3 Dimension (3D) Anaglyph Video Application in Teaching and Learning

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Abstract: The process of teaching and learning (T & L) in a classroom requires full cooperation between lecturers and students. To attract students to understand the topic, the lecturer needs to be more creative and innovative. Most of the students are less interested when lecturers teach subjects that require better reading, subjects that require imagination, or a subject that involves understanding the theory. Therefore, the Faculty of Civil Engineering of UiTM Pahang considers this issue as very important in ensuring students are more focused and enthusiastic in understanding such subjects. Using video in the T & L is one of the proven methods to attract students and facilitate them to understand the contents to be conveyed. However, the improvement of existing videos into 3D versions raises the student's interest and focus in the classroom. The main objective of this method is adopted to provide variety for the students in Faculty of Civil Engineering of UiTM Pahang contents in the classroom learning environment, making more interactive and increase their desire to explain that the topics taught. Production of special 3D glasses together in the classroom proves this method not only improves the characteristics of cognitive, but affective and phychomotor characteristics were also awakened. The feedback received from the students, also in the form of an automatically processed web-based questionnaire, reveals that the 3D anaglyph meets the main course objective to familiarize the students with modern technologies without losing focus to the physical engineering problem studied.

Keywords: Interactive, Teaching and learning, 3D video

1. Introduction

With the expanding utilization of advancements in our daily lives, it is vital that instructors comprehend the utilization of data and correspondence advances (ICTs) for example, 3D anaglyph feature, given their effect on the instructive existences of both ourselves, as workforce, and the individuals who we educate, that is, our client or students.

Civil Engineering students face huge challenges during undertaking topics of new construction techniques or technology through conventional methods of learning especially for the first few semester students. It reduces their interest and performance when they can hardly understand any particular topics. The implementation of new learning method such as 3D anaglyph is very critical in order to enhance students' interest, understanding and performances. Huge advancements have been made during the last decades primarily due to the revolution in Information and Communication Technologies (ICTs).

Today's students depend intensely on ICTs in both their own and expert lives (Jones and Fox, 2009; Mori, 2007) and as being what is indicated have a desire that these innovations will be a piece of their training and utilized inside of the instructive setting by workforce or faculty (Barnes et al., 2007; Hanny and Fretwell, 2011; Oblinger and Oblinger, 2005). Given that such advancements offer a more helpful and compelling approach in teaching, it is obvious that their utilization is now so frequent and widespread. Anaglyph 3D is the name given to the stereoscopic 3D impact accomplished by method for encoding every eye's picture utilizing channels of distinctive (for the most part chromatically inverse) hues, commonly red and cyan. Anaglyph 3D pictures contain two distinctively sifted shaded pictures, one for every eye. At the

point when seen through the "shading coded" "anaglyph glasses", each of the two pictures achieve the eye it is expected for, uncovering a coordinated stereoscopic picture. Corresponding shading anaglyphs utilize one of a couple of reciprocal shading channels for every eye.

The most widely recognized shading channels utilized are red and cyan. Utilizing tristimulustheory, the eye touches three essential hues namely red, green, and blue. The red channel concedes just red, while the cyan channel pieces red, passing blue and green (the mix of blue and green is seen as cyan). In the event that a paper viewer containing red and cyan channels collapses with the goal that light goes through both, the picture will seem dark. Another as of late presented structure utilizes blue and yellow channels. (Yellow is the shading saw when both red and green light goes through the channel.)

In this study, the lecturers involved assess students' achievement using a video which is not converted to 3D anaglyph and a video that has been converted into 3D. The assessment includes the percentage of achievement based on students' understanding, concentration, enthusiasm and summaries at the end of class. The other objective of this research is to make a student centered learning where students are not entirely dependent on the lecturers teaching method and materials. They have to find their own way to improve their knowledge and understanding. By using this 3D video, student can easily find the software and apply it to their own group video.

Fig. 1 Anaglyph picture of Saguaro National Park at dusk

2. Literature Review

The utilization of ICTs is seen as imperative in the matter of realizing where the active learning includes practices, for example, collaboration, exchanges with associates and among students and educators and in addition to applying information through engagement. It has been recognized that student's learning includes both formal and informal learning settings by using 3D anaglyph video.

Teachers' beliefs play a significant role in the adoption of new technologies in education. If, for example, an educator has limited use of, or limited knowledge of, using a new technology then they are unlikely to adopt the technology in their teaching (Abrami, 2001; Mueller and Wood, 2012). According to Vie (2008), educators need to understand and use applications such as ICTs in order to be able to successfully integrate the technologies into their teaching and learning strategies. Therefore, if we are to better understand uptake and/or use of ICTs, it is important to understand how teaching staff use ICTs or what they take into account when considering whether or not to use ICTs as an educational tool. Preferred style of teaching is also a potentially relevant factor when considering the use of 3D anaglyph video and other ICTs as an educational tool.

There are said to be two teaching styles. One is teacher centred, and the other learner centred or student centred. A learner-/student-centred teaching style is one in which the instructor goes about as a facilitator to student learning (Mascolo, 2009). Teacher-centred

learning emphasises the teacher transmitting the knowledge, was viewed as a more traditional lecture style of teaching: the knowledgeable transmitting knowledge to the novice. In contrast, learner-/student-centred learning focuses on the students' learning. In a learner-/student-centred style of teaching what the student does in order to learn is the focus rather than what the teacher does (Harden and Crosby, 2000).

It is concurred that in higher education, there is a requirement for instructors to move far from the utilization of educator drove exercises in the classroom and to receive a more learner-/student-centred style. Whatever the style, it is imperative that we consider consciousness of educating in our comprehension of ICTs. It is contended that an obstruction to the appropriation of new innovations in the classroom is educators' mentalities towards instructing in that so as to encourage progress, instructors need to embrace a learner centred way to deal with showing instead of the conventional instructional method of educator focused (Parisot, 1997).

3. Methodology

Fig. 2 shows the flowchart in creating 3D anaglyph PowerPoint presentation. Generally, the majority of the resources in producing the anaglyphic contents such as pictures, videos as well as software to convert the media into anaglyphic format that could be downloaded for free from the internet. In addition, a step-by-step tutorial on how to convert these media into anaglyphic pictures and videos was also available on various websites like YouTube. After conversion, the media were then inserted inside the PowerPoint slides. Fig. 3 portrays a sample of anaglyph picture. The 3D effect can only be seen using special glasses made out of red and cyan transparent lenses. These lenses are available at the local stationary shop with the cost of one Ringgit Malaysia per sheet. Lastly, the frame for the lenses could be downloaded from the internet in cut-out forms as illustrated in Fig. 4. The glasses were made by the students to attract their attentiveness in the classroom and to be actively involved in the class while the 3D contents were made by lecturer beforehand. In order to assess the students performance in the subject, a survey has been conducted right after the class ends. A total of 30 students were asked to answer an online survey. The results were then analyzed to see whether this method increases the students' attention and understanding on the course.

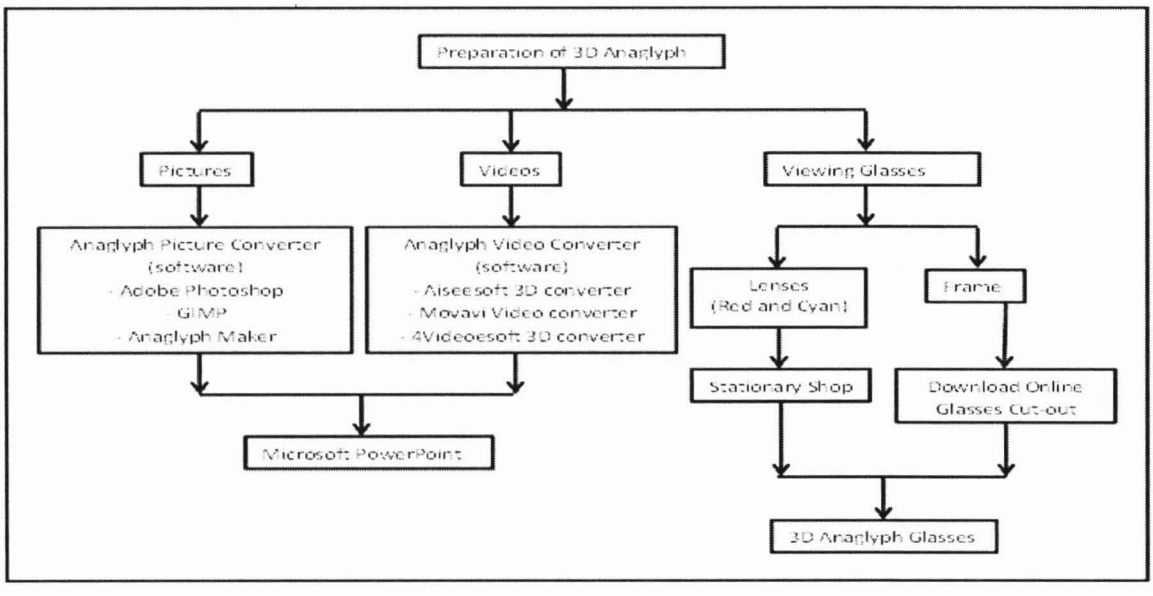

Fig. 2 Flowchart of 3D Anaglyph production

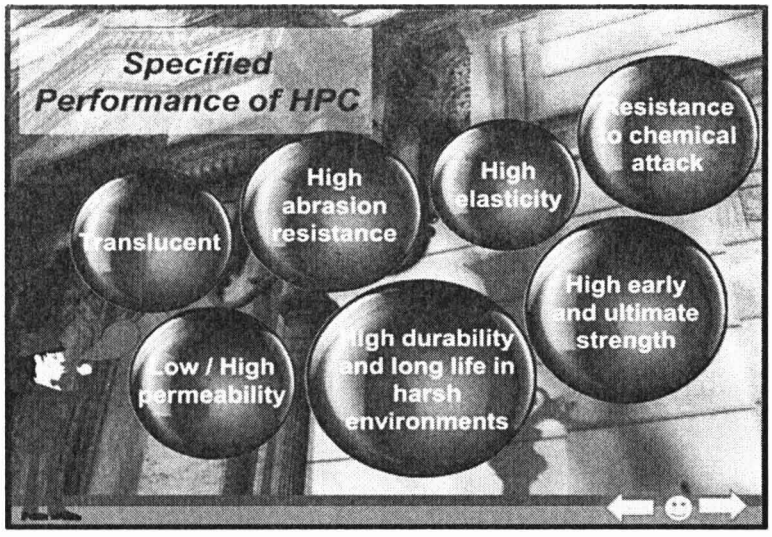

Fig. 3 Sample of 3D Anaglyph picture

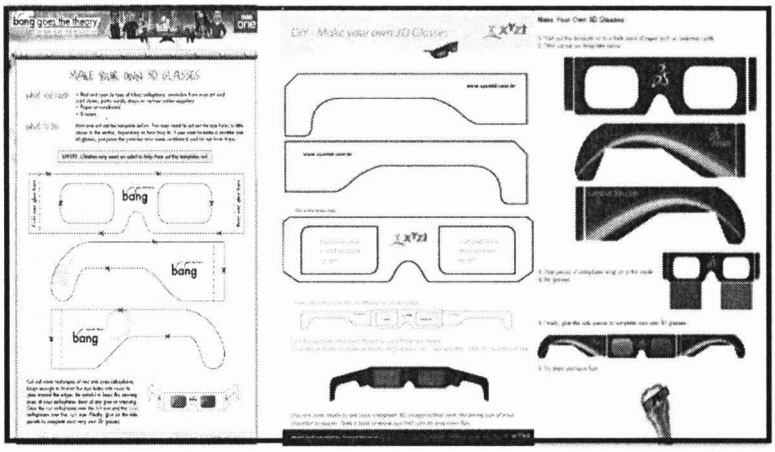

Fig. 4 Sample of cut-out glasses frame

4. Discussion and Conclusion

In this study the most crucial conclusion is that the application of interactive 3D anaglyph video in Faculty of Civil Engineering of UiTM Pahang contributes more effectively to the teaching and learning process.

Based on the online survey result in Fig. 5, it is found that the percentage of rating scale for strongly agree and agree are high with average scores of 44.14% and 40.77% respectively. Meanwhile, the rating scale for neutral is low with the average scores of 13.75%. Findings show that the rating scale for disagree is very low with average scores of 1.35% while there is no respondent for strongly disagree.

From the data collected, 1.35% out of 30 respondents disagree that the 3D anaglyph video increased their attention level in this subject. The factor that contributes to this result may be due to the limitation of suitabile 3D glasses for individual usage. This reason is supported from the previous study by Andrew and Chris (2010) that students frequently experience poor 3D video quality because of poor shading quality whereby every eye sees a little partition of the point of view picture planned for the other eye. Another factor stated in their study is the

ghosting, otherwise called crosstalk, restrains the mind's capacity to effectively combine the pictures seen by every eye and along these lines diminishes the apparent nature of the 3D picture.

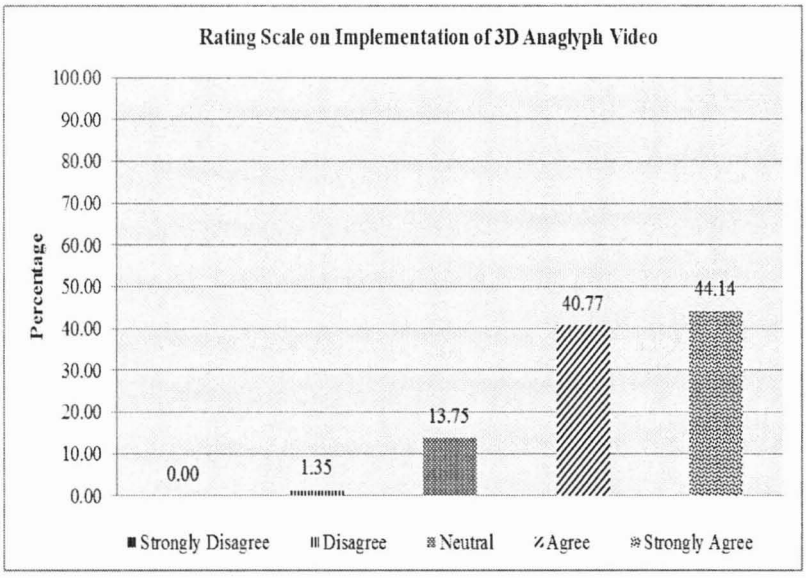

Fig. 5 Rating scale on Implementation of 3D Anaglyph Video.

Data collected also show that there was a group of student that can adopt teaching and learning with or without using the 3D anaglyph video in the classroom. This statement is reflected by the data analysis of 13.75% neutral for average score rating.

The utilization of this 3D anaglyph likewise might essentially reshape how we consider learning, making changes in the part of the lecturer, taking into consideration diverse situations for learning, enabling the learner and introducing more noteworthy open doors for reflection. These progressions also have the potential to bolster behavioural change and learner engagement to another level and during a period when understudies are especially separated from customary realizing. This may offer the training framework for genuine extension to enhance the quality and profundity of learning (Freitas and Neumann, 2009; Korakakis et al., 2012; Huang et al., 2015).

Previous study by Varghese (2015) reported that this tool could be utilized as an exceptionally successful instrument by instructors and would turn into an incredible help to the students, particularly when showing and learning complex subjects like the elements that used to construct a building and how to operate machine needed in completing thesis. It can turn into an awesome help to the students, who generally would initially need to envision and draw the pictures related in their mind before sufficiently seeing to make progress. The 3D showing practices can be connected to any topic as it can make learning more exciting, simple and pleasant. In conclusion, the utilization of 3D anaglyph virtual environment in engineering subject is definitely prescribed, as commended by the present consequences and result obtained.

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