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Development of Sequin Module for Fashion Design Subject using Multimedia Elements for Mobile Learning

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Abstract: M-learning module is a mobile module suitable for being used as a learning aid in the Era of the Industrial Revolution (IR 4.0), where it can be accessed anytime and anywhere. M-learning module on Fashion Design topic in the subject of Design and Technology (RBT) form one has been developed and named the Sequin module, which provides knowledge of theory and skills in fashion design. This study aims to evaluate the multimedia elements in the Sequin module based on the perspective of teachers who teach the subject of RBT form one. In this study, 40 RBT teachers in the Federal Territory of Kuala Lumpur (WPKL) were involved, and respondents were randomly selected. Data collection was done online using a questionnaire in Google Form and analysed descriptively. The analysis results found that all items in the multimedia construct, such as text elements, graphic images, video, audio, and animation, are at a high level. The mean value indicates that the teacher believes that the multimedia elements found in the Sequin module are very appropriate, cheerful, fun, and interesting for the students to learn the topic of Fashion Design. Besides, the teachers also think that the presentation that uses this multimedia element facilitates the delivery of knowledge and improves students' understanding. Overall, the module's content in terms of colour, background, and a combination of text, graphic images, video, audio, and animation gives students excitement to use the module. The implication of this study is that more multimedia-oriented modules need to be developed to facilitate the learning of a subject.

Keywords: Sequin module, fashion design, mobile learning, design and technology and educators

1. Introduction

The formation of integration in education in the era of Industrial Revolution 4.0 (IR 4.0) requires a combination of technology and education, even though they are two different things (Taib, Ismail, & Lubis, 2019). The use of ICT in the teaching and learning process is associated with changes in the role of educational agents, where students are the real architects of their learning, and teachers become reference experts to it (Romero-Rodríguez et al., 2021). When the Covid-19 pandemic hit the world, schools were closed to prevent transmission, and students could only learn online to not miss out on lessons (Yan et al., 2021). Demands from this situation, students need to adapt to the transition of learning methods from face-to-face to m-learning. (Yan et al., 2021), and electronic devices are the primary tools that become a necessity to every student. As such, smartphones, tablets, and computers have become an integral part of the daily lives of children, adolescents, and adults today (Milushkina et al., 2020). In addition, students are now more likely to use electronic devices to read, communicate, play and find information (Tereshchenko et al., 2020; Varga, 2020; Ab. Rahman, 2017). This is also supported by Ali et al. (2019), who stated that children use gadgets for various purposes such as playing games, watching videos, listening to songs, chatting with their friends, browsing different websites. Therefore, mobile education or m-learning is the best approach for students in this era of IR 4.0. This shows that a mobile learning module is a form of learning material that is very suitable for the changing times and the use of technology in education.

1.1 Research Objective

This study aims to evaluate the multimedia elements in the Sequin module based on the teachers' perspective who teach the subject of Design and Technology (RBT) form one.

2. Literature Review

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2.1 M-Learning

Mobile learning or m-learning can increase students' interest and motivation in learning new courses (Elkhateeb, Shehab, & El-Bakry, 2019). M-learning is a learning and teaching method that can occur regardless of place and be carried out at any time (Anthony et al., 2019). The use of materials in m-learning should be emphasized to ensure the m-learning process runs smoothly and effectively. So, the m-learning module is a learning and teaching aid that allows the learning and teaching processes regardless of time and place. Rochmah et al. (2021) showed that students are more likely to use the U-Fraction m-learning module for the mobile learning process, and students believe this module can facilitate this learning. Research on m-learning through WhatsApp Application featuring Laman Kamal by Hikmah et al. (2021) showed increased student interest in education. In addition, m-learning can also stimulate students to learn independently,as the study of Shamsuddin (2021) demonstrated that the M-SMAW software developed is suitable for use as a learning support material for self-access welding technology courses. The results of these previous studies show that m-learning can attract interest and facilitate students to learn in any situation. Therefore, learning aids in the form of m-learning modules for RBT Form 1 subjects, especially Fashion Design Topics, should be developed to facilitate students to learn.

2.2 Fashion Design Topics

Fashion Design is one of the Design and Technology (RBT) Form One textbook topics. This RBT subject is a new subject that was first introduced in secondary schools starting in 2017 to replace the Integrated Living Skills (KHB) subject. The objective of this subject is to provide students with knowledge, skills, tools, materials, and computer software. In addition, this RBT subject also exposes students to creative, critical, and innovative thinking skills in problem-solving. If the purpose and objectives of this subject are observed, it has been shown that this subject is also in line with the current rapid development where students need to think ahead with specific skills such as the latest technology. This is supported by Daud (2017), who states that RBT subjects play a role in creating a creative, innovative, and productive society. Fashion Design is topic 5.2 and the final topic in the RBT Form One syllabus. This topic describes the definition of fashion design, types of fashion design, fashion design materials, types of grafts,fashion design tools, and fashion design production. The content of this topic provides knowledge and skills to students to solve problems in daily life, such as the need for clothing and accessories. Delivery methods also need to be in line with the changing times, such as using multimedia-based learning to facilitate students' understanding of this topic. Digital technologies have been studied for decades support creative and innovative thinking in various fields including fashion design (Lee et al., 2021).

2.3 Multimedia Based Learning

Moreover, the education sector cannot ignore the need for multimedia as a learning control force (Nawi & Hashim, 2020) in this era of IR 4.0. Multimedia is a combination of text, graphics, audio, and video and aided technology to support comprehension (Guan et al., 2018). According to Abdulrahaman et al. (2020), multimedia or digital learning resources help students pursue learning well with mental representation using different media elements, which support information processing. Therefore, an alternative teaching aid that teachers can use to make learning and teaching processes more effective and exciting is by using modules that use multimedia software (Salsidu et al., 2017). A study conducted by Daud (2017) showed that the learning and teaching processes method using multimedia-based modules gives students more understanding than textbooks. Meanwhile, the results of Chen & Wang (2021) research stated that the integration of text, sound, animation, and video in multimedia software provides practical learning and teaching because this software gives a clear picture of what is in the textbook. In addition, the interaction between sight and hearing can attract students' attention in learning and teaching processes. This is supported by Yap (2016), who states that students can achieve good understanding and have high motivation to learn by using multimedia learning modules. The study of Isa & Ma'arof (2018) found that graphics in RBT subjects makes the lesson easier to remember than text without graphics. This shows that the delivery of knowledge in the form of a combination of text, animation, pictures, audio, and video has more impact on student acceptance than reading books or chalk and talk teaching methods. This coincides with the Cognitive Theory of Multimedia Learning.

2.4 Cognitive Theory of Multimedia Learning

Multimedia designed for learning requires understanding several theories, such as the cognitive theory of multimedia learning, which has three assumptions that describe learning methods from teaching multimedia materials (Abdulrahaman et al., 2020). Cognitive Theory of Multimedia Learning is a theory that is often applied by researchers in the development of m-learning modules. Therefore, the researcher uses this theory presented by Mayer (2014), which is based on a combination of text and pictures in the delivery of knowledge. There are three assumptions offered as in Table 1.

Table 1: Assumptions proposed by Mayer (2014)

Assumptions	Explanatory
Assumption of TwoChannels	Pupils have different channels inprocessing information, both verbal and visual information
Assumption of Limited Capacity	Pupils can only process limited information in one channel at a time
Active Processing Assumptions	Meaningful learning exists when students select relevant material, manage it in a coherent structure and integrate it into relevant knowledge

Source: Bujeng (2019)

3. Methodology

This study is a quantitative study with a module development design. The location of this study was selected in all national secondary schools in the Federal Territory of Kuala Lumpur (WPKL). There are two types of samples in this study, namely module validation experts (n = 11) and instruments (n = 3) selected by purposive sampling and also RBT form one subject teacher (n = 40) who was randomly selected. The instrument used in this study was a questionnaire form distributed online. The study was conducted according to proper procedures and obtained permission from the Technical and Vocational Faculty, Sultan Idris University of Education, the Ministry of Education Malaysia, Federal Territory of Kuala Lumpur Department of Education, and secondary schools WPKL.

3.1 Sequin module Development

Sequin module development uses the ADDIE Model as the basis in development. The researcher chose the ADDIE Model because this model has effectiveness in developing practical and attractive modules (Saleh & Siraj, 2016). In addition, the study of Hadi et al. (2017) found that using the ADDIE model in the design of learning modules had a positive impact on academic achievement and skills. The book Instructional Design: The ADDIE Approach by Branch (2010) states that the ADDIE Model is a model that is sensitive, proactive, interactive, and responsive because it accepts whatever goals are set for its orientation purposes. In addition, the ADDIE process becomes more systematic, dynamic, synergistic, and systemic with a combination of learning techniques and theories. This shows that the ADDIE Model is very suitable as a backbone in developing the Sequin module because this learning module contains a combination of learning theory and goals. This model has five phases that need to be passed by the researcher in completing the study of the development of the Sequin module, namely the Analysis, Design, Development, Implementation, and Evaluation phases.

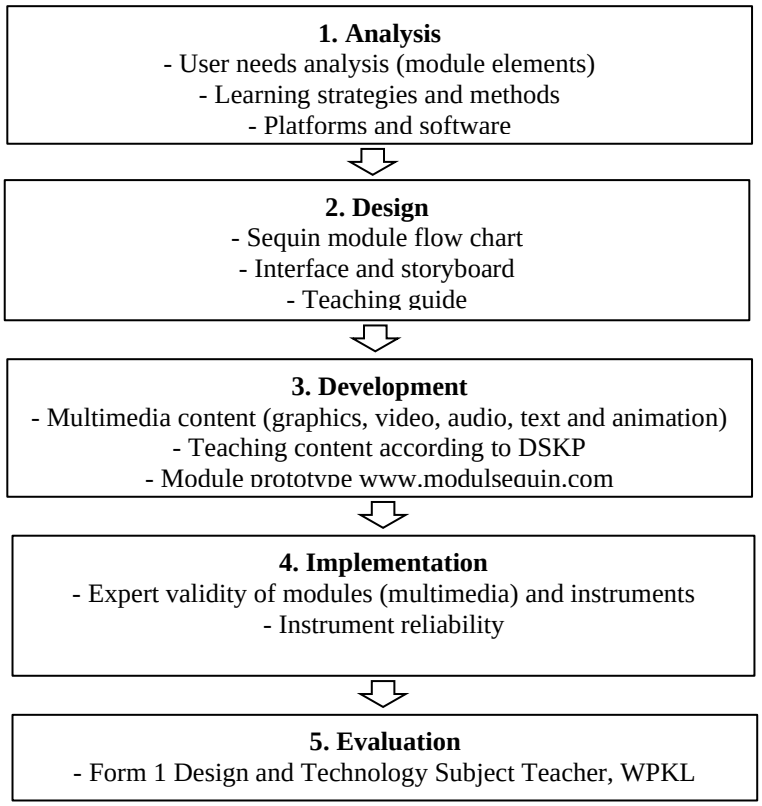

Fig. 1: Development of Sequin module according to ADDIE model

3.1.1 Analysis

The analysis phase is the first and earliest phase in the ADDIE Model. This phase is important to ensure that instructional design is produced according to the actual needs of users (Daud, 2017). In this phase, the researcher determines the module's objectives, determines the users, user needs, learning strategies and methods based on learning theory, platform, and software requirements, and cost analysis required in developing the module. Needs analysis study was conducted on Form 1 RBT teachers (n = 40) in WPKL secondary schools to determine user needs and learning strategies in the module. The learning elements and strategies loaded into the module are based on the feedback provided by the respondents.

3.1.2 Design

In developing educational software, the design phase is the construction phase of the interface, navigation, storyboard and teaching guide that users will use. In this phase, the researcher determines instructional methods such as making lesson plans according to the learning theories discussed in the literature review chapter. Besides that,the researcher also develops module flow charts, storyboards, determines technical tools, and provides teaching guides for teachers who will use this module.

3.1.3 Development

The educational software development phase is carried out based on the planning and determination from the design phase. The researcher developed the Sequin module based on multimedia principles such as text, graphics, audio, animation, video, and colour in this phase. Module contents such as notes, exercises, quizzes, classroom assessment (PBD) and additional information are loaded as outlined in the analysis and design phase. The Sequin module is developed in the form of a website linked to www.modulsequin.com.

Fig. 2:The front page of the Sequin module website

Fig. 3: Key topics in the Sequin module

3.1.4 Implementation

Implementation is a phase where experts evaluate the prototype of the Sequin module in terms of language, content, and multimedia. The module evaluation process carried out in this phase is to check all the errors and weaknesses of the module that has been developed. These modules are validated by experts who have been appointed according to the criteria set in their respective fields. This study uses the Content Validity Index (CVI), an index that shows the level of agreement between experts that is often used as a strategy in calculating the rate of expert agreement (Kasim, 2019). The validity results show that the I-CVI value for the Sequin module is 1.0, and this is similar to Polit & Beck (2006),which states that the number of experts between three (3) to five (5) should get a value of 1.0. At the same time, the validity of the questionnaire instrument obtained a percentage of expert agreement of 100%. This shows that the Sequin module and the questionnaire instrument have high validity and are good to use.The Cronbach's Coefficient Alpha (α) method was used to test the reliability, and the Cronbach's Alpha value for multimedia constructs in the questionnaire instrument of this study was 0.986. The value of this reliability coefficient indicates it has excellent reliability (Cohen et al., 2007).

3.1.5 Evaluation

The multimedia elements in the Sequin module were assessed by respondents (n = 40) among Form 1 RBT subject teachers who were randomly selected in this phase using a questionnaire instrument.

4. Finding and Discussion

The data of this quantitative study was analyzed using descriptive statistical analysis through IBM SPSS Statistics version 26 software and reported in the form of descriptive reports such as percentages, means, and standard deviations.

This study showed that female teachers (n = 38) taught more RBT subjects than males (n = 2). Malays dominate racial demographics compared to other races such as Chinese, Indians, and others. The majority of teachers who teach RBT subjects are teachers with a Bachelor's degree in Technical and Vocational fields. RBT is a new subject introduced, but if seen from work experience, teachers who teach more than 11 years dominate in teaching this subject compared to teachers in the category of 6-10 years and 0-5 years. The age of this subject just entered its fifth year in 2021, and the number of teachers who have taught RBT subjects for five (5) years is the highest.

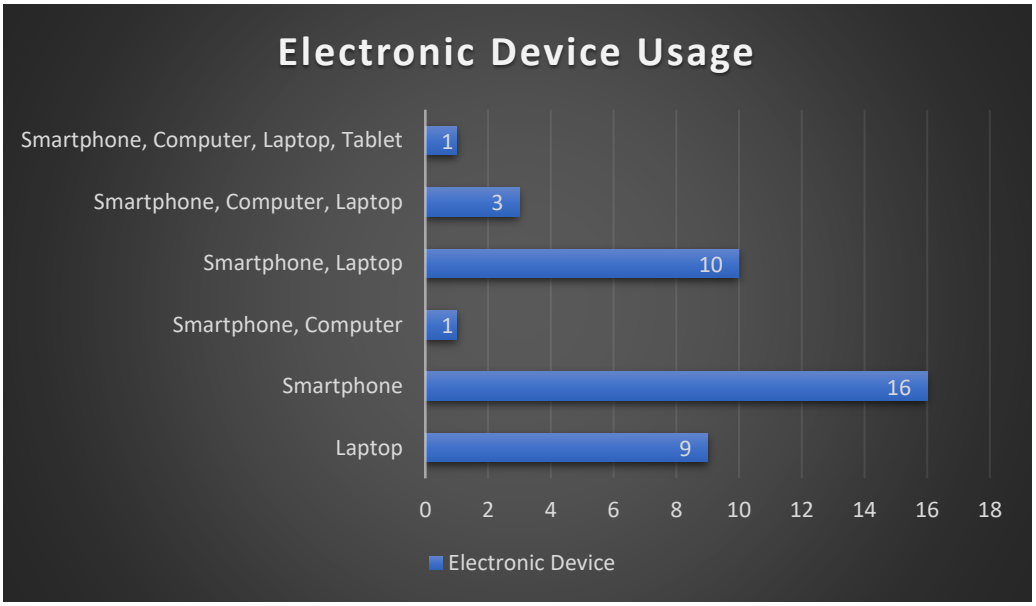

Fig. 4: Histogram of electronic device usage

Electronic devices are required to browse the Sequin module in the form of a website with the link www.modulsequin.com. The results show that teachers' most widely used device to browse this module is a smartphone. This indicates that smartphones are always with teachers and are frequently used daily. In addition, laptops also offer the highest usage where teachers use laptops to surf the internet and perform tasks. This shows that mobile tools are the choice of teachers to find information and materials for teaching. Obviously, electronic devices are necessary for daily life, whether working, studying, or social activities.

4.1 Multimedia Elements in the Sequin module Based on the Perspective of Form One Design and Technology (RBT) Teachers

The multimedia elements in the Sequin module showed high usability by the teachers involved in this study. The findings show that all multimedia elements in the Sequin moduleare in the mean value on a strongly agreed scale.

This shows the teachers' view that the colours found in this module are fascinating. The colour element plays a vital role in giving a stunning first impression. Every section in the Sequin module filled with various colours has given a tendency to users, especially students, to have fun using it. In addition, attractive colours will also provide positive emotions to users. The background of a module content also has an impact on the reader. The appropriate background makes the content of m-learning module easy to read and reduces the eye strain on electronic devices.

Table 3: Usability of multimedia aspects

Item	Mean	Standard Deviation	Interpretation mean
Color	4.63	.490	Strongly agree
Background	4.63	.490	Strongly agree
Graphic Image	4.60	.496	Strongly agree
Video and audio	4.60	.496	Strongly agree
Animation	4.58	.501	Strongly agree
Module content presentation	4.58	.501	Strongly agree
Combination of text, graphic images, video, audio and animation	4.58	.501	Strongly agree
Font type	4.55	.504	Strongly agree
Font size	4.55	.504	Strongly agree
Music	4.55	.504	Strongly agree
'Let's Chat' and 'Member Chat' rooms	4.55	.504	Strongly agree
Stimulate students to use module	4.55	.504	Strongly agree
Memory for the long term	4.53	.506	Strongly agree

Text is one of the leading multimedia elements in message delivery. The delivery of information or message depends on the text or writing so that the reader can easily understand and not be confused (Isa & Ma'arof, 2018). The analysis of this study shows that this Sequin module has a text that students easily understand, and the type of font used is clear and makes it easier for students to read through mobile phones and computers. In addition, the font size used in the Sequin module meets the needs of a website medium where users can view the content well. Graphic images found in this module give an overview of the description according to the text. Students more easily understand something by looking at a clear and accurate picture, especially fashion design tools that students have never known. Besides, clear messages and concepts can be conveyed and give visual emphasis to users by using graphic images (Daud, 2017).

Video and audio materials can attract users to use the module. Videos show real life and give an accurate picture of the lessons taught. For example, the process of producing a fashion design product that has been video taped allows students to see the actual production steps of a fashion design product. The tendency of students to see visually will provide more understanding and make it easier for teachers to guide students to produce creative and innovative products. Active learning occurs by using a media-based approach that allows behavioral exploration (Mayer, 2022). In addition, the audio contained in the video also plays a role in the video presentation. Audio can give a sense of motivation to the user to learn. For example, the audio found in the game quiz provides a positive stimulus if the user answers the quiz correctly. Besides, audio like the latest music and following the current trends also make the module more fun and increases the user's attention to access it.

The teachers think that the animation in this module is different from the usual to make this module more cheerful and fun. The animations displayed in this module can enhance and maintain the user's attention and facilitate the understanding of complex concepts. Form one students are students who have just moved from the childhood phase to adolescence. Therefore, the animation element is one of the exciting factors found in the module that makes it fun to explore. Overall, the findings show that the presentation of the content of this module is fascinating from the perspective of teachers, and it is very interactive for students to use.

The appropriate and interesting combination of text, graphics, video, audio, and animation in the Sequin module caneasily understand students while improving students' memory of fashion design for a long time. In addition, developing a Let's Chat and Member Chat column in the Sequin module has facilitated two-way interaction between teachers and students and students with peers to discuss Fashion Design topics or conduct group work online quickly. This chat room can also build a spirit of cooperation and improve students' communication skills with teachers and friends and make this module more exciting and fun. The multimedia elements contained in the Sequin module can provide a

positive stimulus to students to use it. Besides that, the multimedia element also motivates students to learn independently because it quickly understands a concept (Puspita, Muchlas, & Kuat, 2020).

5. Conclusion and Suggestion

The Sequin module is a quality-focused m-learning module where its development follows proper procedures based on the ADDIE Model and gets validation from expert evaluators. Five multimedia elements are available in the ModulSequin: text, graphic images, audio, video, and animation. Each part has a role in giving students an understanding of the Topic of Fashion Design.

This study shows the applicability of the Sequin module from the perspective of Form One RBT subject teachers in WPKL in multimedia constructs. The study's findings showed that all items in the multimedia construct were at a very high level where the mean value of all items showed very agree. This indicates that the Sequin module has good multimedia features, is engaging, interactive, user-friendly, and suitable for use by students. In addition, it turns out that all aspects of multimedia found in the Sequin module have applied the Cognitive Theory of Multimedia Learning which has three assumptions. The first assumption is that the text and graphics displayed in the module are read and viewed by the student will then be processed in the auditory channel and visual working memory. Then the arrangement of information from easy to the difficulty level and simple and short text as well as clear graphics facilitate cognitive processing while reducing cognitive load. This satisfies the second assumption found in the theory where there are capacity limitations in the visual and audio channels. The third assumption is cognitive processing in two channels and the integration of verbal and visual representations with existing knowledge. For example,the video display of 2D and 3D sketches of a fashion design product with the integration of new knowledge and existing knowledge of sketches. This makes the module very suitable as a learning aid that can stimulate students to learn independently and teachers only as mentors.

The implications of the study are important, and hopefully, the Ministry of Education Malaysia will further look into the improvement of the current textbook with the addition of multimedia elements as suggested in the study. In addition, multimedia-based modules for other topics in RBT subjects and other subjectsmust be multiplied to attract students for fun learning.

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