# **Implementation of Video for Learning Based on Persuasive Theory to Stimulate Interest towards Physic Subject**

Norah Md Noor, \* Radhiah Ab Rahim

Faculty of Education, Universiti Teknologi Malaysia \*Corresponding author : norah@utm.my

#### Abstract

In line with current technological developments of web 2.0, digital video material of varying quality and content can now be freely available to students and educators. Research shows that suitable theory embedded within the video developed might have a positive influence to the user. So, the purpose of this project is to develop the educational video entitled: Scalar and Vector Quantity based on Persuasive Theory in order to help students change their perception toward learning physics. Instructional design model used for this video development is ADDIE Model. The persuasive theory embedded in the video integrated five factors that are source factors, receiver factors, channel factors, message factors and situational factors. Source factor is all about presenter credibility and attractiveness. Receiver factor is classifying the user characteristic. Channel factor used to deliver the content is video. Situational factor is how to minimise distraction and maximize the quality of the video. The video developed was tested by experts to confirm the validity of content. Data collected were used to improve the video quality and content. The modified version of the video was tested by 6 Form 3 students and shows potential consequence to inspire students' interest towards physics subject.

Keywords: Persuasive theory, Video based learning, learning using video, interest towards physics, STEM

#### **INTRODUCTION**

Net Generation or generation Y tend toward independence and autonomy in their learning styles, which impacts a broad range of educational choices and behaviours, from "what kind of education they buy" to "what, where, and how they learn" (Carlson, 2005). Generation Y students are no longer suitable with the teaching method like "chalk & talk", slide presentation and hand-outs only. Their world is accustomed with high-tech equipment such as laptops, iPhones, iPad and Smartphone which makes their perspective thinking far ahead of others. Growing up with the internet, has transformed their approach to education. Thus, the process of teaching and learning must also be in line with their progress. Therefore, as stated by Katz (2002), independence in learning is positively connected to students' preferences for the more open Internet functionality.

Education Development Plan 2013-2020 stated that teaching and learning in Malaysia has embarked on the Information and communication technology (ICT) in education. The Ministry continues with the aim to qualify all schools to reach the "Smart School" by achieving the minimum standards of ICT use, the ability of teachers, availability of infrastructure and ICT applications. In addition, it also aims to integrate ICT in teaching and learning process (Kementerian Pelajaran Malaysia, 2012). Based on the research that has been conducted on the impact and potential of ICT in education, the Ministry will organize a chance to deliver more ICT-based solutions that are more innovative, supported by clear evidence of positive effects.

#### **RESEARCH BACKGROUND**

Physic is an important subject if students want to further study in the science stream. Students have to love the subject so that they can upgrade their understanding. The problem is that students are not interested in physics. They are more to remembering the symbols and formula that is being used rather than to understand how the phenomena occur. As a result, students cannot elaborate deeply the physics concepts when they are given the different situation from what they have learned in the class. This means that the students are unable to solve the problem because they do not understand the fundamental concept (Abraham, 1992).

Student motivation is one of the important criteria in independence learning because it is the students' own desire to achieve success in their respective fields. Research by Wu & Tuan (2000) claimed that students agree that some teaching strategy can influence their motivation in learning. Therefore, instructional teaching strategies must base on a concept that can motivate the students to stimulate their motivation (Fischer & Horstendahl, 1997). Based on the researched by Chiu and Greg (2009) most students feel that if they can gain knowledge by concentrating on watching short learning video at home than study in the school.

Video can help student learn in various approaches. It is much friendly and effective tools for enhancing students' interest in their studying as well as generate their creativity. Research done by Romiszowski (1981) discovered that designed video can help students learning in four elements; seeing, engaging, doing and saying.

There are many kinds of video learning in physics available on the internet. A number of teachers use video as a teaching material. Some of the students like to search learning video by their own at home. However, most of the

learning video that was developed only to stress on the content. Hence, this might cause students to easily get bored and unable to focus in class.

Therefore, this project tries to develop a learning video on the subtopic Scalar and Vector Quantities by using persuasive theory which could engage students' interest and motivation in studying physics. Scalar and Vector Quantities is a subtopic in Introduction of Physics in form four. This is one of the important topics that physics student have to master because the knowledge will be used mostly in the study of physics even in the tertiary level.

The usage of Persuasive theory embedded within the video is because it can influence changes in behavior or attitudes (Simons, 1976). According to Keller (1983), motivation referred to the human inclination to make the decision regarding experience, goals that he wishes to explore and also the amount of effort needed to achieve those aims and goals. By using persuasive theory, it will increase the students' motivation and try to reduce the distract circumstance. Thus it will make students more focus, understand and can make an excellent decision.

There are five main factors in persuasive theory that should be considered when running the process of developing a video. Firstly are the source factor or in other words, the communicator's credibility and attractiveness. This factor enhances user to become confident and to trust the video. Secondly is the receiver factor. It is to ensure that information is delivered parallel to the user's level. So they can easily understand what the video is talking about.

A third factor is the channel factor or the means by which media is being used in attracting the user. For this project, the video message mode is suitable because user obtains more information in physical and behavioural characteristics. Video allows user to watch how the phenomenon in physics occurs. It will make them experience it. The fourth factor in persuasive theory is the message factor. The message or content of a video should have a strong idea. Effective message presents idea for both sides either the source or the receiver. This can make them to think alike as expected and then achieve the same conclusion similar to the idea of the video. The last factor in persuasive theory is the needs in reducing distraction and forewarning. Video learning should produce less noise and have a good quality in audio and video.

All the factors should be implemented in the video to persuade students to be attracted to the physics subject. A strong combination of source, message and channel factors, hopefully will give high impact and a positive view to the students in studying physics.

#### **RESEARCH OBJECTIVES**

- 1. To develop an educational video entitled: Scalar and Vector Quantity based on Persuasive Theory.
- 2. To identify the aspects within the developed video that able to change students perception toward learning physics.

## **RESEARCH METHODOLOGY**

ADDIE Model has been chosen as a guidance to develop the video because it is the most popular and suitable model for developing educational video. The word ADDIE is an abbreviation of its five original phases which is analysis, design, development, implementation and evaluation.

The analysis phase started with identifying the criteria of the group that will be using the video which is the students of Form 3 that have not learnt anything about Physics yet. This analysis involves investigating the students' background and their prior knowledge. Then, choosing the subtopic which was the "Understanding Scalar and Vector Quantities" in physics Form four syllabus within the Integrated Curriculum Secondary School by Ministry of Education. Lastly, classify the persuasive factors that need to be embedded into the video.

Designing process starts with determining the goal which requires the students to know and to achieve once they have finished learning using the video. In this phase it is important to determine the theme, style and limitation of the video. The story board was drawn to explain how each screen will be displayed in the video.

The video was developed primarily using Adobe Premier CS3. Adobe Premiere is a timeline-based video editing software application. Microsoft PowerPoint 2010 was also used to produce the presentation slide and create the desired image by just saving it as JPEG File Interchange Format. Free Video Converter software is used to convert them into a suitable format to put it into a website. The resolution of video is 720 x 480 dpi. The length of the video is 3.21 minutes and its size is 715 MB.

During the implementation phase, the video developed was validated first by four pre service teachers who have undergone teaching training and have expertise regarding content and learning theory. They watch the video then answer the questionnaire given. The three aspects that have been evaluated are persuasive theory aspect, content of scalar quantity and vector quantity and the quality of the video. The instrument were divided into 4 selection which are ATS- Highly disagree, TS - Disagree, S - Agree and AS - Highly agree.

nd	International Seminar or	ı Ouality d	and Affordable	Education	(ISOAE 2013	)
		~ ~				e

Ta	ble 1	:	Validation	on	persuasive	theory	aspect	s in ir	istruc	tional	video

No	Aspects	ATS	TS	S	AS
1	The actors possess good			3	1
	characters to attract the Form 3				
	students				
2	The video is suitable to the			4	
	Form 3 students' mind level				
3	The video is able to attract me.			4	
4	It is easy for me to focus on the	1		2	1
	information delivered in this				
	learning video				

Table 1 shows that all of them agree that this video has persuasive theory aspect. Only one of them states that it is difficult to focus on the information given by the video

All the experts agree that the developed video delivers the content of scalar quantity and vector quantity effectively. They were also given a guided question to confirm that the video content were valid and fulfil the objective. The question is as follows:

1. Will you suggest your students to watch this video? Why?

P2: yes because learning cannot solely based on the "chalk and talk" method. The teaching and learning session also involves the technology

P4 : maybe, but with my own improvisation

Table 2 : Validation on content on the Scalar and Vector Quantities

No	Aspects	ATS	TS	S	AS
1	the video is able to explain			3	1
	clearly on the scalar quantity				
	and vector quantity				
2	the video is able to show			3	1
	differences between scalar				
	quantity and vector quantity				
	clearly				

All answers given by the experts show the same standpoint that the video able to deliver the content of scalar quantity and vector quantity successfully except that it has to be blended with the teacher guidance.

No	Aspects	ATS	TS	S	AS
8	I like the audio used in the video		2	2	
9	I like the quality of the picture in the video	2	1	1	

 Table 3 : Validation on quality of the video and technical parts

Based on Table 3, two of them like the audio from the video while the other said that the *audio quality is poor due to the noises from the surrounding*. Three of them said that the quality of the picture is unsatisfied and make them feel uncomfortable to watch the video.

The experts were also given a guided question to confirm what aspect of technical and quality of the video need to be adjusted. The question is as follows:

What are the commotion/problems appear while watching this video?

P1 : the narrator is too excited

2.

P3 : lack of quality of the video due to the surrounding noises which deter the focus (lack of clarity)

Besides that, the experts were also given the opportunity to give some comments and recommendation about the video.

3. Do you have any comments/recommendations on this learninv video?

P3: Enhance the video quality. Put some background music to attract the audience. Make the video colourful. ... shooting near to physic related area for example the lab or an empty studio ...

2<sup>nd</sup> International Seminar on Quality and Affordable Education (ISQAE 2013)

P4 : Use sounds and it is not necessary for a video to be at one place only. The video has to be standardized with your sentences

Based on the answers, all of them suggest that the quality of the visual and audio need to be enhanced. Due to that, the researcher had requested for a help from the multimedia staff of Centre for Teaching and Learning, UTM to use their facilities in order to develop the video that align with the standard requirement. All of the aspects of persuasive theory; source factor, massage factor, receiver factor, channel factor and situational factor were blended together to bring out the desired video.

The video was shot again by using better facilities that is Sony HVR-Z7P HDV PAL Camcorder. Other than that, researcher also gain help from the professional to edit the video using the Final Cut Pro X software. There are several improvements made to the video after the evaluation as follows.

Video before evaluation	Video after evaluation
The video started with the introduction of the topic by an attractive teacher to promote students' attention.	The video started with the title of the topic that is ' <i>Scalar quantity and Vector quantity</i> '. The presenter was replaced with another person who has both talents in teaching and high credibility as a presenter in front of the camera. So, she can present in natural way to make the students comfortable to keep watching the video. There is also an important notes pops up while she delivers the content.
The purpose of the situation is providing an example for the content. Action in real situations can make students see the clear view about the topic. There are two situations, for the first situation it will explain on the scalar quantity. In this scene, the highlighted part is when the teacher states the mass is a scalar quantity because it only has a magnitude that is 2kg.	In this video, the ball is used rather than a pillow because of it is a more formal situation for education purpose. There are two situations; the first situation will explain on the scalar quantity. In this scene, the highlighted part is when the teacher states the mass is a scalar quantity because it only has a magnitude that is 400g.

2<sup>nd</sup> International Seminar on Quality and Affordable Education (ISQAE 2013)



The second situation is to explain the vector quantity. The shooting angle is beside the presenter and may distract student's attention.



The second situation is to explain the vector quantity. Once again, the highlighted part is when a teacher states that the force applied to the ball is a vector quantity because it has a magnitude and direction.

Video before evaluation	Video after evaluation
After that, slide presenting the differences in both situations. A brief information and concept will be delivered. It is to generate a new framework for users to find extant information about this topic. Instead of people giving a lecture, this part may purposely use a slide presentation method.	Next, the slide presents the differences in both situations. The slide in this video is not used by Microsoft PowerPoint 2010 but is developed by animation tool from final cut pro. This is to ensure the quality of the slide to be clear and easy to see. So, a brief information and concept delivered to the user will help them concentrate on the content.
To make sure that students really understand the	The video includes an evaluation part to test the
topic there is an evaluation part. A question is given to know whether students can differentiate the scalar quantity and vector quantity.	understanding of students on scalar quantity and vector quantity subtopic. The answer is also provided to guide students to check for themselves to avoid misconception
In the last scene, it is a crucial part to make sure the physics is highly accepted by users. Motivation supports from a little cute child with intent to convince and persuade. Besides, by using a child to	In the last scene, it is a crucial part to make sure the topic is highly accepted by users. Motivation supports from a little cute child with intent to convince and persuade. The previous child is 3 years old and cannot engage to

nd	International	Seminar on	Ouality and	! Affordable	Education	(ISOAE 2013	)
	1	000000000000000000000000000000000000000	2000000 00000	11,70.00000	Венновинон	102110 -010	/

show that physics subject is accepted by a young	pronounce the word "physics" correctly, and then he is
child to promote that it can also be accepted by	replaced by two children age 7 and 8 years old. So they
Form 3 student.	can speak more fluently with an attractive body language.

There is an audio amendment to reduce the noise and background music is also implanted in this video, so the viewer will not get bored. The location of shooting was made in a studio to provide formal atmosphere. Black colour was chosen as the background purposely for easy editing. The content was still the same based on previous evaluation; all experts agree that the content used can convey the suitable knowledge to the students.

## **RESULTS AND DISCUSSION**

A video that has been modified were than tested among six Form 3 students in secondary schools during the implementation phase. The three aspects that have been evaluated are persuasive theory aspect, video based learning and whether they're interested with future study in physics.

No	Aspects	ATS	TS	S	AS
1	the actors possess good looks and			4	2
	characteristics				
2	the video is suitable to my level of			4	2
	mind				
4	the video is suitable with my			4	2
	learning style				
5	the topic attracts me to learn	1	1	4	
7	i like the audio used (sound and		2	3	1
	background music)				
8	i like the quality of the picture in			4	2
	this video				

 Table 4: Evaluation on persuasive theory aspects on the video

Table 4 shows that students believed that the video developed able to deliver the subtopic of scalar quantity and vector quantity in an attractive way and they like it. Majority of the respondents agree that the persuasive element embedded in the video able to attract their attention to continue learning using the video. All of them agree that the video is suitable to their learning style, parallel to their mind and the presenter's character as well as the picture quality within the video was good.

However, one of the respondents does not agree with some elements of the persuasive theory. He did not support item number 5 in the questionnaire. Based on informal discussions, the respondent is more matured compared to his friends although he is from Form 3. He is much advanced in technology compared to his age. Hence that explains why he did not have interest with the video developed. Due to that, one of the elements within the persuasive theory which is message factor did not match his characteristics.

To confirm in case there are other elements of persuasive that might cause the respondent to dislike this video, a guided question is also given to the respondents. The question is as follows:

What are the commotion/problems appear while watching the video

- P4 : my problem is that i lose focus on the content over the narrator
- P5 : the commotion i experienced was when the ball was falling
- P6 : no commotion since the short time provided plus the high speed of my home' internet

Based on the answer given, respondent P6 enjoys the video without any circumstance. The respondent P4 lost focus on the topic because he was too interested with the presenter's attractiveness. While, respondent P5 is distracted by the motion of the ball while watching the video.

Persuasive elements were embedded within the video deliberately to make students focus on the video. Respondents P4 and P5 have reflected on the persuasive element without realizing it. The persuasive element such as the presenter has to be attractive and the message has to deliver in the best way really makes the respondent focus on the video.

No	Statements	ATS	TS	S	AS
1	the use of a video helps me in learning the topics			6	
3	using a video lift my burden to study		1	5	
4	video provides comfort to me to learn just anywhere			4	2
5	video allows me to learn in an appropriate time		1	3	2
5	i am interested to learn using a			5	1

5

5

1

1

Based on the table, all of the students agree that using video in learning helps students to study easily, comfortably, helpful, gives benefit to them and increases their interest in understanding the topic. Most of them agree to learn by video because it can reduce their burden and increase their efficiency in study. The video can also help them to study in their own flexible time. In addition, students were also given guided questions to give their opinion on video based learning.

The question is as follows:

In your opinion, what is the benefit in learning using a video?

video

in form 4

learning effortless

i will reuse this video when i am

learning using a video has made

9

11

P2: it simplifies the process of learning especially to a student like me who easily gets bored with books P4 : in my opinion a video like this gives me more focus

P5 : in my opinion, the benefits in using video in learning is that it can be replayed all over again as many times as we like

In order to identify the aspects within the developed video that able to change student's perception towards learning physics, a guided question was given to the students. The first question is: Will you take physics when you are in form 4? Why?

	Positive	Neutral	Negative
P1		"Yes because	
		physics itself is	
		the daily	
		activities for	
		individuals"	
P3	"Yes, according		
	to my		
	observation		
	through this		
	video, physics		
	will be an easy		
	subject if we		
	know how to		
	relate it to our		
	lives"		
P6	"Yes, because i		
	am interested to		
	further my study		
	in the science		
	stream"		

Table 6 : Students' perspective whether they want to take Physics subject when in Form 4

Based on Table 6, most of the students have given positive comments towards physics after watching the video. Two of them positively agree, exclusively based on the video itself. Seems like the video do able to persuade them to be interested in physics. Second question is: *Will you suggest your friend to watch this video? Why?* 

	Positive	Neutral	Negative
P1	"Yes because it gives information that is easy to understand"		
P3	"Yes because majority of my friends will love to watch this video"		
P4	"Yes i think my friends and i will be able to learn better"		

Table 7 Students' desire on sharing the video among their friends

Based on Table 7, all students would like to share the video among their friends. Two of them positively agree that the video can be easily understood by learners. One of them agree that the video in entertaining. These answers might have an influence from the persuasive elements embedded within the video development.

## CONCLUSION

This research try to develop a video to teach students about something called Physics. Our intention is to make students who watch the video to like it and start to explore more on this subject. Hopefully, they will start to love physics and they will take science as their main field of study.

Based on the research purpose, an educational video entitled "Understanding of Scalar and Vector Quantities" has been developed. Persuasive Theory has been embedded within the video as it were suggested to be able to modified behaviour and attitudes.

Research done by Williams (2003) said that many secondary school students are not interested in taking physics because it is a boring subject. However, from the evaluation of persuasive theory aspects of the video, it shows that all respondents whether neutral or positive would like to further their study in science stream where they need to learn physics after watching the video. The most positive elements within the video are the presenter personality and the quality of the video that able to engage the students to watch the video until end. They were also willing to recommend the video to their friend.

This video developed was tested to the student at their own place and space. Maybe that is the reason why they provide a positive answer on using this video for learning. From the research done by Chin and Greg (2009) from the student's viewpoint, to concentrate on watching short lecture video at home was easier than sitting in long-hour lectures in class. The video was packaged and published as an mp4 format video. Since this video was published on YouTube, it could be watched and downloaded by everyone in the world.

Hopefully, the finding from this research can help to stimulate student interest towards Physics. The video based on persuasive element can be used to engage student interest and the content should be able to give clearer understanding on the topic. However, further research need to be done to confirm how actually the video can be used in class of outside class that effectively change the behaviour of the students towards physics or even other complex subject.

#### ACKNOWLEDGEMENT

The authors are deeply indebted and would like to express our gratitude to the Universiti Teknologi Malaysia for supporting this study under the Instructional Development Grant (IDG) Vote A.J160000.7716.4J071.

## REFERENCES

- Abraham, M. R., Grazybowski, E.B., Renner, J. W. and Marek, E. A. (1992). "Understanding And Misunderstanding of English Graders of Five Chemistry Concepts Found in Textbook." *Journal of Research in Science Teaching*, 29(2), 105-120.
- Ajzen, I. (1992). Persuasive communication theory in social psychology: A historical perspective. *Influencing human behavior*, 1-27.

Carlson, S. 2005. The Net Generation goes to college. The Chronicle of Higher Education, October 7.

Chiu, C., & Lee, G. C. (2007). A Video Lecture and Lab based Approach to Learning of Image Processing Concepts. *Frontiers in Artificial Intelligence and Applications*, *162*, 395.

Chiu, Chiung-Fang, and Greg C. Lee. (2009). A video lecture and lab-based approach for learning of image processing concepts. Computers & Education 52.2 (2009): 313-323.

Fischer, H. E. & Horstendahl, M. (1997). Motivation and learning physics. *Research and Science Education*, 27(3), 411-424.

http://chronicle.com/free/v52/i07/07a03401.htm (accessed March 26, 2013).

Katz, Y. J. (2002), Attitudes affecting college students' preferences for distance learning. *Journal of Computer* Assisted Learning, 18: 2–9. doi: 10.1046/j.0266-4909.2001.00202.x

Kementerian Pelajaran Malaysia (2012). Malaysia Education Blueprint 2013-2025. Kementerian Pelajaran Malaysia Romiszowski, A. J. (1981). Designing instructional systems: Decision making in course planning and curriculum design. New York: Nichols Publishing.

Schwartz, D. L., & Hartman, K. (2007). It is not television anymore: Designing digital video for learning and assessment. Video research in the learning sciences, 335-348.

Somekh, B., & Davies, R. (1991). Toward a pedagogy for information technology. Curriculum Journal, 2(2), 153-70

Williams, C., Stanisstreet, M., Spall, K., Boyes, E., & Dickson, D. (2003). Why aren't secondary students interested in physics?. *Physics Education*, *38*(4), 324.

Wood, W. (2000). Attitude change: Persuasion and social influence. Annual review of psychology, 51(1), 539-570. Wu, S.J. & Tuan H.L.(2000). A case study of students' motivation in a 9<sup>th</sup>. Grade physical science class. Second

International Conference on Science, Mathematics and Technology Education, Taipei.