Journal of Educational Research and Innovation: Conference Series
Vol 1 No 1, Desember 2025, 58x – 67)
Available Online at:
https://e-journal.nawaedukasi.org/index.php/jerics
ISSN:
0000-0000

Implementing Deep Learning in Education in the Digital Era for College Students

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DOI:
Received:15-11-2025 | *Revised: 07-12-2025* | *Approved: 20-12-2025*

Abstrak: ***The implementation of deep learning in education continues to evolve with various strategies and patterns. E-learning systems are learning models that utilize digital media. Mobile learning is also a form of learning that utilizes communication technology devices. The goal is to implement deep learning through mobile learning application software. The advantages of this application software include ease of delivering and providing learning materials, ubiquitous access, engaging visualization, and highly effective and efficient learning. Further more, the learning process is more detailed and in-depth, making it easier for students to understand and learn. Mobile Learning with deep learning is a learning model that uses portable technology in the digital era. The advantages of mobile learning are an alternative learning source that can increase the efficiency and effectiveness of the teaching and learning process in student lectures. The results of this paper are to produce the implementation of deep learning mobile learning models in the world of education in the digital era, by applying the concept of learning anywhere, anytime, and fun. The objectives are: (1) Develop a deep learning design model for mobile learning-based learning using a learning management system; (2) Develop a mobile server which is a web-based mobile service application. The stages are: 1. Create a mobile learning deep learning application software that contains learning materials; 2. Create a mobile server model with a web-based mobile learning service deep learning application.***

Keywords: ***Deep Learning, Mobile Learning, Implementation, Education.***

I. INTRODUCTION

The implementation of Information and Communication Technology (ICT) in educational institutions is now a necessity, because the application of ICT can be an indicator of the success of an educational institution. Not a few lecturers take advantage of technological advances by using the internet as online learning or what we usually hear about online learning. A new trend in the eLearning world today is known as Mobile Learning, the use of portable media such as smartphones, iPhones, PC Tablets to access online learning systems. The use of mobile phone technology so far is not only focused as a means of communication or entertainment, but has been used as a medium of learning. It is proven from several studies that use mobile phone technology as a learning medium. Such as the Mobile School Service research developed by (Zoran Vucetic, et all; 2022), where mobile phone technology is used as a medium of learning media for students at the University of Serbia (Novi Sadnery, Zrenjanin, 2021). Besides that, mobile phone technology is also used in the world of education, such as research on the Development of Mobile Phone Based Learning Designs on SQL Material for Advanced Database Courses at the Department of Informatics Engineering, Undiksha (Wirawan; 2023). Where this research produces a mobile phone-based learning media as a learning tool for SQL material. Student responses who are taught mobile phone show a positive response.

1.1 Research Purpos

The objectives of this study are to implementing deep in education in the digital era for college students with develop a learning design model based on Mobile Learning using a Learning Management System. Developing a mobile server which is a web-based mobile service application.

1.2 Research Urgency

This research was conducted to produce a product in the form of a mobile learning application software. The mobile learning application software will benefit from the availability of teaching materials that can be accessed at any time and the visualization of interesting material. Mobile Learning is a learning model that is carried out between places or environments using technology that is easy to carry when the learner is in a mobile / cellphone condition. With the various potentials and advantages it has, Mobile Learning will be an alternative learning resource that can increase the efficiency and effectiveness of the teaching and learning process.

II.LITERATUR REVIEW

2.1 Learning Media

The learning set by the lecturer includes teaching objectives, teaching materials, teaching methodology and teaching assessment. Teaching materials are a set of scientific material consisting of facts, concepts, principles, generalizations of a science that comes from the curriculum and can support the achievement of teaching goals. Teaching methodology is the methods and techniques used by lecturers in interacting with students so that teaching materials reach students, so that students master the teaching objectives. In the methodology, there are two aspects that stand out the most, namely teaching methods and teaching media as teaching aids. Meanwhile, assessment is a tool to measure or determine the level of achievement of a teaching goal (Arsyad, 2024). Learning patterns that utilize learning media as sources in addition to lecturers can be described as follows:

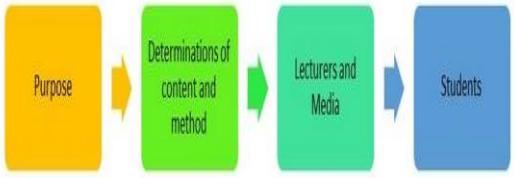

Figure 1. Media assisted learning pattern.

In learning practice there is actually no rigid pattern between learning components. The complete combination pattern can be described as follows:

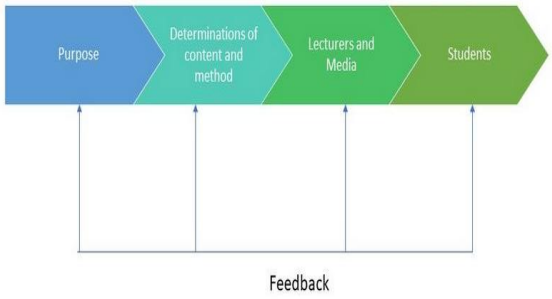

Figure 2. Combination patterns in learning.

Learning media is a means of communication in the teaching and learning process in the form of hardware and software to achieve the process and learning outcomes effectively and efficiently and so that learning objectives can be achieved easily. The target of using learning media is so that students are able to create something new and be able to take advantage of something that already exists to be used with other forms and variations that are useful in their lives. Thus students easily understand and understand the subject matter delivered by lecturers to students.

2.2 Mobile Learning

a. Basic concepts

Mobile learning (m-learning) is learning that utilizes technology and mobile devices. In this case, these devices can be PDAs, cell phones, laptops, tablet PCs, and so on. With mobile learning, users can access learning content anywhere and anytime, without having to visit a certain place at a certain time. So, users can access educational content regardless of time and space. Imply that e-Learning is a distance learning concept using telecommunication and information technology.

b.Mobile learning

Mobile Learning is a learning model that is carried out between places or environments using technology that is easy to carry when the learner is in a mobile / cellphone condition. With its various potentials and advantages, it is hoped that Mobile Learning will become an alternative learning source that can increase the efficiency and effectiveness of the process and learning outcomes of students in Indonesia in the future (Semiawan, Conny R, 2023).

c.Functions and Benefits of Mobile Learning.

There are three functions of Mobile Learning in learning activities in the classroom (classroom instruction), namely as a supplement (optional), complementary (complement), or substitute (substitution). There are three alternative models of learning activities that students can choose, namely:

- Completely face to face (conventional).
- Partly face-to-face and partly through the internet.
- Completely via the internet.

d.Mobile devices.

(Rosa and Salahudin, 2021) said that a mobile device is a device that is easily carried everywhere, is light and can easily be carried in our hands. Mobile devices come in many varieties in terms of size, design and layout, but they share very different characteristics from desktop systems.

e.Mobile Device Application Platform.

Some are familiar to us such as IOS, Android OS, Black Berry OS and so on.

Figure 3. Types of mobile.

f. M-Learning.

The term mobile learning (m-Learning) refers to the use of handheld and mobile information technology (IT) devices, such as PDAs, mobile phones, laptops and tablet PCs, in teaching and learning. M-Learning is part of electronic learning (e-Learning) so, by itself, is also part of distance learning (d-Learning).

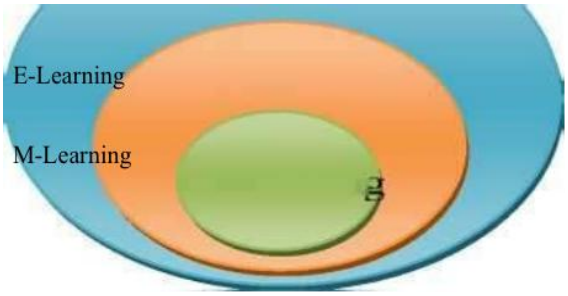

Figure 4. Schematic of m-learning.

M-Learning is unique learning because learners can access learning materials, directions and applications related to

learning anytime and anywhere. This will increase attention to learning material, make learning pervasive, and can encourage learner motivation to lifelong learning. In addition, compared to conventional learning, M-Learning allows more opportunities for ad hoc collaboration and informal interaction among learners. Some of the advantages of M-Learning compared to other learning are:

1.Can be used anywhere at any time,
2.Most mobile devices are relatively cheaper than desktop PC.
3.The device size is smaller and lighter than a desktop PC.
4.Is estimated to be able to include more learners because M-Learning utilizes technology commonly used in everyday life.

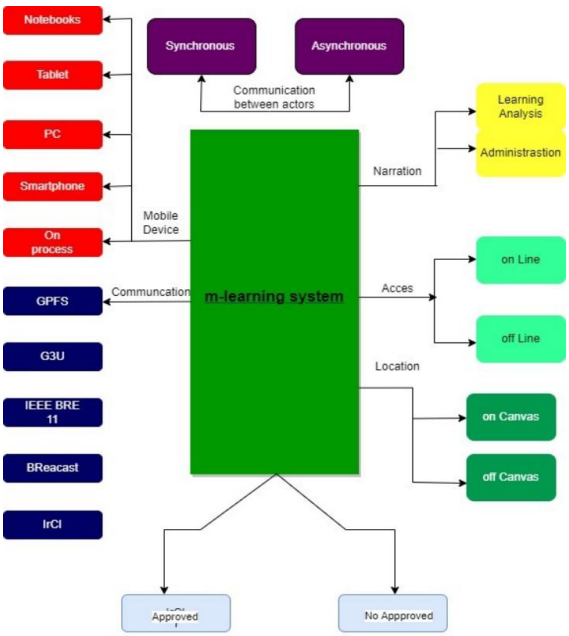

Figure 5. Below regarding the m-learning classification

III. OBJECTIVES AND BENEFITS

3.1. Purpose

a.To develop mobile learning applications on mobile phones using Java technology.
b.To implement mobile learning applications on cellphones so that they can run on different types and types of cellphones.
c.To develop an update system for web-based mobile learning applications.

3.2 Benefits

a.For students, the mobile learning-based learning model is expected to help students manage their learning independently. So that it can increase student motivation and interest in learning, with the ultimate goal of increasing student achievement.
b.For the teaching staff, the results of this study are expected to help lecturers in managing and developing learning designs in an innovative, creative and interactive way.
c.For policy makers, the results of this study offer an alternative to new learning technologies, which can help students and lecturers in teaching and learning activities.

IV. METHODE

4.1.Flow Chart

This type of research is Action Research which is oriented to the application of action with the aim of improving the quality or solving problems in a group of subjects under study and observing the level of success or the consequences of their actions, to then be given further action which is to improve the action or adapt to the conditions. and situations in order to obtain better results.

4.2.Location

This research will be conducted at UPN "Veteran" Yogyakarta, has one (1) undergraduate level Information Systems department (S1), undergraduate level Informatics Engineering Department (S1), economics major, chemistry department and others.

This research case study will be conducted in the Programming Algorithm course in the Informatics Engineering Department.

The reason for choosing programming algorithm courses is that these courses are prerequisite courses for new students for all majors in UPN "Veteran" Yogyakarta. Furthermore, the reason for choosing the informatics engineering department was that the ratio of the number of students from all departments at UPN "Veteran" Yogyakarta was in the Department of Informatics.

4.3 Types of Methods

The method used in this research is the research and development method, where the development design chosen is to use the Dick and Carey Model (quoted from Santyasa, 2022). Because the main output to be produced in research is in the form of software, the media development process will be equipped with a special software development method using the Software Development Life Cycle (SDLC) method with the Waterfall-based Model (Moore, R., Lopes, J., 2023).

Meanwhile, the specific targets of this study are (1) To develop a learning design model based on Mobile Learning using a Learning Management System /LMS (Abdul K, 2024) ; (2). Developing a mobile server which is a web-based mobile service application.

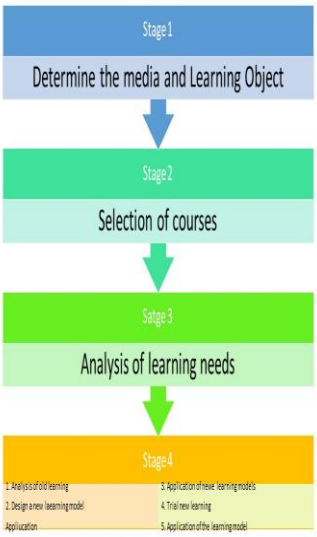

Figure 6. The stages of developing the design of the learning innovation model.

Because the media developed in this study will produce a final product in the form of a simulation program software, the third stage will be followed by the fourth stage of the development design adapted to the software development method, namely the Software Development Life Cycle (SDLC) method with the Waterfall Model.

The SDLC methodology is a methodology for analyzing and designing a structured system.

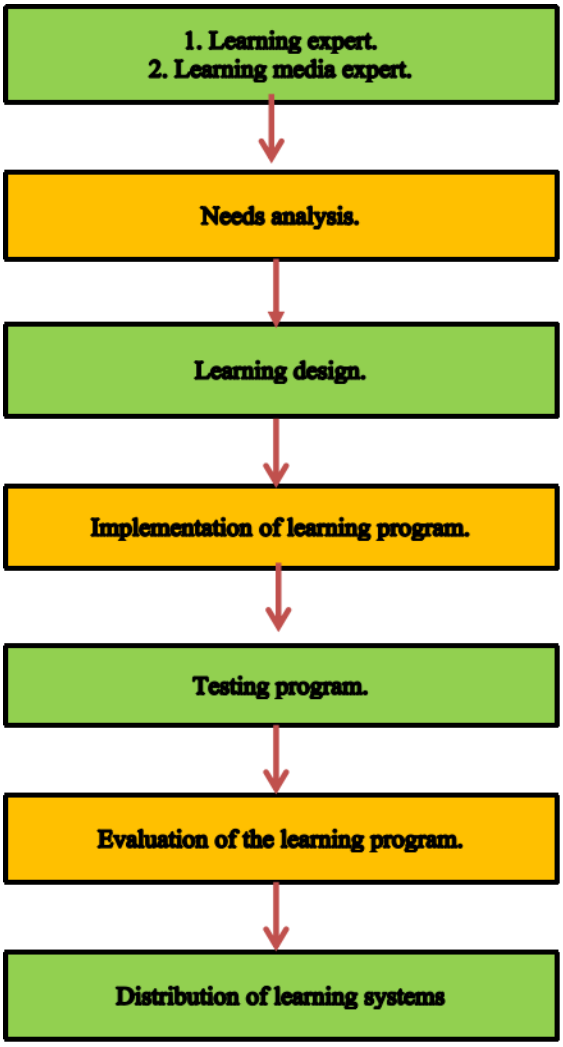

Figure7. Design a learning innovation model

The fifth stage is the last stage of the design of learning media development, where at this stage software testing as a learning medium is carried out which includes: media expert testing, content expert testing, small group testing and field trials.

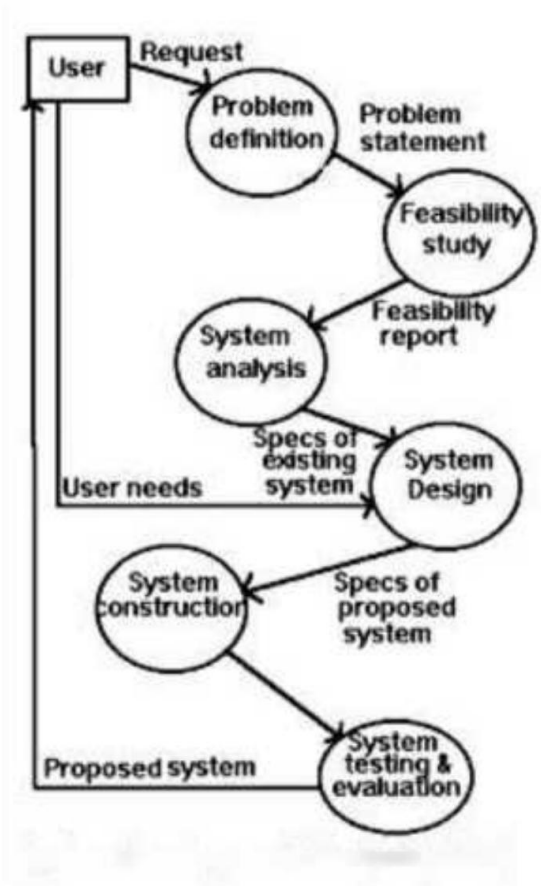

Figure 8. Development of learning innovation model design.

4.4 Variables

The independent variable in this study is the mobile learning media developed in this study. While the dependent variable measured in the study is the student's response to the development and use of Mobile Learning as a learning interaction aid.

4.5.Data Collection Techniques

The data collection of this research was carried out by: Observation, Interview, Questionnaire Documentation (questionnaire) to measure the likelihood of student learning outcomes.

4.6.Data Analysis and Interpretation

Quantitative data to measure the success of learning media using cellphones and laptops (mobile learning) were analyzed using descriptive statistical

techniques. Meanwhile, qualitative data from observations and interviews were analyzed using categories and coding techniques.

V. RESEARCH OUTCOMES

The output of the first phase of research is in the form of application tools / learning media application software on mobile phones which are then called mobile learning applications, which can operate on various types of cellphones. Then the second stage output is a web-based mobile learning application known as the mobile web which can be updated via the website. The mobile learning application design model can be described [6] as follows:

a. First stage design model.

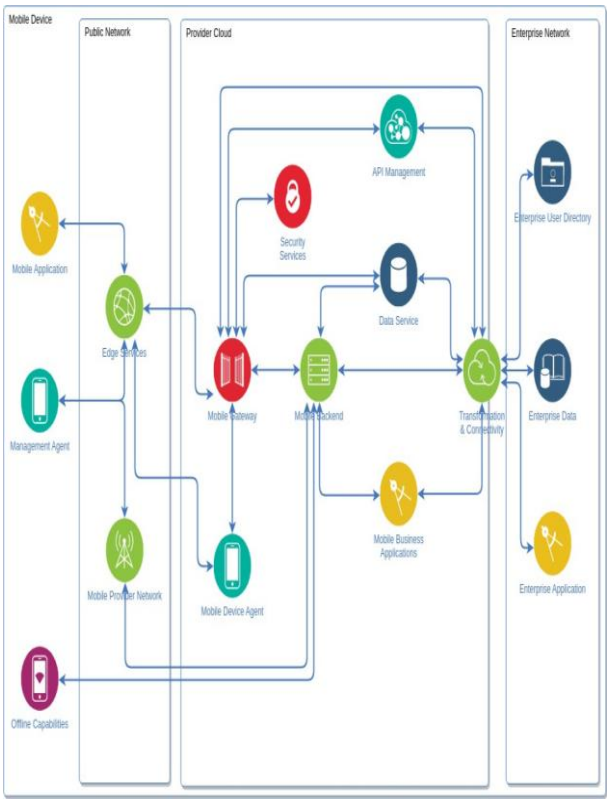

Figure 9. Design of the m-learning model.

In this first stage, it focuses on the use of mobile devices such as cellphones, smartphones, PDAs, and so on.

a. Second stage design model

The mobile web design model is described as follows:

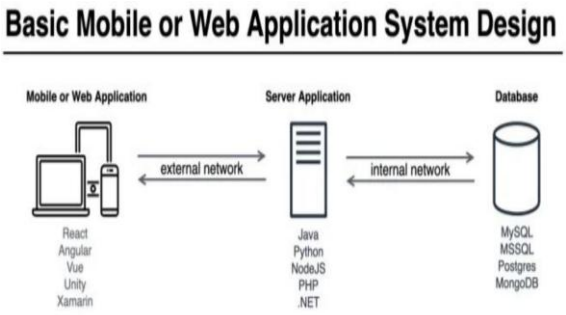

Figure 10. Mobile web application design model.

b. Development of a mobile learning system

The development of the mobile system is directed at two sides, namely as follows:

•Developing a mobile server which is a web-based mobile service application on the server side.

•Developing a mobile client, which is a mobile application on the client side that can access mobile server services.

c. Outcome indicators

The indicators in developing this application are the successful development of a mobile learning application on a cellphone that can be operated on various types of cellphones, building a web server information system site for updating the m-learning application.

d. Research Facilities

The research facilities required are as follows:

a). Hardware

1.1 Laptop specifications for editing purposes, with detailed specifications:

Intel centrino Core 2 Duo processor (2.1 Ghz, 800 Mhz FSB),

•4 DDR memory.

•320 GB hard drive.

•512 MB video graphics

2.1 Canon MP 258 Printer

b). Software

The software specifications that will be used in this study are as follows:

Windows XP as the operating system, Java Environment, Wireless Toolkit, Graphics Programming with Java (Taufiq A, 2025)
c). Services
Services are services that are used are 1 Gbps internet services.

VI. RESULTS ACHIEVED.

6.1 Overview Of Learning Models At Upn "Veteran" Yogyakarta

Based on the results of observations, the learning activities used at UPN "Veteran" Yogyakarta for all majors and levels are generally still lecture or conventional. Especially for some general basic courses. The vision and mission of the informatics engineering department to produce computer graduates who master software engineering, computer network and system design, computer graphics applications, web design, computer aided design, information systems, database systems, multimedia and programming language skills.

6.2Deep Learning Technology Based on Mobile Learning.

The method used in this research is a research and development method, with a Dick and Carey model development design, with the main output in the form of software. So that in the development process using mobile learning-based learning media, the method used is equipped with a special software development method, namely the Software Development Life Cycle (SDLC) method with the Waterfall-based Model. The design of the research method development model is described as follows:

1.Determination of courses
2.Needs analysis is Functional Needs and Non- Functional Needs :
1)Operational Can be accessed by clients from various browsers that support javascript. Can be accessed on Android & Blackberry smartphones.
2)Security There is the use of a password in the login form to distinguish the type of user, including their respective access rights.
3)The draft development process :

a.Analysis of Learning Conditions.
Based on the results of observations of the algorithm & programming course, the data obtained were analyzed using qualitative descriptive. The results of the descriptive qualitative analysis show the characteristics of the department informatics engineering learning model.
b.Development Steps :
(1)The results of descriptive qualitative analysis for development prospects and opportunities.
(2)The results of descriptive qualitative analysis for the development of learning technology
c.Measuring Steps of Learning Outcomes.

The assessment indicators that apply are in accordance with the applicable academic rules at UPN “Veteran” Yogyakarta, the range of values applies.

d. Mobile learning development design.

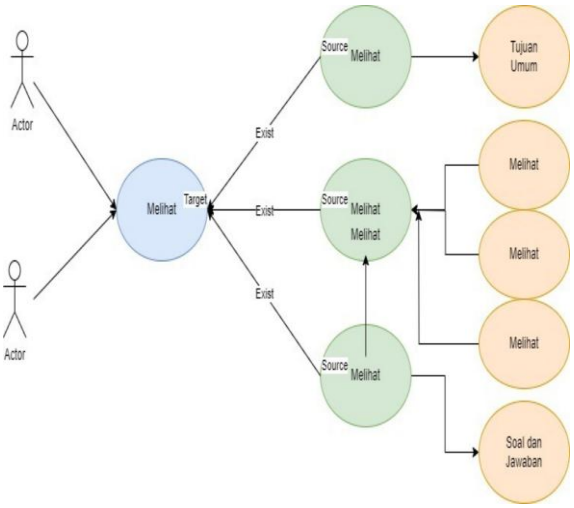

Figure 11. Use case diagram.

e. Activity diagrams for Lecturers and Students.

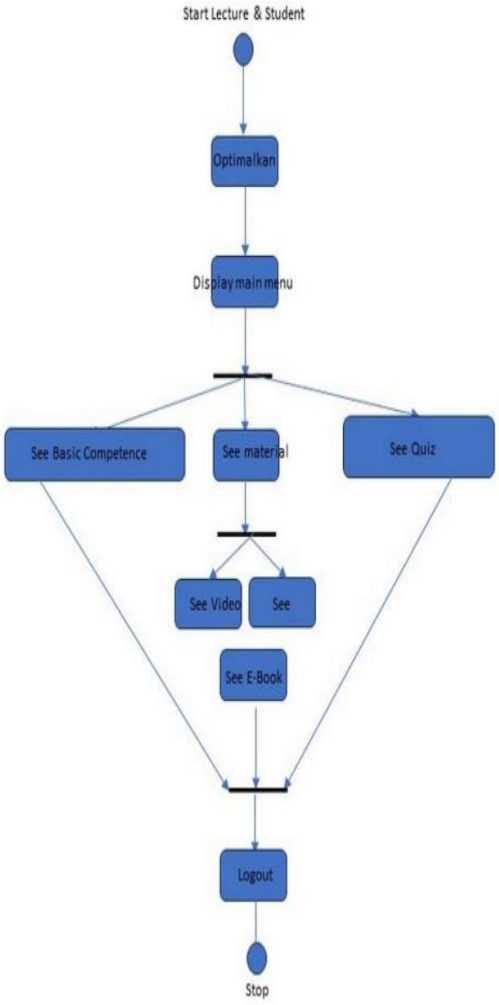

Figure 12. Activity diagrams of lecturers and students.

Activity diagrams for lecturers and students are in the form of flow diagrams that show the flow of activities between lecturers and students in the m- learning application system.

f. Encoding (Coding).

At this stage the results of data analysis are implemented into program codes in accordance with the language used in this study. In making this mobile Learning program using the Java NEATBEANS 7.2 language.

VII. IMPLEMENTATION

After arriving at the stage of making mobile learning software as described in the previous chapter, the target according to the next research methodology will focus on the following activities:
a. Testing and Implementation of Mobile Learning Applications
b. Mobile learning application testing
c. Analysis of Learning Technology Results Based on Mobile learning.

VIII. CONCLUSIONS

8.1Conclusion.

1.There is no use of the Mobile Application on UPN "Veteran" Yogyakarta. Most of the learning residents still use hadphone as a communication tool.
2.Mobile applications can be made using the NetBeans application with J2ME.
3.Mobile applications that have been made will be able to run on several different operating systems on mobile devices such as: Symbian OS, Windows mobile OS, Blackberry and Android OS by adjusting the application to the mobile OS before packaging.

8.2 Suggestions.

As an implication of the results of this study, based on the research results and conclusions that have been presented, the following suggestions are made, namely:
1.It is recommended that the teaching staff maximize the use of several teaching aids in improving the quality of the teaching and learning process such as the use of the Mobile Learning application.
2.It is recommended that the managers of educational institutions always consider the results of this research in determining policies regarding the use of mobile devices in universities.
3.It is recommended for further researchers to continue, develop and expand the scope of this research so that the results of the

research obtained are used as consideration and reference for teaching staff to use the Mobile Learning application as a learning aid.

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