

# The Development and Evaluation of an Interactive Multimedia Module for the Topic of Art Elements of the Visual Art Education Subject

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This research aims to develop and evaluate the effectiveness of an interactive multimedia learning module for the topic of Elements of Art of the Visual Art Education subject for Form One secondary school students. This study involved two methodological approaches involving the design and development of an interactive multimedia learning module and a case study. The development of the learning module was based on the ADDIE model, involving five main phases: the analysis phase, design phase, development phase, implementation phase and evaluation phase. The case study involved the evaluation of the effectiveness of the learning module based on a pre-test, post-test control group design. The sample of the study consisted of 30 Form One students (15 girls and 15 boys, with a mean age of 13) recruited from a secondary school. They were randomly and equally divided into an experimental group (n = 15) and a control group (n = 15). Learning intervention lasted for a number of days. The research instrument, which comprised 50 multiple-choice questions, was used for the pre-testing and post-testing of students' understanding of the selected topic of learning. Data were analysed using an independent t-test, which revealed that the post-test score of the experimental group was significantly higher than that of the control group, clearly suggesting that the use of the novel interactive multimedia learning module is highly effective compared with the conventional method of learning. The findings of this study therefore provide strong evidence to support the use of ICT, particularly multimedia technology, in the teaching and learning of the Visual Art Education subject among Form One secondary school students.

**Key words:** *Elements of art, interactive multimedia, learning module, visual art education.*



## Introduction

The Malaysian government has made a number of efforts to achieve the main aim of Vision 2020, which is to transform Malaysia into a developed nation. One has involved elevating the standard of education in Malaysia to a level on par with that of developed nations. The school curriculum has therefore been revamped by making changes to all aspects of the teaching and learning process, one of which concerns the use of Information and Communication Technology (ICT) in the presentation and delivery of learning content. Such a concern is hardly surprising given that almost every aspect of our lives depends on such technology. Put simply, ICT is an enabler that empowers us to perform our tasks more efficiently and effectively. In the educational realm, the use of ICT is indispensable to ensuring that teaching and learning can take place with greater efficiency. Herein lies the challenge for teachers to use ICT in their teaching practice as much as possible. In this new millennium, in which technologies pervade our lives, teachers should develop sufficient skills in using computers to design, develop and deliver teaching content and materials (Maulan & Ibrahim, 2012). Yet many teachers find such an undertaking extremely challenging and even daunting.

Throughout the world, the forces of globalisation have driven many countries to take all measures necessary to make them competitive and resilient. For example, many educational systems have undergone drastic transformations to remain abreast of advancements in ICT. As anticipated, many school courses or subjects have been revamped to improve their learning content, pedagogical approach, presentation and delivery, and performance assessment. For example, in Malaysia, the Visual Arts Education Curriculum (VAEC) has been reviewed and updated constantly by focusing on the use of ICT, notably multimedia technology. According to Hassan Mohd Ghazali (2000), the impact of globalisation has created many challenges, demanding a shift in the role of visual art teachers (VAT) so they not only have strong content knowledge but also well-developed computer and technological skills to help them teach more efficiently. Arguably, in the twenty-first century, students are more likely to expect their teachers to teach more creatively and innovatively, thus making it imperative for teachers to possess good technical skills in using technology.

Undeniably, ICT has a profound impact on student learning. With appropriate technological applications or tools, visual art teachers can make the teaching and learning process more interactive and dynamic (Gregory, 2009). In particular, the use of ICT applications in art classes can help to create a learning environment in which students can learn art concepts more efficaciously through improved visualisation (Taylor, 2007). Such a learning environment can also help enhance their critical thinking and creativity. Moreover, students can discuss and collaborate in solving problems related to arts (Loveless, 2003). Clearly, the use of technology such as computers and multimedia can make the teaching and learning

process more active and meaningful, which ultimately leads to improved student performance (Ahmad Muhaimin et al., 2006). Conversely, a lack of technology can make such a process ineffective and mundane (Harozila et al., 2019: 1106).

Computers and multimedia applications can therefore serve as a potent tool for teaching the Visual Art Education subject, enabling students to express their ideas and artworks more efficiently. Such a claim is consistent with the assertion of Baharuddin et al. (2003), who describe Computer Assisted Learning (CAL) as an approach that uses computers for teaching and learning, thus providing freedom to students to explore information more readily. The development of quality CAL software must take into consideration the important aspects of learning theories to make students interested and more motivated to learn (Chua, 2002; Zarul Akmar, 2002). Relevant theoretical principles need to be factored into the development of learning applications to make the learning process more engaging (Zarul Akmar, 2002) and interesting (Rashidi & Abdul Razak, 1995).

### **Problem Statement**

To further improve the educational system of Malaysian secondary schools, the Integrated High School Curriculum (KBSM), and specifically the Secondary School Standard Curriculum (KSSM), is being implemented in several stages. This helps to make the transition from the old to the new curriculum smooth and manageable. With the new curriculum, students are expected to develop a strong interest in learning science, technology and arts. However, Malaysian society's perception of the subject of Visual Arts Education (VAE) has not changed much over the years, with many seeing it as concerned primarily with painting and colouring. As highlighted by Mustafa (2000), Syed Shaharuddin (2000), Md. Nasir (2004) and Mohd Johari (2005), many students and parents view VAE as boring and unimportant, and therefore as not worth learning. This misplaced perception needs to be addressed to ensure VAE is regarded as important as other competing subjects, such as mathematics or science (Awang Had, 1977).

Roland (2006) suggests that few art teachers have used ICT in their classes, despite them being aware of the immense benefits of such technology. Ironically, most of the teachers tend to believe that the use of ICT would stifle the development of students' creativity and artistic expressions, and their understanding of art forms (Sharulnizam, 2009). Sharulnizam's findings are symptomatic of the lack of concern or interest among such teachers in adopting technological applications or tools in their teaching practice. To date, the acceptance and awareness of the importance of ICT among VAE teachers are still low, with teachers lacking the motivation and zeal to teach such an art subject. Further compounding such a problem are the poor condition of equipment, facilities and ICT infrastructure (such as computers, projectors, scanners and printers), which are often either badly damaged or poorly

maintained. As a result, teachers are forced to resort to using a more conventional teaching approach, which is ineffective and inefficient.

It is therefore incumbent on all concerned – especially VAE teachers – to seek ways to improve student participation in learning VAE. In recent years, various multimedia applications and tools have been used in almost all disciplines of education. Studies have consistently shown that the use of multimedia technology can help improve students' motivation and learning performance (Jamalludin & Zaidatun, 2003; Macaulay, 2002; Al-Mikhlaifi, 2006). However, Al-Mekhlaifi (2006) cautions that the effective use of such technology largely relies on a number of sociocultural and demographic factors, such as gender, age, experience, attitude and academic background. Such factors need to be factored into the teaching and learning process to ensure that all students, irrespective of their background, can learn effectively with the use of multimedia tools. Given the lack of use of ICT, in particular multimedia technology, in the teaching of VAE and the low motivation of students to study this subject, this research was carried out with the aim of developing and evaluating the effectiveness of an interactive multimedia module for the topic Elements of Art of the VAE subject.

### **Case Study**

This research aims to develop and evaluate the effectiveness of an interactive multimedia learning module for the topic Elements of Art of the VAE subject for Form One secondary school students. Two research objectives were formulated to guide the research as follows:

- 1 To develop an interactive multimedia module for the topic of Elements of Art of the VAE subject.
- 2 To evaluate the effectiveness of the interactive multimedia module on students' learning performance.

### **Methodology**

This study involved two methodological approaches to the design and development of an interactive multimedia learning module and a case study. The development of the learning module was based on the integration of the ADDIE model with the APH-Pencil development lifecycle model, Rapture model-based design, ID model and Scaffolding model. For the ADDIE model, five main phases were carried out: the analysis phase, design phase, development phase, implementation phase and evaluation phase. The learning content of the learning module was based on the topic of Elements of Art of the VAE subject, namely lines, shapes, forms, space, textures and colours. The learning module contained several audios, videos, animations, and 2D and 3D graphics to help explain the definition, type, function and technique used in creating each element. It also contained several exercises or assignments,

which students were required to carry out to test and enhance their understanding of art elements. The design of the learning module adopted a number of relevant theoretical principles of behaviourism, cognitivism and constructivism.

The case study involved the evaluation of the effectiveness of the learning module based on a pre-test, post-test control group design. The sample of the study consisted of 30 Form One students (15 girls and 15 boys, with a mean age of 13) recruited from a secondary school in Temerloh, Pahang. This school was deliberately selected in view of its status as a Grade A school, the category of Malaysian secondary schools with high academic performance, qualified teachers and excellent facilities. At the time of the study, such students were learning about the selected topic of the subject matter. The research instrument, comprising 50 multiple-choice questions, was used for the pre-testing and post-testing of students' understanding of the selected topic of learning.

### Findings and Discussion

Both the experimental group and control group consisted of 15 students, with the former comprising five boys and 10 girls and the latter 10 boys and five girls. The mean age of the students was 13 years. Table 1 summarises the distribution of the research subjects based on gender and group.

**Table 1:** Research subjects based on gender and group

| Group        | Gender |        |
|--------------|--------|--------|
|              | Male   | Female |
| Experimental | 5      | 10     |
| Control      | 10     | 5      |
| Total        | 15     | 15     |

Before using the interactive multimedia learning module, both groups were pre-tested with a set of 50 questions to determine their prior understanding of the learning contents of the selected topic, namely lines, shapes, forms, space, textures and colours. After learning such a topic, they were post-tested with the same set of question. Table 2 and Table 3 summarise the pre-test and post-test results of the experimental group and control group respectively. The same tables also show the differences between the two results.

**Table 2:** Percentage score of the experimental group

| ID             | Percentage score   |                     |              |
|----------------|--------------------|---------------------|--------------|
|                | Pre-test score (%) | Post-test score (%) | Increase (%) |
| E1             | 76.0               | 76.0                | 0.0          |
| E2             | 72.0               | 78.0                | 6.0          |
| E3             | 62.0               | 68.0                | 6.0          |
| E4             | 72.0               | 62.0                | -10.0        |
| E5             | 68.0               | 86.0                | 18.0         |
| E6             | 68.0               | 90.0                | 22.0         |
| E7             | 76.0               | 78.0                | 2.0          |
| E8             | 72.0               | 62.0                | -10.0        |
| E9             | 82.0               | 78.0                | -4.0         |
| E10            | 82.0               | 68.0                | -14.0        |
| E11            | 48.0               | 68.0                | 10.0         |
| E12            | 58.0               | 68.0                | 10.0         |
| E13            | 58.0               | 56.0                | -2.0         |
| E14            | 82.0               | 78.0                | -4.0         |
| E15            | 68.0               | 82.0                | 14.0         |
| <b>Overall</b> | 69.6               | 73.2                | 3.6          |

As shown in Table 2, for the experimental group, the mean scores of students' understanding of the topic of Art Elements (lines, shape, forms, space, texture and colours) before and after learning were 69.9 per cent and 73.2 per cent respectively. On closer examination, the highest pre-test score of the experimental group was 82 per cent (attained by students E9, E10 and E14). By contrast, the lowest pre-test score was 48 per cent (achieved by student E11). For the same group, the highest post-test score was 90 per cent (attained by student E6) and the lowest post-test score was 56 per cent (achieved by student E13). Overall, there was an increase in students' understanding by as much as 3.6 per cent, signifying that learning using the interactive multimedia learning module had a significant impact on students' understanding of art elements.

**Table 3:** Percentage score of the control group

| ID             | Percentage score   |                     |              |
|----------------|--------------------|---------------------|--------------|
|                | Pre-test score (%) | Post-test score (%) | Increase (%) |
| C1             | 78.0               | 76.0                | -2.0         |
| C2             | 76.0               | 72.0                | -2.0         |
| C3             | 82.0               | 72.0                | -10.0        |
| C4             | 56.0               | 66.0                | 10.0         |
| C5             | 76.0               | 68.0                | -8.0         |
| C6             | 58.0               | 68.0                | 10.0         |
| C7             | 76.0               | 68.0                | -8.0         |
| C8             | 78.0               | 68.0                | -10.0        |
| C9             | 62.0               | 66.0                | 4.0          |
| C10            | 68.0               | 78.0                | 10.0         |
| C11            | 52.0               | 68.0                | 16.0         |
| C12            | 76.0               | 62.0                | -10.0        |
| C13            | 76.0               | 72.0                | -4.0         |
| C14            | 66.0               | 68.0                | 2.0          |
| C15            | 72.0               | 68.0                | -4.0         |
| <b>Overall</b> | 70.1               | 69.3                | -0.8         |

As shown in Table 3, for the control group, the mean scores of students' understanding of the same topic before and after learning were 70.1 per cent and 69.3 per cent respectively. On scrutiny, the highest pre-test score of the control group was 82 per cent (attained by student C3). By contrast, the lowest pre-test score was 52 per cent (achieved by student C11). For the same group, the highest post-test score was 78 per cent (attained by student C10) and the lowest post-test score was 62 per cent (achieved by student C12). Overall, there was a marginal decrease in students' understanding by as much as 0.8 per cent, indicating that learning such a topic using the conventional method did not result in any significant impact on students' understanding of art elements.

A series of independent t-tests were also conducted to determine whether there were significant differences in students' understanding of the selected topic before and after the learning intervention between the experimental group and control group. Table 4 summarises the result of the independent t-test on the difference of the pre-test scores between the two groups.

**Table 4:** Results of t-test and descriptive statistics of the pre-test score by group

| Outcome        | Group        |      |    |         |      |    | df | t     | sig.  |
|----------------|--------------|------|----|---------|------|----|----|-------|-------|
|                | Experimental |      |    | Control |      |    |    |       |       |
|                | M            | SD   | n  | M       | SD   | n  |    |       |       |
| Pre-test score | 2.25         | 0.10 | 15 | 2.42    | 0.08 | 15 | 13 | -0.69 | 0.087 |

As shown in Table 4, the results of the independent t-test show that the difference in the understanding of art elements before learning intervention between the experimental group (M = 2.25, SD = 0.10, n = 15) and control group (M = 2.42, SD = 0.08, n = 15) was not significant at the .05 level of significance (t = -0.69, df = 13, p > .05). These results indicate that both groups were statistically equivalent before the learning intervention, which is to be expected given that the students had been randomly assigned to the experimental group and the control group.

The results of the t-test in Table 5 show that the difference in students' understanding of art elements after the learning intervention between the experimental group (M = 2.42, SD = 0.08, n = 15) and control group (M = 2.08, SD = 0.06, n = 15) was significant at the .05 level (t = 1.723, df = 13, p < .05). Such results indicated that both groups were not statistically equivalent after the learning intervention. More specifically, the post-test score of the experimental group was significantly higher than that of the control group, clearly suggesting that the use of the novel interactive multimedia learning module is highly effective compared with the conventional method of learning.

**Table 5:** Results of t-test and descriptive statistics of the post-test score by group

| Outcome         | Group        |      |    |         |      |    | df | t     | sig.   |
|-----------------|--------------|------|----|---------|------|----|----|-------|--------|
|                 | Experimental |      |    | Control |      |    |    |       |        |
|                 | M            | SD   | n  | M       | SD   | n  |    |       |        |
| Post-test score | 2.42         | 0.08 | 15 | 2.08    | 0.06 | 15 | 13 | 1.723 | 0.001* |

\* p < 0.05

## Conclusion

In this study, students who learned the elements of art (such as lines, shapes, space, textures and colours) using the interactive multimedia learning module out-performed their counterparts who learned using the conventional approach. The findings of this study therefore provide strong evidence to support the use of ICT in the teaching and learning of the VAE subject among Form One secondary school students. As demonstrated, students using such an interactive multimedia learning module or application will be able to learn with





greater efficacy compared with study that relies merely on the conventional method. Such findings are consistent with findings of previous studies, which show that multimedia elements have a profound impact on student learning. Arguably, students learn better when learning concepts are presented and explained in various formats, such as animation, 3D graphics or video. There is ample evidence in the literature indicating that the use of various forms of media facilitates cognition, and thus improves students' understanding of concepts.

In view of such promising findings, art teachers should try to incorporate technology into their teaching practice to improve student learning. Admittedly, many constraints may prevent such a practice; these include inadequate infrastructure (such as computer laboratories) or a lack of support from management. Clearly, school administrators must lend their support to creating a teaching culture in the school in which technology becomes an integral part of the teaching and learning. Overall, the research findings further reinforce the value of ICT in teaching and learning the VAT subject. Further studies would be invaluable for further improving the methodological approach and the generalisation of findings.

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