ARCADIA-Kit With Augmented Reality Application

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Abstract: The purpose of this study is to identify the efficient use of a developed product namely ARCADIA-KIT among Visual Arts Education (VAE) teachers. The study used the ADDIE model as a guideline to develop the product. Virtual Reality (VR) Application has been added to enhance the kit with the technology development to embrace the 21st Century classroom. The VR is the latest trend in teaching and learning in the classroom and is believed to be growing rapidly as is it more robust due to the virtual information embedded with the learning environment to create a realtime performance in the teaching and learning processes. With the growth of the Android and Smartphone among the users, the VR provided such an interesting platform for teaching as it can be accessed anywhere and anytime to ensure the teaching process to be delivered effectively. Quantitative method with questionnaire as a research instrument was used with selected respondents. The samples involved 60 Visual Art Education (VAE) teachers from selected schools in Shah Alam. Correlation analyses were carried out to determine the relationship between the variables studied. Data were analyzed using the Statistical Package for Social Sciences (SPSS) to obtain percentage and frequency. The findings indicate that the ARCADIA-Kit is efficient and useful for the teachers to use when teaching the Landscape topic.

Keywords: Arcadia-Kit, Augmented Reality, Efficient tool, Landscape topic, Visual Art Education

1. Introduction

ARCADIA-Kit is invented due to the needs for a simple and practical kit for teaching and learning the landscape topic in the Visual Art Education (VAE) subject for Form 4 and 5. Landscape in the VAE subject is a complicated topic to teach as it involves designated materials, technique and artistic skills The landscape topic is difficult because it does not only require teachers to have knowledge and artistic skills but also understanding of mathematical concepts when dealing with the calculation and accurate measurement of the landscape setting. Because of these complexities, the main challenge for teachers is to make the teaching of the unique topic a fun art activity.

Taking into consideration these challenges, the ARCADIA-Kit is carefully designed by integrating the ADDIE model and Augmented Reality Application to meet the teachers' needs. The kit contains a magnetic board, magnetic items to create the landscape, clear instructions on how to use the items and

a module to assist VAE teachers when teaching the topic (Figure 1). The kit also allows teachers and students to retrieve information digitally based on the Augmented Reality application that incorporates digital materials to fulfil the needs of the 21st Century learning (Figure 2). Specifically, the kit can be viewed with a smart phone or tablet. This is to change how teachers and students can interact with technology to enhance the teaching and learning process. To ensure the acceptance and success of future AR system, it is vital to understand the end users' experience and requirements (Sha Liang, 2015).

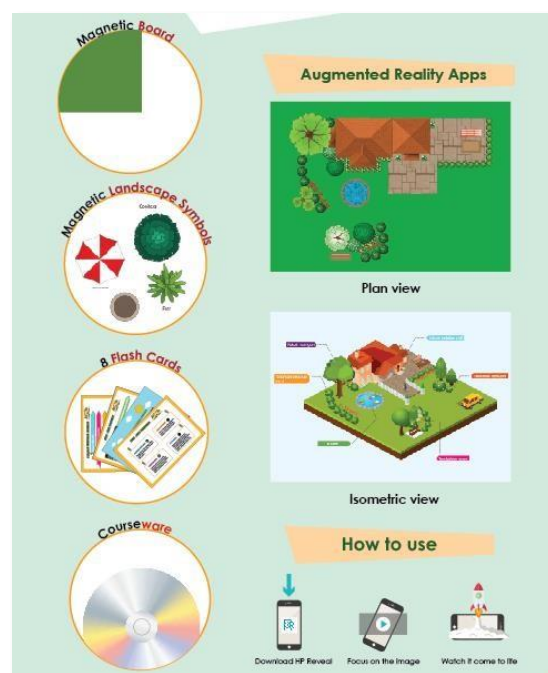Figure 1: Items in the ARCADIA-Kit

Figure 2: The instruction of how to use the Augmented Reality Application

The ARCADIA-Kit consists of a variety of magnetic cut-out shapes of landscape so the materials can stick to the white board when teaching (Figure 4). This will produce an ideal teaching setting as teachers can do the composition of the landscape layout using the whiteboard. The size of the materials can be increased or reduced according to the setting of the classroom. The magnetic board can be separated and this will allow the students to sit in groups and practiced their knowledge during the hands-on activity.

Figure 3: The ARCADIA-Kit

Figure 4: The magnetic items provided in the ARCADIA-Kit

2. Problem Statement

Teachers need to be creative to enhance the teaching and learning process because creative thinking is an essential life skill in the 21st Century. The skills help them to survive, adapt and grow as an individual in education or in business and in the society as a whole (Carson, 2010). Lowenfeld et.al (1975) stated that teachers should be equipped with proper teaching aids in Art Education so that they can improve their creative ability and continuously involve students in creative expression. According to Skowron (2006), learning is less fragmented when standards are meaningfully integrated into a unit of instruction. Science, social studies, physical development, fine arts and language arts standards that are related and combined in learning experiences provide students with logical connections among the content areas. Hence, this study focuses on the design and evaluation of ARCADIA-Kit to assist teachers in teaching

the Visual Art Education subject based on the needs of teaching the Landscape topic taken from the *Kurikulum Bersepadu Sekolah Menengah* (KBSM, 2000). The Augmented Reality Application is chosen to enhance the kit as it allows the users to explore with their gadgets anytime and anywhere and this will create an interesting and fun way of learning in embracing the 21st Century learning needs. Today's teachers are challenged to help students achieve mastery of core-subjects as well as gain 21st century knowledge and skills, (Smaldino et.al, 2012). Adapted and specially designed media can contribute enomously to effective instruction of all students and can help them achieve at their highest potential regardless of their innate abilities (Smaldino et.al, 2005).

Objectives

1. To design the ARCADIA-Kit according to the ADDIE model
2. To evaluate the efficiency use of the ARCADIA-Kit

3. Methods

This research has employed a quantitative method to gather the data on the efficient use of the kit. Data were obtained from 60 respondents using a questionnaire. The questionnaire was adopted from User Experience Questionnaire (UEP) developed in 2005 (Schrepp et.al, 2017). Questionnaire is the simple method to collect feedback from the respondents as it allows them to take their own time to respond. In addition, analyzing the numerical data from questionnaire is highly standardized and thus efficient as well (Schrepp et.al, 2014).

4. Results and Discussions

The questionnaire which consists of 6 scales with 26 questions show that the Cronbach's Alpha is sufficiently high. The data were collected after the activity using the kit was conducted and it is found that ARCADIA-Kit is fully functioning to be used in the classroom.

Table 1: Distribution on the use of ARCADIA-Kit

N	Mean	Std. Deviation
Q1 ARCADIA-Kit is more interesting than a note written on a white board.	5.60	6.370
Q2 ARCADIA-Kit is an efficient way in learning landscape design.	4.57	.698
Q3 ARCADIA-Kit helps me better understanding in landscape design topic.	4.77	.427
Q4 ARCADIA-Kit teaching aids is interesting and easy to use.	4.80	.403
Q5 I hope to use ARCADIA-Kit when teaching landscape design topic.	4.87	.343
Q6 I agree that ARCADIA-Kit will help me to improve my teaching activity.	4.88	.324
Valid N 60		

Table 1 illustrates the descriptive statistic distribution of the use of ARCADIA-Kit. All questions scored high mean (M) and standard deviation (SD) scores. The highest distribution is Q1 (M= 5.60, SD=6.37) followed by Q6 (M=4.88, SD=.324), Q5 (M=4.87, SD=.343), Q4 (M=4.80, SD=.403), Q3 (M=4.77, SD=.427) and the lowest is Q2 (M=4.57, SD=.628). The respondents seem to find that the multimedia element and the instructional material presented through the Augmented Reality application were useful in learning the landscape design. The teaching kit encouraged them to participate actively in the teaching activity and has helped them to understand the topic better when using it. Even though the lowest mean is 4.27, the difference between items is small in percentage. Overall, the result shows that the use of ARCADIA-Kit can improve the teaching quality.

5. Conclusion

ARCADIA-Kit is unique and it comprises a variety of items needed to assist VAE teachers in the teaching and learning of the landscape topic. Based from the collected and analysed data, the results shows that the mean reading for the results are above 4 and thus, the results gained are very high. Therefore, it is stating that the ARCADIA-Kit is very useful and easy to be used. The results also indicated that the respondants needs the kit in order to perform better teaching. The kit comes with a manual guide and its easy-to-follow instructions on how to use the materials and with the integration of the Augmented Reality application are really helpful for the VAE teachers to teach the Landscape topic. Thus, this product has created a new dimension in teaching and learning of the VAE subject. It is hoped that this kit can be commercialised and to be used widely in the schools as it can contribute to a successful teaching and learning experience.

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