

# IEDUTECH APPLICATION DEVELOPMENT BASED ON EXPERT PERSPECTIVES IN THE FIELD OF TVE

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## ABSTRACT

**Abstract:** The Iedutech application based on the perspectives of experts in the field of Technical and Vocational Education (TVE) is a necessary research development. However, less research has been done on the development of Iedutech Applications. Thus, this study aimed to examine the development of Iedutech Application based on the perspectives of experts in TVE. This study employed five (5) experts to assess the level of feasibility of the development of this Iedutech Application. The experts assessed the level of usability based on three (3) aspects, namely content design, interaction design and presentation design. The experts answered ten (10) items of the questionnaire that were provided in each aspect. The results of data analysis in terms of content showed 100% agreement and only 20% disagreement. The research method employed was quantitative using questionnaires to obtain data. The implications of the findings of this study could contribute to Faculty of Technical and Vocational (FPTV) students in the field of Multimedia Creative. The contribution of this study could provide an overview of FPTV to plan the development of applications to facilitate students and lecturers to teach and so on. The development of Iedutech applications based on the perspectives of experts in the field of TVE should be extended to create guidelines in teaching and learning for TVE in the future.

**Keyword:** Application Iedutech, Technical and Vocational Education, TVE

## 1. INTRODUCTION

In the field of current education, science and technology is a priority to trigger creative thinking, professionalism and have the ability to solve problems, especially those involving the development of national education [1]. According [1], mastery in application development can produce a competitive and intelligent generation that applies knowledge in daily life effectively especially in making decision when solving a problem. In the development of a software application, one often encounters failure. Software development failure is often referred to as a software crisis, which is essentially a software application created that does not fit the intended goal. In order to avoid software crisis there are several methods in creating an application. Android is an operating system of Linux-based phones that includes operating systems and middleware. The open source facility or operating system that can be developed freely for its users makes many people to develop it with innovations which are growing on its operating system as well as on the development of its mobile applications. Thus, it is not surprising today that many developers are building mobile applications based on the android platform.

Humans are constantly learning to be able to achieve independence and adapt to various environmental changes. The abilities to read, write and count play a very important role in one's life as one gains a lot with the mastery of these skills. The issue of reading, writing and arithmetic is important based on IEA Study of Reading Literacy report [2]. With the development of current technology, one should be able to utilize this properly as it can help and facilitate various matters, especially in terms of learning. Learning about theory alone can cause learners to be bored quickly. Generally, after the lesson, learners are able to remember 20% of what is seen and 30% of what is heard. And people remember 50% of what is seen and heard and 80% of what is seen, heard and done [3]. Thus, the development of the Iedutech application can help lecturers to teach more easily. Hence, this study was conducted to investigate the lecturers' perspectives of the results of using this Iedutech application.

## 2. PROBLEM STATEMENT

According to [4], the creativity of various learning models and techniques can help students be more interested in learning and the atmosphere becomes fun, cheerful and effective for students. However, this element is still given less emphasis and exposure by educators. This is because, the education system in Malaysia is still not encouraging to emphasize the aspects of learning techniques that are appropriate and relevant at present. Unconsciously, students learn learning techniques and skills by chance, indirectly or following their peers [5]. This situation occurs as there is no specific guidelines for dealing with students' learning and exposure to learning style models that are poorly provided by lecturers during class.

In general, the use of Iedutech application is one of the alternative ways to the existing teaching and learning (T&L) method based on whiteboard and marker pen or even the traditional method using blackboard and chalk board [6]. The Iedutech application not only eases the burden of mastering a subject, but it also eases the burden of lecturers to teach in large numbers and students can also use the application repeatedly to master the content. The objectives of the research are as follow:

- i. Develop an Iedutech application based on ADIDIE design
- ii. Evaluate the usability of Iedutech applications to experts based on aspects of content design, interaction design and presentation design.

## 3. LEARNING MEDIA

[7] conveyed that learning media involved tools, methods and techniques used as intermediaries of communication between a teacher and students in order to communicate and interact more effectively between teachers and students in the process of teaching in schools. The benefits of learning media according to [8], are (i) clarifying the presentation of the message so as not to be too verbalistic; (ii) by using appropriate and varied learning media the passive attitude of students can be overcome and (iii) can create a similar perception of a problem.

## 4. ANDROID

According to [9], android is an operating system for smartphones and tablets. The operating system can be described as a 'bridge' between the device and its users, so that the user can interact with the device and run the applications available on the device. According to [10] android is an operating system for linux-based mobile devices that includes operating systems, middleware and applications. Android provides an open platform for developers to create their own applications. Furthermore [11] android is an operating system for linux-based mobile devices that includes operating systems, middleware and applications

## 5. METHODOLOGY

Expert evaluation was done after the experts evaluated and used the Iedutech android application. The experts evaluated the level of usability in this Iedutech application based on three (3) important aspects that were provided in the evaluation form, namely from the aspects of content, aspects of interaction and aspects of presentation. The researchers appointed five (5) experts to evaluate the usability of the Iedutech android application. The appointment of the experts was based their involvement in the field of Information Technology and more than five (5) years of service experience. The five (5) experts were from the Faculty of Technical and Vocational Education (FPTV) of Universiti Tun Hussein Onn Malaysia (UTHM). Each expert provided insights regarding Iedutech applications and suggestions of strengths and weaknesses as well as improvements. The expert confirmation form was divided into five (5) sections as shown in table 1 below.

Table 1: Experts Questionnaire

Section	Aspect	Item
A	Respondent's information	6
B	Content design	6
C	Interaction design	6
D	Interface design	6
E	Comments and suggestion	1

In developing android applications based on Fleming learning style, the researchers chose the ADDIE model [12]. This was because, according to [13], this model was one of the instructional design models which was often the basis of other instructional design models. In addition, according to [14], the ADDIE model is one of the systematic teaching design models in the production of effective and user-friendly computer learning materials. Researchers used the ADDIE Model in developing the Iedutech application to provide a systematic work guide. There were five (5) phases of work that the researchers had to undergo using the ADDIE Model, namely (i) analysis; (ii) design; (iii) development; (iv) implementation; and (v) evaluation. Figure 1 shows the process in designing Iedutech android applications based on the ADDIE model and figure 2 shows the full content of Iedutech application.

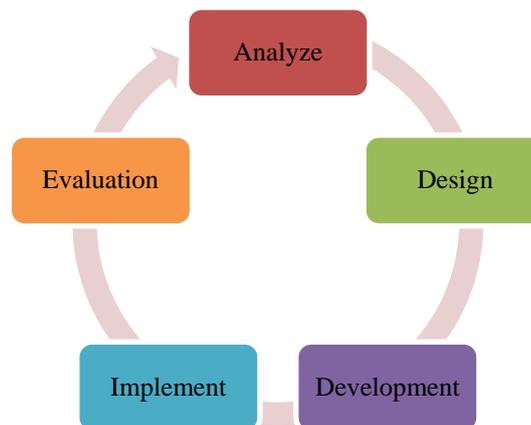


Figure 1: Iedutech Application Design Process

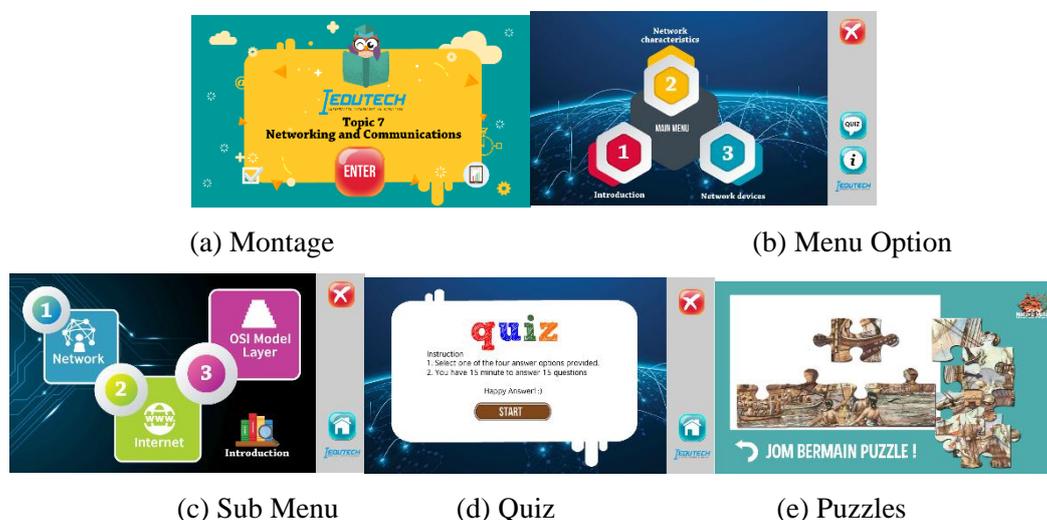


Figure 2: Partially Content the Iedutech Mobile Application

## 6. DATA ANALYSIS

Expert evaluation was done to evaluate Iedutech applications that had been developed by the researchers. Content expert evaluation was done via lecturers who specialized in Information Technology. There were 10 items that were provided to the experts in this section and the experts checked one by one so that the content was appropriate for the Iedutech android application for topic 7 (Networking and Communication) and the age of the targeted users as described in Table 2.

Table 2: Content Design Analysis of Experts

No.	Item	Agree		Disagree	
		(F)	(%)	(F)	(%)
1.	Can this Iedutech app help attract students?	5	100	0	0
2.	Can Iedutech applications improve network understanding and communication?	5	100	0	0
3.	Does the Iedutech app display information that is not too compact?	4	80	1	20
4.	Does the Iedutech application make it easier for students to understand the topics being taught?	5	100	0	0
5.	Does the Iedutech app work without errors?	5	100	0	0
6.	Can the graphic info provided help improve students' understanding?	5	100	0	0
7.	Is the video displayed appropriate?	4	80	1	20
8.	Is the content of the lesson displayed concise?	5	100	0	0
9.	Is the quiz given enough?	4	80	1	20
10.	Can the Iedutech application help students in answering test questions well?	5	100	0	0
<b>Total Average</b>		<b>4.7</b>	<b>91</b>	<b>0.3</b>	<b>9</b>

Table 2 shows the data obtained as a result of the expert checklist in this content section. Therefore, all experts (100%) agreed on this part that Iedutech android application could help attract students and the graphic info provided could help improve students' understanding in learning topics 7 (Network and Communication). However, there were also experts who did not agree (20%) with the video questions displayed about being appropriate and having quizzes and providing training adequately. This was because the experts considered the video in this Iedutech android application as not provided. Next, there were experts who did not agree (20%) that the quiz questions given were sufficient. Experts suggested that researchers added questions in the quiz section to test students' understanding of the topics in this Iedutech android app. Table 3 shows the 10 questions regarding the interaction design to facilitate expert opinion.

Table 3: Interaction Design Analysis of Experts

No.	Item	Agree		Disagree	
		(F)	(%)	(F)	(%)
1.	Is the icon used appropriate?	5	100	0	0
2.	Can the menu display provide clear information to students?	5	100	0	0
3.	Are the parts in this Iedutech application related to each other?	5	100	0	0
4.	Is the button design easy to understand?	4	80	1	20
5.	Does the exit icon make it easier for students to exit the Iedutech app?	5	100	0	0
6.	Are icons and buttons suitable for use in Iedutech applications?	5	100	0	0
7.	Is the color chosen easy to see to interact with?	5	100	0	0
8.	Is the information in the Iedutech application easily accessible?	5	100	0	0
9.	Does the shortcut in this android application work without errors?	5	100	0	0
10.	Are there any technical glitches while using the Iedutech application?	5	100	0	0
<b>Total Average</b>		<b>4.9</b>	<b>98</b>	<b>0.1</b>	<b>2</b>

Table 3 shows the data obtained as a result of the expert checklist in the interactive design section. All experts (100%) agreed that the icons used were appropriate and the menu displayed could give a clear description to the students. Next, experts agreed (100%) with the exit icon that was easier for students to exit the Iedutech application and the shortcut in this android application worked without errors. However, there were experts (20%) who denied the question of the easy button design to understand the android application. This was because, the experts found that there was a button design that was not suitable for the user display and recommended that the researchers changed the button to a design that was easy to understand and suitable for the function of a button. Table 4 shows the 10 questions regarding the presentation design to facilitate expert opinion.

Table 4: Presentation Design Analysis of Experts

No.	Item	Agree		Disagree	
		(F)	(%)	(F)	(%)
1.	Is the font size of the title in the Iedutech application appropriate?	5	100	0	0
2.	Is the display size of the Iedutech application appropriate?	5	100	0	0
3.	Is the use of background color with Iedutech application writing color appropriate?	4	80	1	20
4.	Is the sound effect on this android application appropriate?	5	100	0	0
5.	Does the button on this animation application work properly?	5	100	0	0
6.	Is the font type on the option button appropriate to use?	5	100	0	0
7.	Is the graphics used appropriate?	5	100	0	0
8.	Is the info graphics used interesting to students?	5	100	0	0
9.	Is the video displayed clear and smooth?	3	60	2	40
10.	Are the positions of the text, graphics and buttons fixed?	5	100	0	0
<b>Total Average</b>		<b>4.7</b>	<b>94</b>	<b>0.3</b>	<b>6</b>

The results from the data obtained from the expert checklist in the presentation design section are shown in table 4. Experts agreed by stating that the font size and displayed were appropriate. In addition, the font type on the option button was appropriate and the positions of the text, graphics and buttons were fixed. Next, the graphic info used could attract students and the sound effects on this Iedutech android application were appropriate. There were experts did not agree with the use of background color and the writing color of this Iedutech application. This was because, there were background colors that were not contradictory and it was difficult for experts to see the text or graphics displayed in front of the background color.

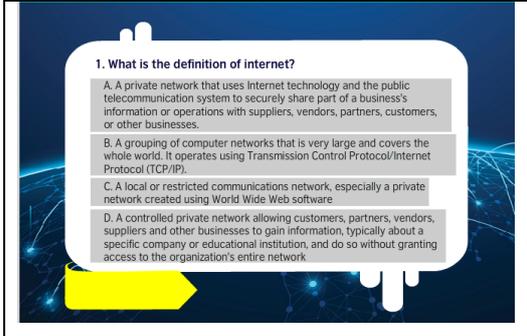
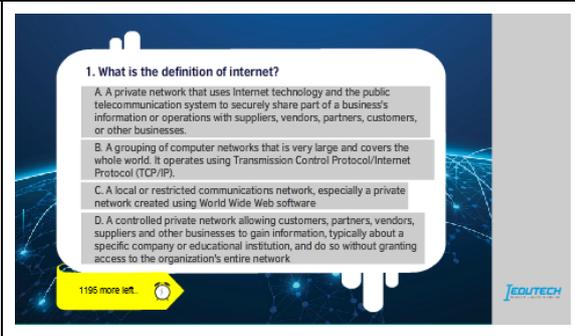
## 7. DISCUSSION

The study found out that for the first aspect (1) which was the content design, all experts agreed with the content design where the graphic info in the Iedutech android application provided was appropriate. This was because the content on each application displayed was easy to understand and the presentation of content was simple but compact. The users of this application were the Bachelor Degree students who needed something easier to understand and were interested in something they that could see and do. This is as explained by [15] who states that the age of the user is the most important aspect that needs to be considered by the application developer during the development process. This is because every application developed could be difficult to be adapted by all ages.

In addition, all experts agreed that the Iedutech application attracted students and made it easier for students to understand the topics taught. In addition, the findings of the study [16] regarding "Development of interactive teaching and learning software for the management of Malaysian polytechnic remains" stated that the application of multimedia elements could attract users to the application developed. However, there were also experts who did not agree by stating that quizzes and training were not enough. In the Iedutech application, the researchers only provided 20 questions for the topic 7 (Network and Communication) quizzes. Therefore, experts suggested to increase the

number of quiz or practice questions for students to answer to test understanding and motivate students. Students become more motivated and willing to spend time for learning only when they feel the learning is interesting and fun [17]. Experts also suggested to increase the time period in the quiz displayed. This is because, the experts suggested planning time frame to answer the quiz so that students were sensitive to the time allotted as in figure 5.

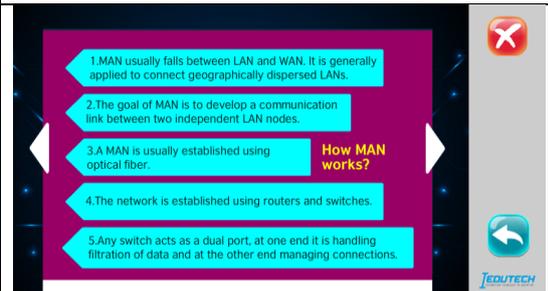
Table 5: Quiz Display Before and After Improvements

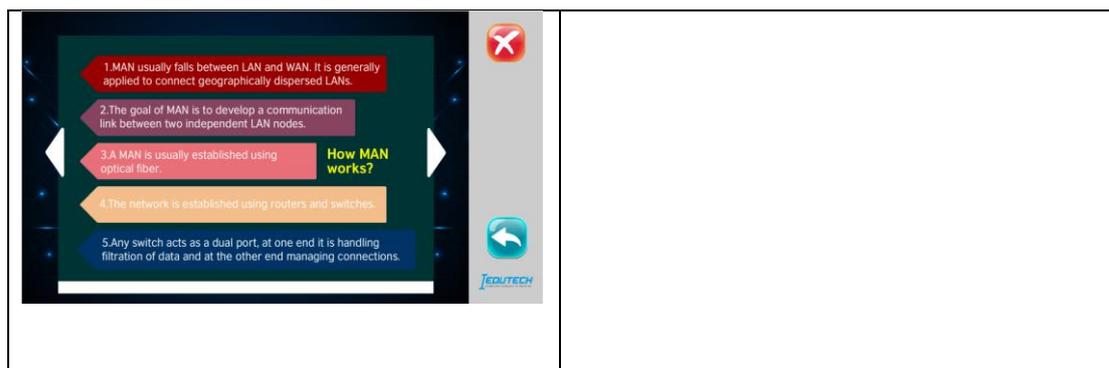
Before	After
	

For the second (2) aspect of interaction design, all experts agreed on the icons used and the menu displayed gave a clear description to the students. Icons need to be placed consistently so that the user does not have to guess what to do next or use the mouse to click in the hope of finding a way to proceed [18]. However, there were experts who suggested that researchers should review the function of each button found in the Iedutech android application. This was because, the experts found that there were buttons that do not work completely and button design that was not suitable for user display. This was supported by [19] that when students listened to text explanations while looking at the button graphics displayed, they not only tried to add information to the memory store but also tried to understand the presentation material by actively selecting relevant text and graphics, organizing it into verbal mental models and visual mental models simultaneously and integrated the models.

The last aspect in the evaluation of usability based on the experts was the aspect of presentation design. Presentation design questions were related to multimedia elements namely text, audio, graphics, and animation. All the experts agreed with the use of text included in this application, namely Chaparral Pro font and British Council Sans. The rate of text usage was small and the font size depended on the suitability of the statement. This is supported by [20], that the use of text alone in the interface makes the interface less attractive. The text used must be appropriate in terms of text type and text size to the tastes of users such as adults, teenagers or school students [21]. The font color and background of the display could be changed so that the user could see the cons in the display as in table 6.

Table 6: Font Color and Background Change Before and After Improvements

Before	After
	



Furthermore, the issue of ‘the graphic info used can attract students’ was also agreed by all experts. This was compatible with the Iedutech android application based on the visual style of VARK Fleming learning where the information contained in the application needed to be converted to graphic info to be more concise and not too loaded with the use of text. The physical layout of visual objects on the screen plays a role in the aesthetic perception of the user towards the interface [22] and the layout of the interface is important to gain trust from the user when using m-learning [23]. However, there were also experts who did not agree with certain issues of the presentation design aspect. There were non-contrasting background colors and it was difficult for experts to see the text or graphics displayed in front of the background color. There are several colors that can enhance student response and also have a calming effect on the user [24]. According to [25], color is not just a color but can create emotions, feelings and memories that can affect the human mind and body through physical as well as psychological reactions to certain colors. Therefore, experts recommend that researchers adjust the graphics or text displayed with the background color to avoid the occurrence of visual fatigue, dizziness, sore eye and loss of focus or motivation [26].

## 8. CONCLUSION

In conclusion, the results of the study showed that experts were satisfied with the products produced. The three usability aspects of the Iedutech application tested, namely the content design, interaction and presentation aspects received positive feedback from experts. Experts hoped that this Iedutech application could provide benefits and support in the Teaching and Learning (T&L) process for lecturers or students. This is because, it is a very important application used nowadays in facing the era of Industrial Revolution 4.0.

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