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## **Medical Electronic Device Paramount Safety a Hybrid Electronic Book: Modern Tools for Students**

Mariana Rosdi  
Politeknik Sultan Salahuddin Abdul Aziz Shah  
annemariarose77@gmail.com

Ku Lee Chin  
Politeknik Sultan Salahuddin Abdul Aziz Shah  
lohleechin1@gmail.com

Rusnani Yahya  
Politeknik Sultan Salahuddin Abdul Aziz Shah  
sayenann@gmail.com

### **Abstract**

This research is about the development of hybrid electronic book title Medical Electronic Device Paramount Safety for higher education at Politeknik Sultan Salahuddin Abdul Aziz Shah. This e-book is developed by using ADDIE model framework which approach the hybrid in content towards a design theory of blended learning curriculum. Some problems that students experience with e-books now days are including eye strain, distractions, a lack of overview, inadequate navigation features and insufficient annotation also highlighting it functionality. With the integrations of technology and learning motivation method, this e-book will be enabling medical electronic students to quickly incorporate with electrical safety testing into single-use of medical devices standard. In order to make reading experience are more engaging differ from fundamental book, the hybrid e-book Medical Electronic Device Paramount Safety are developed with consist of multi element multimedia and digital tools like online quiz, games, augmented reality, link to YouTube channel and the two-way interaction authors by using emails. The summative evaluation effectiveness of e-book is obtained from the students where the overall reading and usage experience of the reader. In conclusion, from the field research shows that deeper grasp of context and activities needed in developing of e-book and offers some recommendations in the future.

**Keywords:** Electronic book, higher education, hybrid e-learning

### **1.0 Introduction**

In development of digital education in era 20 are the most important enhancement cognitive student as activities and reference for them to leverage the knowledge in such ways. Many factors could affect students' physics learning outcome, for example, learning resources, material characteristics, students' experience, motivation, teaching method, and the initial competence of students (Suyatna et al., 2018) . The use of 'modern tools', is to help demonstrate concepts in the class room, help students use the tool and understand concepts especially to the engineering course (Olowo et al., 2020). As a modern tool that could help them in progress of learning, most all educators are developing their course content which involve digital tools and technologies to a very innovative education process for example IOT trainer, Augmented Reality, Virtual Reality, Open learning, E-books and many more. In that variety

of element, researcher have developed a hybrid e-book where students and educators may offer engaging and challenging the learning process in the classroom or lab.

## **2.0 Research background**

The fundamental e-book is widely used whether it's free or paid that seems similar to a physical book where users can read everywhere and anywhere. Several studies have shown the effectiveness of using e-books in learning. Ebied & Rahman (2015) found that students who were taught using e-books were better at achieving learning outcomes than using printed books, with an effect size of 0.43 in the medium category (Rasmawan, 2020). User can turn the book page by page which the presentation of content might be different form of image, font, colour, graphic arrangement etc. However, there are lack of student's engagement in terms of interaction and activities where should include in the e-books . Interactive learning media can be used anywhere and anytime without teacher attendance (Pradina & Suyatna, 2018). Behaviours of student in capture and viewing the content are the most important in part of their engaging in spending student learning time. The use of learning resources become one factor which can influence the learning outcomes (Suyatna et al., 2018).

## **3.0 Research objectives**

The research objectives are to :

1. Develop a hybrid e-book content by using variation digital tools and technology based on ADDIE model
2. Analyse the effectiveness of hybrid e-book implementation to the students as modern tools.

## **4.0 Methodology**

The development of hybrid electronic e-book title Medical Electronic Device Paramount Safety is design to the used of medical electronics students for their subtopic course. It based for the course of Medical System Practice -DEU50013 where students will learn the practitioner as biomedical technician or engineer in their field area. In developing the hybrid e-book, first part ,researcher is using ADDIE model as the design in development guideline with the electronic based content. Second part, the evidence is provided the effectiveness of hybrid e-book as evaluation of implementation that benefit to student learning time.

### **4.1 Addie model**

For the e-book development, researchers are using ADDIE model as an instructional design for the course material. It is a systematic approach that most of all educators used in designing which are Analysis, Design, Development, Implementation, and Evaluation. The development of E-content package involves five phases (Analysis, Design, Development, Implement and Evaluation). E-content package is a unique learning tool where the students are able to learn at their own pace and visualize the content (Ganesan & Muruganantham, 2015). Based from this model, researcher have designed the new framework for the e-book Medical Electronic Device Paramount Safety. Figure 1 shows the framework of e-book based on ADDIE model.



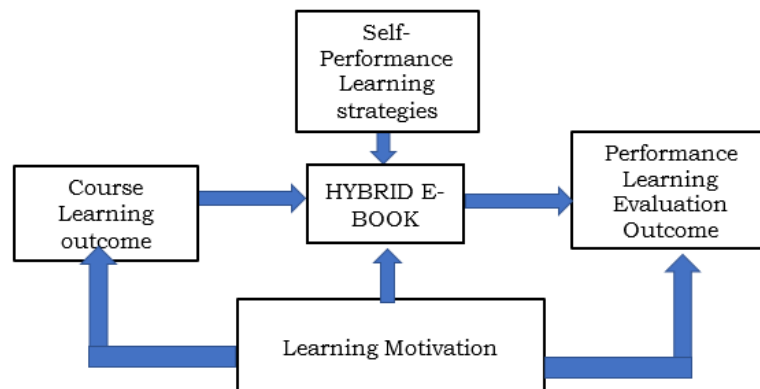
**Figure 1:** Hybrid e-book based on ADDIE model.

### 4.2 Analysis

Before designing the hybrid e-book, researcher is doing the analysis for the learners needed in the topic of Medical System Practice course. As the course are for technical practitioners, questionnaire is distributed to student the needed in reviewing course during their learning time which include question like the tools should include in e-book. Based on the data found that 85% students suggest need the e-books that contain more multimedia and interaction of content of the course.

### 4.3 Design

In the design stage, researcher is designing the hybrid e-book that mapping with the design and course learning outcome by using ARCS motivation model . The ARCS model was well-developed and validated more than 30 years ago (Keller, 1987a), and thus it is not surprising that the model has been used in widely different contexts (e.g. face-to-face classes as well as online environments) by researchers from many different countries (Li & Keller, 2018). This also include the learning strategies, teaching and evaluation method of the topic.



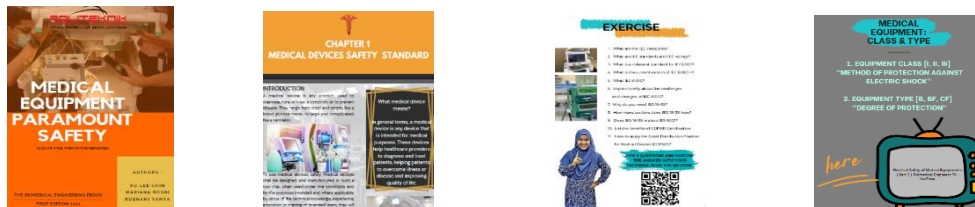
**Figure 2:** Learning effectiveness model based on ARCS motivation.

#### 4.4 Development

The development of hybrid e-book Medical Electronic Device Paramount Safety based on analysis needed and the design of whole content in the e-book. The content includes the design of each part have include image, fancy colour and multimedia such as link to video YouTube as the reinforcement video of laboratories usage in medical device performance test. YouTube is currently most popular online video community where millions of people can share and watch originally-created videos (Olowo et al., 2020)

Augmented Reality where student can experience the actual device indicators. Researcher using BlippAR software as an open learning. AR is one of the learning and instructional tools provides huge potential for designing and or enriching innovative learning environments. The most common AR model today sees content accessed via smartphones.

Link Quizzes and assignments student can download and upload to gain performance also interaction to educators. This are called hybrid because multi element are shows in the e-book. Researchers' idea in development is to develop e-book that can be one stop centre to that selected topic when they do their revision.



**Figure 3:** Development of Medical Electronic Device Paramount Safety hybrid e-book

#### 4.5 Implementation

The research project was implemented after development first trial is done. It was implemented to the medical electronics 65 students Diploma Kejuruteraan Elektronik Perubatan in semester 5 in Session 1 2021/2022. The hybrid e-book is used in DEU50013 Medical System Practice course in chapter 1 topic Standards And Quality Assurance Of Medical Equipment. The lecturer setup a briefing in a class to introduce the purpose and procedures of hybrid e-book c to the students. The students then download the hybrid e-book and do their revision or reference on their free time.

#### 4.6 Evaluation

The evaluation for the research is conduct in 2 part which done during reflection on quizzes, and course evaluation questionnaires. The reflection quizzes are done after students completed each chapter and the answer will submit to the lecturer by emails. This is to reflect their knowledge in studying using hybrid e-book. For self-evaluation all students after completed a questionnaire to evaluate their experiences and perceptions in using Medical Electronic Device Paramount Safety hybrid e-book. This will show the effectiveness and behaviour based on content and materials of the hybrid e-book. Research instruments that been used in this study are questionnaire form. Each facet of the questionnaire was based on the Likert's five-point scale.

Students entered the scores into the questionnaire according to the student’s learning status on a scale between 1 and 5 respectively. The different options were: “strongly agree” 5, “agree to “4, “average” 3, “disagree” 2, “strongly disagree” 1. Questionnaires were distributed among students to identify their perceptions and experience on the use of hybrid e-book applications at their own self learning. The instrument is divided into several sections that cover aspects of hybrid e-book applications such as design, interaction, content, interface, user -friendly and visual design aspects. These aspects are developments based on the ARCS model. The findings of this study were analysed using SPSS software version 22 to get the mean value for each item.

**5.0 Result and discussion**

From the project, researcher have obtained the goals of the objectives which have design the hybrid e-book Medical Electronic Device Paramount Safety which come up from the analysis needed from the students and lecturer. The second result were capture after students of Medical Electronics semester 5 have completed their revision using the hybrid e-book. The following is the min analysis of Quizzes evaluation for Table 1.

**Table 1** :Quizzes Evaluation

1. Chapter 1	3.70
2. Chapter 2	3.80

The findings in table 1 show the mean score for the Quizzes Evaluation by chapter in the hybrid e-book. Overall, students can answer the question and they have submitted the answers to lecturer by emails.

**Table 2:** Self Evaluation

	min
ATTENTION—learning interest	3.8
RELEVANCE—teaching methods	3.8
CONFIDENCE—learning behaviour performance in their confidence	3.6
SATISFACTION—learning satisfaction	3.8

The findings in table 2 show the mean score for the learning attention, relevance, confidence and satisfaction aspect of the Medical Electronic Device Paramount Safety hybrid e-book. There were 2 question items used for each part questionnaire. From the analysis shows tremendous min result on how the hybrid e-book can attract more positive output in self-learning behaviour. Research findings indicate that the ARCS model was applied in the hybrid e-book are include in the attention, relevance, confidence and satisfaction perceptions of both lecturers and students.

## 6.0 Conclusion

These findings have a number of implications. Number one is in designing the framework of hybrid e-book by using ADDIE model which is so practical in developing the project. It helps the researcher to obtain goals of the objective of the project. Number two is for researchers and educators this can be a guideline and references in developing teaching material that can meet the needed of academic, education and institutional goal. For students, the learning experience by using this hybrid e-book as a modern tool of study create another sense of positive attitude in their journey of study.

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