentation and are useful in achieving the learning objectives (Boyle.T, 1997). Animations can also enrich the presentation of the instructional process. It also allows emphasis attention is given to the content to be delivered.

Some studies have shown that human nature will remember 20% of what they see, 40% of what they see and hear, but about 75% of what they see and hear and do at the same time (Lindstrom, 1994). In Willingham's study (2009), he asked a simple question and draw on the use of multimedia.. "Why do students remember all seen on television and forget all the lessons in class?"..also proposed a simple answer by him is because the media visual helps students retain concepts and ideas in memory. The rationale in multimedia learning theory states that people learn more deeply from words and pictures than from words alone (Mayer 2001). Furthermore, Mayer (2001) in the modality principle states that students will learn better from animation and oral than animation and text on the screen only. Evaluation found that students using ANIMATE program can improve their test scores than those who did not (Nathan et al., 1992). However, not all students who use the ANIMATE got excellent marks (Nathan &Resnick, 1994). Thus, Nathan and Resnick (1994) suggests that additional guidance may be introduced where necessary to support student-centered interaction.

Hypermedia is a system of interactive information that can be achieved by unconsecutive or not according to a fixed route as the sequence of pages in the book sheet. Instead, the information is displayed in a hypermedia presentation can be accessed according to the interests, desires and needs of consumers. Various types of information are included in hypermedia presentations as video, audio, graphics, text and animation for the use and convenience of the user. According to Wikipedia, Ted Nelson (1965) who first used the term to define hypermedia as an extension of the term hypertext is a medium where hypermedia link information is non-linear which contain graphics, animation, audio, video and text. Liao (1999) conducted another study in which he found that 60% of students indicated a positive response, 37% gave a negative response and only 3% who did not show any effect on the use of hypermedia.

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Table 1. Collecting pre and post-test data process at PPFG, UKM

No	Activity	Description of activities	Duration
1	Pre-Test	Performed to determine the level of students' achievement on the topics that have been learned by using power point slide which consist the statics images.	1 hour
2	Workshop	Explaination and lecturing by using all animation models.	2 model x 1/2 hour = 1 hour
3	Post-Test	Performed to determine the effect of animation to their students' achievement.	1 hour

Table 2. Topics and subtopics in workshop 1 and 2

Animation / Sucject	Number of Question	Topics (2 subtopics from each model)	Workshop
Animation model 1 /Electric and magnet	2	Magnetic field 1. A circulating charge particle 2. Solenoid	1
Animation model 2 /Thermodynamics	2	The kinetic theory of gases 1. Ideal Gases-work 2. Adiabatic process	1
Animation model 3 /Wave	2	Sound wave 1. The Doppler Effect 2. Source of musical sound	2
Animation model 4 /Mechanics	2	Motion in 2 and 3 dimension 1.Projectile Motion 2. Relative Motion in 2 Dimension	2

Table 3. Evaluation scalein the survey form

Range of average mean	Evaluation of using animation
0.00 – 2.50	notinterest negative impact no problem
2.51 – 5.00	interest Positive impact problem

Table 4. Average means data for the interest, impact and problem factor

	N	Minimum	Maximum	Mean	Std. Deviation
interest	81	2.17	5.00	4.0473	.53114
impact	81	2.33	5.00	4.0947	.53225
problem	81	1.00	4.40	2.3407	.63831
Valid N	81				

Table 5. Influence of interest to the impact of using animation in teaching and learning

		interest	impact
interest	Pearson Correlation	1	.714[**]
	Sig. (2-tailed)		.000
	N	81	81
impact	Pearson Correlation	.714[**]	1
	Sig. (2-tailed)	.000	
	N	81	81

[**]. Correlation is significant at the 0.01 level (2-tailed).

Table 6. Influence of problem to the impact of using animation in teaching and learning

		problem	impact
problem	Pearson Correlation	1	-.583[**]
	Sig. (2-tailed)		.000
	N	81	81
impact	Pearson Correlation	-.583[**]	1
	Sig. (2-tailed)	.000	
	N	81	81

[**]. Correlation is significant at the 0.01 level (2-tailed).

Table 7. Average mean for Pre-test1, Post-test1 dan Pre-test2, Post-test2

		pretest1	posttest1	pretest2	posttest2
N	Valid	15	15	15	15
	Missing	5	5	5	5
	Mean	3.6000	7.5333	2.6667	5.4667
	Mode	4.00	8.00	3.00	6.00

Table 8. Frequency table pre-test 1 and post test 1

Pre-test1	Frequency	Post-test1	Frequency
E	1	C	1
E	2	C	1
D	1	B	2
D	2	B	2
C	4	A	5
C	3	A	2
B	1	A	2
B	1		
Total Valid	15	Total Valid	15
Missing System	5	Missing System	5
Total	20	Total	20

Table 9. Frequency table pre-test 2 and post test 2

Pre-test2	Frequency	Post-test2	Frequency
E	1	D	1
E	1	C	3
D	3	C	3
D	5	B	5
C	3	B	2
C	1	A	1
Total Valid	15	Total Valid	15
Missing System	5	Missing System	5
Total	20	Total	20

Table 10. Paired T-test Data

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1 pretest1 - posttest1	-3.933	1.099	.283	-4.542	-3.324	-13.8	14	.000
Pair 2 pretest2 - posttest2	-2.800	1.146	.296	-3.434	-2.165	-9.4	14	.000

**. Correlation is significant at the 0.05 level (2-tailed).

This is clearly explained although hypermedia can provide a positive impact in teaching and learning, but there is also a group of students who are not able to collect the opportunities provided by the hypermedia presentation. However, the conclusion is that hypermedia can enhance the ability al most of the students.

The Purpose of Study

The aim of this study is to determine the evaluation level of animation in learning and teaching proses and the effect on academic achievement of 4 core subjects among undergraduate students in School of Applied Physics (PPFG), National University of Malaysia (UKM) by using Prezi.com software.

Participants

The sample of study involves 61 of 1ˢᵗ year students and 20 of 2ⁿᵈ year students at semester 2 academic session 20132014.

Method and Material

Preliminary stage focused on the content structuring in the animations design. Animations are then built up by using Flash 8 software which a part of them are as per mentioned topics in table 2. Flash 8 imply for aniamtions and interactive animations .Next, all animations are then compiled and integrated in Prezi.com software as hypermedia presentation slide. Prezi is a presentation software which appear as a virtual whiteboard that allows people to see, understand and remember ideas. The zoom able characteristics of prezi let people enjoy when exploring ideas in the slides.

There are two methods had been used to collect data which involve distribution of questionnaires and by doing pre and post-test in the animation workshop.

Questionnaires

Purposely, the questionnaire was distributed to determine students' perception and opinion about the use of animation in learning and teaching at PPFG, UKM. For second year students, questionnaire had been sent to all 20 students during regular lecture on 17 March 2014 and was collected after one week of circulation. While for 61 of the first year students, a short 40 minutes workshop was held in a lecture hall on 12 May 2014 involving description regarding the use of animation as a learning medium of 4 core subject: electric and magnet, thermodynamics, wave and mechanics in the hypermedia Prezi slide presentation and mobile applications. Questionnaire had been distributed and collected at the end of the workshop sessions. The questionnaire is catagorized into 4 sections which include:

a) Section I   - Dermographic
b) Section II   - Students' interest with the use of animation
c) Section III   - Impact of animation in teaching and learning physics
d) Section IV   - Problems of using animation in learning teaching physics

Generally, there are 20 questions in the questionnaire. Section I consisit of 1 question,6 questions each from section II and section III, and 7 questions from section IV.

Animation Workshop

Two animation workshops had been held involving only second year students at semester 2 academic sessions 20132014 on 7 Mac and 14 Mac 2014. This evaluation is purposely to determine the effect of animation on the academic achievement of 4 core subjects among the students at PPFG, UKM. Even though the 4 core subjects is learned by the first year students, only second year students had been choosen to take part in the workshop because all second year students had finished learn all the topics as mention in table 2 in the last semester by using power point slide which included static image in the presentation during teaching and learning.

Students were given pre-test which is held before learning and teaching had been done by using animation model or before the workshop is started. After the workshop is finished, all students were then given the post-test to determine the effect of animation to their achievement. This can be seen clearly as shown in table 1.

For these animation workshops, 3 hours is needed to complete all activities in a workshop. All animation models that had been created and published in Prezi.com software had been used as teaching materials in the workshops. Animation model 1 and 2 which consist of subject electric and magnet and thermodynamis are tested in workshop 1 while animation model 3 and 4 which consist of subject wave and mechnics are tested in workshop 2.

Students need 1 hour for pre-test and another 1 hour for post-test to be completed. Because of the time constrain, only 2 subtopics from each model is selected to be discusses and tested. Table 2 explain clearly the topics and subtopics that were choosen in the workshops.

Analyzing Data

Questionnaire is processed by using Statistical Package for the Social Sciences (SPSS) software. SPSS is choosen because it is a program which is used widely to analyse statistics data in science social field and many other researchers from the other field. Analyzing is done by considering mean value, percentage, frequency, and Pearson relationship involving interest, impact and problem factor of using animation in learning and teaching 4 core subjects in PPFG, UKM.

Result of pre-test and post-test is also analysed by using SPSS. Significant value and average means is analysed to compare the result between pre-test and post-test. Paired-Ttest is also done to look at the relationship between results of the test to the students' academic archievement of the 4 core subjects in PPFG, UKM.

Findings

Students' Perception on Using Animation in Learning And Teaching Physics

Students' perception on using the animation in learning and teaching is evaluated by analizing the respond from all 81 questionnaires which had been distributed to the first and second year students in PPFG, UKM. Evaluation is done by calculating the average means of every section in the survey form as section II or question 2 until 7 determine students' interest with the use

of animation, section III or question 8 until 13 determine the impact of animation in teaching and learning physics and question 14 untill 20 from section IV determine the problems of using animation in learning and teaching physics at PPFG, UKM. Analyse survey data also conscious about relationship between influence of interest to the impact of using animation in teaching and learning physics and also between influence of problem to the impact of using animation in teaching and learning physics. While for section I in the survey form only figure out that 22 of respondense are male students and 59 of them are female students.

Scale specified in the evaluation of interest, impact and problem of using animation in learning and teaching from the questionnaires were shown in the table 3. While table 4 shows the average means data for the interest, impact and problem factor.

Generally, table 4 shows that almost of students are interest with the using of animation in learning ang teaching with average mean 4.0473 and with average mean 2.3407 explained that students do not have problem of using animation in learning and teaching the 4 core subject and also they believe that by using animation, they can improve their academic achievement which average mean 4.0947. This evaluation can be seen more clear and detail in figure 1,2 and 3.
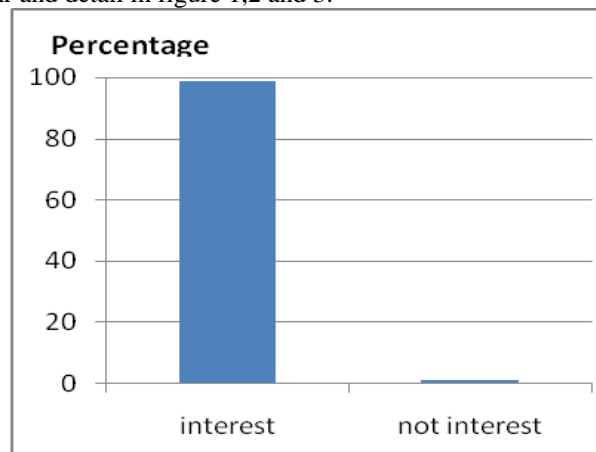

Figure 1. Students' interest with the use of animation

Base on figure 1, 98.8% of the students show their interest in using the animation and only 1.2% of the students refuse the ability of the animation in learning and teaching of the 4 core subjects at PPFG, UKM.

On the other hand, base on figure 2, analyse data shows that 37% of the students feel worried if there will be some problem in implementing the animation in PPFG, UKM a specially when there is no internet connection and also technical problem due to failure of software to be function. While 63% of the students agreed that there is no problem to apply animation in their lessons.

Although a bit number of students feel that using of animation will have some problem, figure 3 shows that almost or 98.8% of the students still believe animation can bring positive impact to their achievement in learning the 4 core subject in PPFG, UKM.

Referring to the result from SPSS analyse data in table 5, significant value in measuring influence of interest towards impact is 0.000 which is smaller from given significant value 0.01 explain that interest of using animation will give positive impact to the students' achievement.
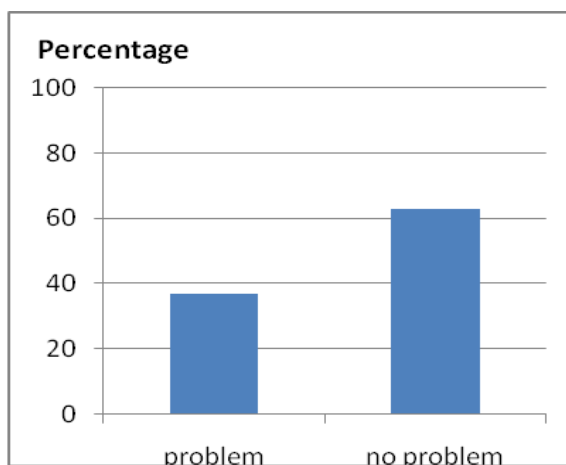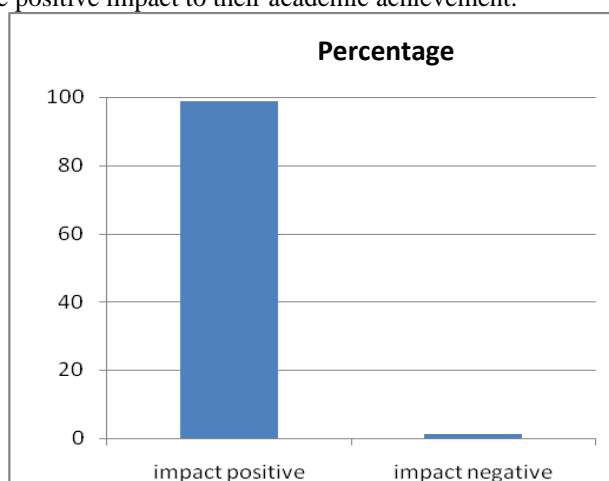
Figure 2. Problems of using animation in learning and teaching

Same goes in table 6, significant value 0.000 from SPSS analyse also smaller from the given value 0.01 tell that student who feel that they got no problem in using animation also will give positive impact to their academic achievement.

Figure 3. Impact of animation in teaching and learning Effect of Animations To The Achievement of 4 Core Subjects in PPFG, UKM

Result of pre-test and post-test is analyzed to determine the effect of animation in the Prezi.com software to the students' achievement of 4 core subjects in PPFG, UKM. 15 out of 20 students attend the animation workshop 1 and 2. The lowest score is 0 and the highest is 10. Grade E mark 0 and 1, grade D mark 2 and 3, grade C mark 4 and 5, grade B mark 6 and 7, and grade A mark 8, 9 and 10.

Table 7 figured average mean for all the given test to the students. Results of tests 1 and 2, pre-test and post-test from the workshop organized which showed an increment in mean average of 3.60 to 7.5333 and 2.6667 to 5.4667. These prove that using of animations will improve the students' achievement of 4 core subjects in PPFG, UKM. Detail of the marking can be seen on table 8, and 9.

Table 8recorded the marks for pre-test 1 was improved in post-test 1 with the mod marks change from grade C to grade A. While Table 9recorded the marks for pre-test 2 was improved in post-test 2 with the mod mark change from grade D to grade B.
Paired T-test is also done to test the validity of hypothesis. Table 10 shows that significant value is 0.000 for both cases are smaller than 0.05 which prove the validity of hypothesis that using animation will improve students' performance also the method is able to improve the quality of graduates from PPFG, UKM.

Conclusion

In conclusion, 98.8% students in the School of Applied Physics, National University of Malaysia are impressed with the use of animation in their lessons. Although there are 37% of them feel worried with some problem that may be occur when implement the animation in their learning and teaching, still 98.8 % of students believe that animations in Prezi.com hypermedia presentation slide can help them much in improving their academic archievements in the 4 core subject at PPFG, UKM. This was proven by the increament in mean average of pre-test and post-test from the workshop that recorded an increment of 3.6 to 7.5 for test 1 and 2.7 to 5.5 for test 2.

There are same result by other research regarding the use of animation in teaching and learning. Aksoy (2012) found that animation techniques are able to help students in getting higher academic achievement than traditional techniques. Jolly (2003) also discover the average mean increase after implementation of animation in learning and teaching process from 5 to 7 which show that the effectiveness of the teaching method.
There are quite number of students are doubt about the smoothness of the use of animation during learning and teaching. Base on question 19 in the survey form, some of the concerns by the students are:
a) Technical failures that may occur during the preparation of the equipment that may take their learning time.
b) Interruption of internet line which may delay the process or the use of animation or can not display animation online.
c) Students may need more explanation about the animation that has been displayed.
d) The student may lose concentration because too excited with the new system or an animation.

Some of the problem highlighted above are because of students are less familiar with the technology in the education system in the 21st century. In brief interview, which involves students in year 2 PPFG, UKM, they admit that some of them can play the game applications through their mobile devices. However, for mobile applications that involve education, students still have not explored these areas. Koharudin (2004) stated that overall; the use of e-learning by undergraduates' students in Malaysia remains moderate as they are still in process of adaption to new technologies.

Further more, UKM have their own internet access system which known as "UKM TETAMU" and "UKM WARGA". However, the speed and bandwidth of internet access is limited. There are some halls and lecture rooms that can not reach internet access. This is a factor that may disturb the use of online teaching aids. Anyway, the slide show produced in the Prezi.com software can work online and also offline if there is no internet access. For the offline use, lecturers and students are required to online download it to their PCs only one time, then they can bring the slide anywhere in their thumb drive or external hard-disk. In the future, suggested that UKM will improve their intenet accessibility system.

Reference
A. S. M. Najib, 2013. Journal Problem Solving in Thermodynamics: Animation in animated mind- mapping. Vol 9.www.ijern.com .
A. S. M. Najib, 2014. Journal Problem solving in electric & magnet: animation in hypermedia presentation. www.elixir.com.
D. T. Willingham, 2009. *Why Don't Students Like School?*. San Francisco: Jossey-Bass.

G. Aksoy, 2012. The Effect of Animation Technique on 7th Grade Science and Technology Course.http://www.scirp.org/journal/PaperInformation.aspx?PaperID=19798.

J. O'Connor, & R. Brei, 1994. Mathematics and Science Partnership: Product, People, Performance and Multimedia. *Computing Teacher 1994* 1: 27-30.

Malaysia. 2013. *Pelan Pembangunan Pendidkan Malaysia (PPPM)2013-2025*.

M. J. Nathan, W. Kintsch, & E. Young, 1992. A Theory of algebra-word-problem comprehension and its implications for the design of learning environments. *Cognition and Instruction*. 9:329-389.

M. J. Nathan, & L. B. Resnick, 1994. Less can be more: Unintelligent tutoring

based on psychological theories and experimentation. In S. Vosniadou, E. De Corte, & H. Mandl (Eds.)*, Technology-based learning environments* (halaman 183–192). Berlin: Springer-Verlag. MohdKoharudin. 2004. Perkembangan, pembangunandanpenerimaan e-

pembelajaran di Institusi.

http://www.jurnalteknologi.utm.my/index.php/jurnalteknologi/article/view/727/712 .

O. Park, & S. Gittelman, S. 1992. Selective use of animation and feedback in

computer-based instruction. *Educational Technology Research & Development,* 40(4), 27-38**.**

R. E. Mayer, 2001. *Multimedia Learning*. New York: Cambridge University Press.

R. Lindstrom, 1994. *The Business Week Guide to Multimedia Presentations: Create Dynamic Presentations That Inspire*. New York: McGraw-Hill.

S. Jolly, 2003. Studying the effectiveness of animation and graphics with text on fourth, fifth and sixth graders. http://dwb.unl.edu/diss/jolly/sjolly.pdf .

T. Boyle, 1997.*Design for Multimedia Learning*. London: Prentice HallEurope.

Wikipedia. 2013. Hypermedia. http://en.wikipedia.org/wiki/Hypermedia.

Y. K. C. Liao, 1999. Effects of Hypermedia on Students' Achievement: A Meta Analysis*Jl.of Educational Multimedia and Hypermedia* (1999)8(3), 255-2771http://www.medvet.umontreal.ca/techno/eta6785/articles/effect_hyperme dia.pdf.