

# E-PENGAJIAN AM: Identifying Graphs in Interactive Mobile Learning Application

Haziyah Binti Abu Hanifah

Universiti Kuala Lumpur (UniKL)

Malaysian Institute of Information Technology (MIIT)

Jalan Sultan Ismail, 50250 Kuala Lumpur

haziyah.abu@s.unikl.edu.my

Mastika Binti Mustafa

Universiti Kuala Lumpur (UniKL)

Malaysian Institute of Information Technology (MIIT)

Jalan Sultan Ismail, 50250 Kuala Lumpur

mastika@unikl.edu.my

**Abstract**— Pengajian Am is one of the subjects required to pass any semester of the Sijil Tinggi Persekolahan Malaysian exam. Alih Bentuk Komunikasi (Linear Kepada Bukan Linear) is one of the topics in the field. The goal of this project is to design a user friendly and an effective interactive mobile learning application for Pengajian Am graph subject which will be taken by the STPM students in Semester 2. In addition, this application would enable the student to visualize the concept of graph and making a revision process easier for STPM students to master this topic in a short time. This is really important, so students are expected to read and practice any of the subjects taught during the semester. E-Pengajian Am smartphone learning framework used the ADDIE model. This model was selected because it is very useful in developing this mobile application and help the developer to develop an effective learning development in five phases. Overall, this project is very good at helping STPM students learn because the content is easy to understand. The findings of the analysis which have been obtained indicate that they are pleased with it and have made this a useful application.

**Keywords**—Pengajian Am; Mobile learning; STPM; ADDIE

## I. INTRODUCTION

Education plays an important role in the world today. Training lets people understand themselves, embrace the world, and develop self-confidence. Apart from that, it increases the standard of the nation's schooling and achieves a happier life. In addition, curriculum allows educators to lead a competent and professional generation where the standard of education continues to develop. Basically, as we know and see, education has a thousand implications in the quest for wisdom in the future. In general, technology-based schooling is always the best approach in the world. This has had an effect on education and its implications can be separated into three stages, including substitutes, changes and phases of transformation [1]. Teachers make it a medium for teaching sessions and learning without modifying the teaching process, whereas in the transition period, teachers use ICT that can trigger change in the practices of new teaching. The transition process entails significant changes in the role of students and teachers in teaching and learning. About every area of life is influenced by the exponential growth of information and communication technology, including education.

The research of this project is:

- To identify the best media to easily visualize the concept of graph in the Pengajian Am subject.
- To develop an interactive Pengajian Am (Identifying Graph) using mobile learning application.
- To evaluate the effectiveness of the mobile learning application.

## II. LITERATURE REVIEW

### A. Mobile Learning

Today, the sophistication of creativity is exceptionally valued by the world. Portable apps can be seen as web server fixes by running on mobile computers and cell phones. As we know, portable apps help multiple clients connect with internet services and can make it easy to use on lightweight hardware such as papers, PCs and tablets. Other than that, it tends to be used online or anywhere outside the classroom and can be accessed and downloaded. For the most part, the Association of Specialized Education settled on teaching by using creative gadgets. Generally speaking, having a portable programmed is the strongest learning and facilitating technique rather than the expansion of new knowledge.

### B. Mobile Learning Application Context

Preparing is a beginning stage for seeing preferable change over for expanding future learning. Flawless learning focuses on providing the best possible way to do so. Around the same time, learning how to use portable software will make the instructional system more compelling in terms of supplementary instruction that is available to anyone.

Portable learning is a means to get to the substance of learning. As the use of remote computers, such as cell phones, workstations and laptops, has become another standard in this period, it seems to be much more remarkable today [2]. As per Markett [3], students will help to improve this dynamic by empowering under-study relationships by versatile application, seeing under-study shyness in their approach turned out to be fearless in improving or altering their home- room condition.

### C. Mobile Learning in Malaysian Context

Decades earlier, teaching improved and expanded from only adapting in the study hall to separate learning and the simulated study hall. Similarly, data processing is no longer limited to the research hall. From now on, the notion of organizing teaching creativity is in line with the desires of the Ministry of Higher Education (MOHE) to advance progress in data and communication (ICT) as a focal concept in transforming the instructive system. The conveyance tool for a course is usually the eye-to-eye homeroom set-up in Higher Education Malaysia (HEIs) in Malaysia, just as mixed with the standardized Learning the Board System (LMS) as a stage [4]. There are conditions for an investigation on the possibility of offering higher education understudies another stage to ensure that their learning is sustained outside the study hall in order to understand the potential of the mobile phones. In the 21st century, capability studies have widened the reach of Electronic Learning due to the advancement of portable technologies, in which work environments became replaced by laptops, application computing and cell phones.

### D. Benefit of mobile learning

According to Elias [5] Crescente & Lee, [6] the advantages of using mobile devices as a learning tool as the cost of mobile devices is significantly smaller than that of computers and notebooks. In addition, it increases the participation of young people because the content of formal curriculum is relevant and useful to them. For example, they may submit content learning and download files to their own mobile devices. Mobile learning technology is the safest tool for educators to use to educate their students. Through this, students do not have to think of ways for them to learn quickly while in class. This is because not all students can learn something with a short time. Study the tough subjects at the student's own rate without any time limits. Other than that, cell phone features are an extra learning aid, ideal for use of highlights and drills to include better learning exercises. This versatility makes it easier for students to minimize their unproductive hours, which can increase their job educational balance.

## III. METHODOLOGY

This chapter would explain the approach to be used in interventions, the demographic type of respondents, the data collection process and the application-based analysis methodology model, which includes five steps, such as review, planning, growth, implementation and evaluation. More information on each process will be given.

### A. Research Methodology

According enotes.com, in methodology there are two research approaches, which are quantitative and qualitative. The methodology that will be used is the quantitative method. Quantitative approach has been used as the best research methodology to find data quantification, according to Huang [7] to produce the most accurate outcomes.

In the Mobile Learning Framework, E-Pengajian Am Mengenal Pasti Graf is designed and developed based on the ADDIE model to achieve the objective. In order to create this mobile application, the ADDIE method is very helpful and effective. It has a versatile guide that will allow educational planners to develop a successful development of learning.

### 1) Analysis phase

The process of research can be known as the "Goal-Setting Stage." The designer's attention in this stage is on the target audience. It is also here where the curriculum refers to the skill and intellect level displayed by each student / participant. This is to ensure that what they already learned will not be duplicated and the subjects and lessons that students are yet to discover and understand will be the emphasis instead. At this point, after finishing the course, teachers discern between what the students already know and what they should know.

To ensure that the analysis is systematic, many main components must be used. It is important to use course texts and records, syllabi and the internet. A layout can be determined as the primary reference for the syllabus with the help of online materials such as web courses. Educational review will be performed towards the conclusion of the curriculum to decide what themes or topics should be provided.

### 2) Design Phase

The design process deals with learning goals, methods for testing, tests, material, review of the subject matter and preparation of lessons and collection of media. The step of design should be systematic and particular. Systematic means a logical, orderly approach to define, establish and review a series of objectives designed to meet the aims of the project. Relevant means that with regard to specifics, each aspect of the instructional design plan has to be implemented.

In design phase, structure and flow of this mobile learning application must be clearly stated inside the framework such as on learning objectives, content, exercise, assessment, includes the storyboards, wireframe and flowchart for this project.

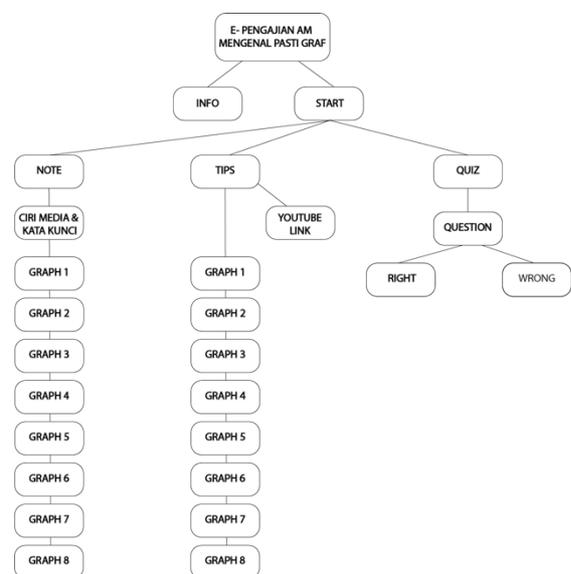


Fig. 1: Breakdown topic in E-Pengajian Am



Fig. 2: Mockup Design of Note page interface

### 3) Development Phase

At the production process, programmers will create and assemble the content assets they have developed while framework analysts will collaborate and incorporate the various technologies. System testers will conduct different tasks to detect defects and develop systems. The input received can be used to revisit and revise the project as needed. If the course material has been developed, designers can execute an imperative pilot test; this can be achieved by engaging key stakeholders and rehearsing the course material. The input from the pilot will also help to find gaps and better improve the entire process prior to deployment.

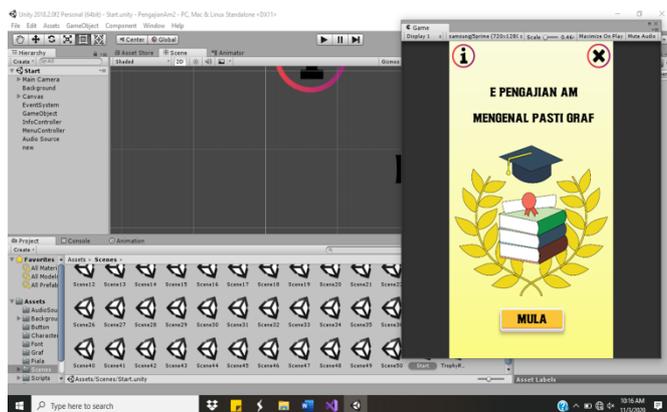


Fig. 3: Development in Unity

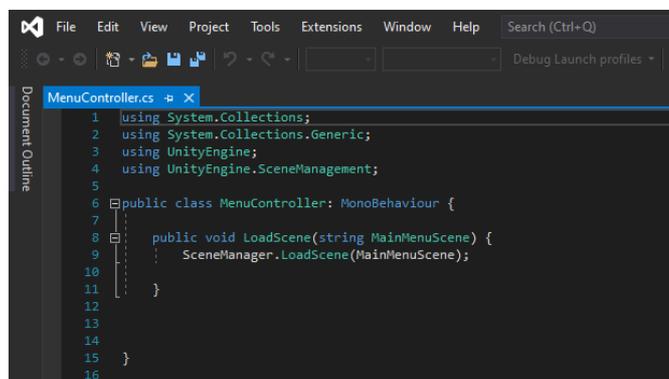


Fig. 4: Programming in Visual Studio 2019

### 4) Implementation Phase

The implementation phase includes the strategy being turned into motion. Training the students, organizing the pupils, and planning the learning suitability environment are the phases of the implementation process. It would help to increase their comprehension and knowledge of the curriculum and resources by teaching the teachers before the beginning of the course. In order to contribute more efficiently to community conversations and events, it is important that learners have access to essential resources, instruments, and information. In order to ensure the extension of knowledge and skills, learning and development, learners should be familiar with the material provided in the course. Organizing the world of learning aims to offer a challenge-free course.

### 5) Evaluation Phase

Evaluation is the last step of the ADDIE process. This is the point at which the project is subjected to meticulous final checking on whether, how, why, until the whole project has been completed (or not accomplished). It is possible to break down this stage into two parts: Formative and Summative. At the production cycle, the initial appraisal actually occurs. The Formative stage happens when the research is performed by students and IDs, while the Summative portion occurs at the conclusion of the curriculum. The key purpose of the assessment stage is to assess if the targets have been accomplished and to determine what would be needed to step forward in order to increase the project's performance and success rate.

## IV. TESTING AND RESULTS

This chapter will discuss the results of research and the mobile learning application. Testing and results were carried out after the end of the project's development phase. The creator has distributed a questionnaire to the target group in order to collect the data. The study method that includes is Alpha Testing and Beta Testing.

The research data collection has been carried out in September 2020 where 40 STPM students from schools around Johor Bahru who pursuing the subject Pengajian Am in Semester 2 using online testing. The students have been given a prototype copy of the application and requires to answer 10 usability questions. An equal number of male and female students involved in this testing. 25 students were in Science stream while 15 students were from Art stream.

The figure 5 below shows 20% (8) respondents are strongly agree this application easy to navigate meanwhile 80% (32) respondents just agree with this question. has shown that this application has been successfully created and it can be made into a useful application for them.

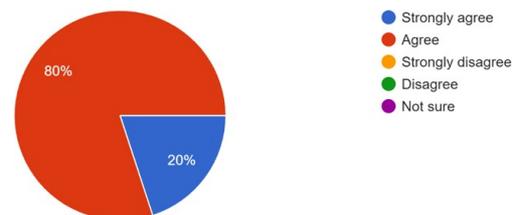


Fig. 5: The application is easy to navigate

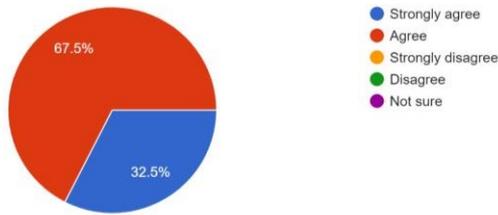


Fig. 6: The content is easy to read and understand

From figure 6, the pie chart show, 27 respondents (67.5 percent) agree with this statement. Although 13 respondents (32.5 per cent) are firmly in agreement, the material is easy to read and understand. Mostly, the respondent agrees and strongly agrees that the material is straightforward relative to another application.

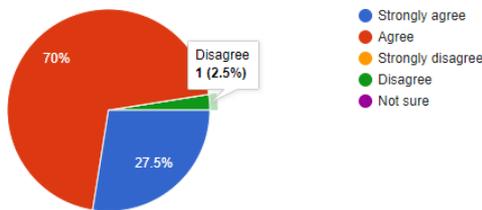


Fig. 7: The content is complete and suitable to be used as references

The pie chart in figure 7 shows that 70 percent (20) of respondents agreed, while 27.5 (11) respondents strongly agreed and 2.5 percent (1) of respondents disagreed that the material was full and acceptable for reference use. This has demonstrated that this material is appropriate as supplemental notes for the respondents and educators.

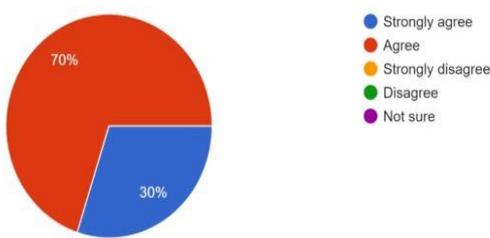


Fig. 8: Recommend this app to my friends

Figure 8 shows, 28 respondents (70%) answering agree while 12 respondents (30%) answering strongly agree with recommend this app to my friends.

## V. CONCLUSION

Conclusions can be drawn from the above results, the developer states that the objectives of the project have been achieved. All the evidence and knowledge gathered has shown that it is possible to digitally learn the topic of Pengajian Am. As such, directing potential developers to enhance mobile device learning can be beneficial in several ways. Made it into a multiple platform devices application will benefit a lot of users. Adding choices of audio narration and the contents in different language such as English, Chinese and Tamil will improve the application acceptability in the future.

## REFERENCES

- [1] G. M. Willems, *New Trends in Dutch Teacher Education*. Retrieved from researchgate: [https://www.researchgate.net/publication/241847416\\_New\\_Trends\\_in\\_Dutch\\_Teacher\\_Education](https://www.researchgate.net/publication/241847416_New_Trends_in_Dutch_Teacher_Education) (2000).
- [2] Ambrose, S. A., Bridges, M. W., Lovert, M. C., DiPietro, M. and Norman, M. K (2010). *How Learning Works: Seven Research Based Principles for Smart Teaching*. San Francisco, California: Jossey-Bass.
- [3] Markett, C., Sánchez, I. A., Weber, S., & Tangney, B. (2006). Using short message service to encourage interactivity in the classroom. *Computers & Education*, 46(3), 280–293
- [4] Elias, Tanya (February 2011). "Universal Instructional Design Principles for Mobile Learning". *International Review of Research in Open and Distance Learning* 12 (2): 143–156.
- [5] Crescente, Mary Louise; Lee, Doris. "Critical issues of M- Learning: design models, adoption processes, and future trends". *Journal of the Chinese Institute of Industrial Engineers* 28 (2): 111–123, 2011.
- [6] Baharom, S., & Hussain, R. M. R. (2013). *An exploration of the mobile learning environment to support teacher training*. In Mohamed Amin Embi & N. M. Nordin (Eds.), *Mobile Learning: Malaysian initiatives & research findings* (pp. 103–110). Bangi: Centre for Academic Advancement, Universiti Kebangsaan Malaysia.
- [7] Huang, S.T., Yi, P.C., & Yu, J.L. (2005). ADDIE instruction design and cognitive apprenticeship for project-based. *2th Asia-Pacific Software Engineering Conference (APSEC '05)*. IEEE