

Mobile Learning Application With NativeScript Framework For Learning Material

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Abstrak

Universitas merupakan tempat untuk proses belajar mengajar dan mengembangkan kreatifitas sesuai di dalam setiap program studi. Sehingga sangat diperlukan sebuah aplikasi yang dapat mengakomodir hal tersebut. Aplikasi tersebut haruslah tidak terbatas pada waktu dan tempat yang dapat digunakan dimana saja untuk menunjang kreatifitas antara dosen dan mahasiswa. Mobile Learning merupakan salah satu media yang menjembatani hal tersebut, dengan Mobile Learning maka proses belajar mengajar khususnya informasi mengenai bahan ajar dapat dengan mudah di dapat tanpa terbatas waktu dan tempat, sehingga komunikasi antara dosen dan mahasiswa dapat menjadi lebih rutin, efisien, dan membuat proses belajar mengajar menjadi lebih fokus dan terarah sesuai dengan Rencana Pembelajaran Semester (RPS) yang telah dibuat sebelumnya. Aplikasi mobile ini menggunakan javascript dan css serta framework nativescript yang dapat memudahkan pengembangan selanjutnya, penggunaan framework nativescript sudah membagi setiap modul sesuai dengan fungsinya masing-masing sehingga aplikasi Mobile Learning ini diharapkan dapat menjadi langkah awal dalam pengembangan aplikasi Mobile Learning berikutnya.

Kata kunci : Mobile, NativeScript, Belajar, Aplikasi

Abstract

University is a place for the learning process and develops creativity in accordance with its own major program. There for an application is needed to fulfill those requirements. The application is not limited to the time and place as the result they could be used anywhere and anytime to support creativity between student and teacher. Mobile learning is one of the most suitable applications to support learning process and creativity development. Through Mobile Learning the teaching and learning process especially to acquire the teaching material can be easily access without limited time and place so communication between student and teacher can be more routine, efficient and can create learning process more focus and have an purposes balance with the lesson plan . Mobile learning application uses java script, css and native script framework that will make the next development for this application can be more easier, because nativescript framework already separate each module in accordance with its function. Finally, it facilitates the development of mobile application, so it is expected to be the first step in the mobile software future development.

Keywords : Mobile, NativeScript, Learning, Application

1. INTRODUCTION

Technological developments in the Industrial 4.0 era require everyone to continue to be active and creative in the field of computerized technology, as conveyed by Alasdair Gilchrist (2016: 198) [1] Industry 4.0 builds a device that provides benefits both in operational, communication, and information technology to improve the level of automation and digital products, both in manufacturing processes and industrial processes and not only that includes higher education or in universities, which is a place to share knowledge between lecturers as instructors and students. In the world of robot industry began to facilitate human workmanship that can be controlled by a smart cellular phone or known as a smartphone which at this time has become a tool to facilitate both to communicate, as well

as a means to get and share information, creativity and knowledge quickly , which of course has a lot of impact on every line of life.

According to Laudon (2014: 199) [2] Nearly one million people worldwide have smartphones and most of each smartphone user accesses the internet with their mobile devices and more than 150 million people around the world read newspapers online, and millions more read news through existing sites, Laudon also added that businesses are currently conveying their information using the internet and trying to maximize the use of cellular phones, to spread information about the products and services offered,

Pengguna Ponsel dan Penetrasi Media Sosial (Jan 2017)

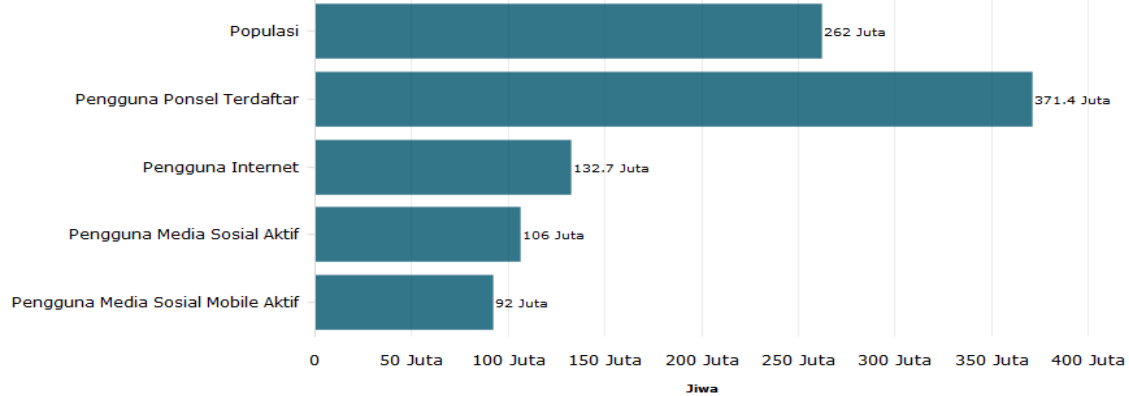


Figure 1. Mobile User Statistics and Social Media Management

This can show that smartphone users in Indonesia are very large, and most are quite active in their use, so using a smartphone as a medium for disseminating information or a medium for sharing knowledge is a fairly effective and efficient way. [3] The design of a learning system is a comprehensive process, by showing efforts to increase student learning motivation in the classroom through teaching and learning based on the development of creativity and innovation. And mobile learning is the answer to becoming a bridge between the learning process and students and lecturers. According to Hodjat Hamidi (2017) [4], "Mobile learning is a critical educational component of higher education. Mobile learning allows students to learn, collaborate and share their ideas with the help of the internet and technology development. " must study at any time, without the need for facilities such as desks and classrooms, can accelerate the sharing of knowledge for any information that can and immediately can also be disseminated, so as to increase student awareness of the material to be studied. The importance of Mobile Learning in the education process was also conveyed by Mostafa Al-Emran (2016: 93) [5] "Mobile learning (M-learning) has become an important educational technology component in higher education. M-learning makes it possible for students to learn, collaborate, and share ideas with each other with the help of internet and technology development. ", It was not only an opinion but examined 383 students and 54 faculty members from 5 universities, so it can be concluded that Mobile Learning provides a positive attitude towards students who use it and is needed to help students including teaching staff as a media and a bridge in the teaching and learning process at the university.

2. RESEARCH METHOD

To find out the system requirements of the mobile application for learning materials needed by this university, several stages of work were carried out. Starting from the preparation by giving scope to the application system that will be built so that the process is more directed and increasingly focused to solve the problem needs of the application, followed by analyzing the needs of the system to be built, each features to be used and displayed. The design of the application system in the form of a login view, user pages, list of courses, display of teaching materials, class display, which is made based on a study or analysis of needs. The design method is done by analyzing the things done by lecturers and students by dividing them according to their respective assignments and functions into

use case diagrams and data flow diagrams to design the whole process that occurs in the use of Mobile Application.

Traditional System Development Life Cycle (SDLC) [6] which is the most widely used to date, SDLC refers to 3 things namely requirements analysis, data modeling, and normalization, where in the first phase of requirements analysis, a programmer and a team conduct interviews to obtain overall picture of the needs of the system to be made. In the data modeling phase, paying attention to the needs and forms of the data, looking for a model that fits the data and design it according to the needs, after the database has been modeled and designed, the next phase is normalization carried out to eliminate or reduce or make as much efficient data as possible that is not needed, after the three phases will be carried out Development, Testing, and Production in which there are Backup, Recovery and Archiving. In the SDLC phase, the first phase was an analysis of the needs of one of the universities in Tangerang, while for the second phase, due to the limited available database, the analysis results agreed to retrieve data from Google Drive University, to facilitate the maintenance of the database exist because it is on the google server, each of which has been packaged in a Portable Document File (PDF) file, whereas in the last phase for normalization, it only relies on the features of Google Drive that if there are those that have the same naming of each file that exists , the right is not possible, and the data about the learning material is placed in a folder in accordance with the name of the course listed. The making of the program is based on the results of the analysis, which in the end the results of the making of the program are implemented to students who are following the learning process in class. Overall, this system life cycle for the manufacturing process can be described as shown below:

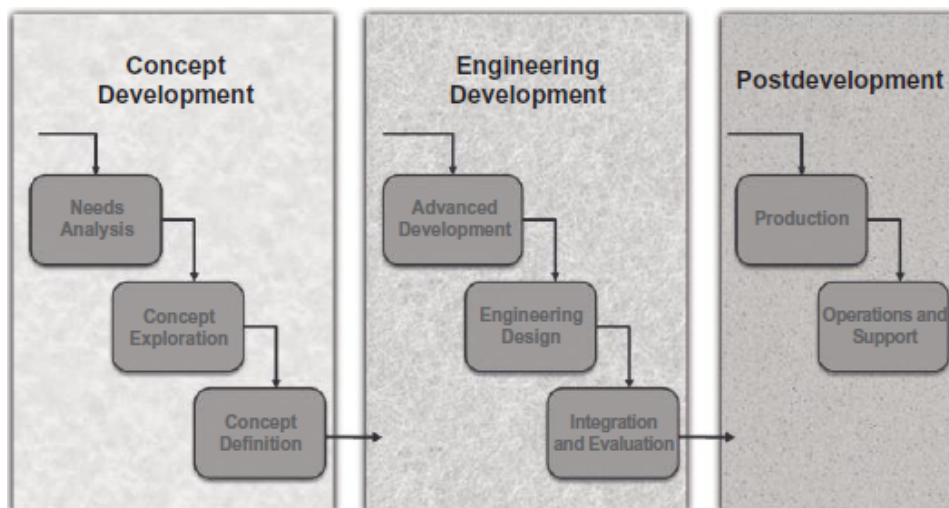


Figure 2. System Life Cycle Model


The phase in the picture starts from [7] "(1) The concept development stage, which is the initial stage of the formulation and definition of a system concept perceived to best satisfy a valid need;" the system analysis that will be made for this mobile application is very much needed for teaching and learning needs "(2) the engineering development stage, which includes the translation of the system concept into a validated physical system design meeting the operational, cost, and schedule requirements;" for the process of making this application all things are taken into account in terms of costs and the need to make the system, including using the connection to Google Drive as a database for files that will be used for learning materials and (3) the postdevelopment stage, which includes the production, deployment , operation, and support of the system throughout its useful life. " In this phase after the application has been made can not be done because this application has not yet reached the full production stage, it needs to be studied more deeply for further research, only to the testing and evaluation stage only

2.1 Scope and Analysis

The scope of the mobile application for this learning material, is determined from each study program in the tertiary institution, but for the time being the scope is limited to the Information Systems Study Program, for learning material that is in the information system study program. The results of the analysis in one of the tertiary institutions, that the information system study program that really needs this application, is a role model for other study programs, because it shows how the information system in the form of learning material is delivered in digital form and packaged in the form of a mobile application phone that can be used at any time without limitation of time and place, analysis is also carried out by observing the Semester Learning Plan (RPS) that is in the information system study program, one example of the RPS used as material for program analysis is as follows:



RPS - Computer Network



RENCANA PEMBELAJARAN SEMESTER (RPS)
UNIVERSITAS MATANA

MATA KULIAH KODE MATAKULIAH / SKS SEMESTER PRASYARAT STATUS MATAKULIAH	: Jaringan Komputer (Computer Network) : / 3 SKS : Genap 2017/ 2018 : : Wajib
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A. DESKRIPSI MATAKULIAH

This course is intended to develop the following skills and attributes: Knowledge of Computer Network, Client Server, Mobile Network, Wire. Wireless, design network infrastructure, design internet protocol, OS and TCP layer, transmission medium, create an topology, and how to become Chief Technology Officer and professional Network Administrator, Team Work and particularly information literacy.

E. DAFTAR PUSTAKA

- Heriadi, D. (2012). *Packet Tracer - Solusi Cerdas Menguasai Internetworking (Konsep dan Implementasi)*. Jogjakarta: Andi Jogjakarta.
- Mir, N. F. (2006). *Computer and Communication Networks*. Prentice Hall.
- Wardhana, L. (2010). *Teknologi Wireless Communication & Wireless Broadband*. Jogjakarta: Andi Jogjakarta.
- Tanenbaum Andrew. *Computer Network 4 Ed.*, Prentice Hall, 2002

F. RENCANA KEGIATAN PEMBELAJARAN MINGGUAN

Minggu	Capaian Pembelajaran	Pokok Bahasan	Sub Pokok Bahasan	Metode & Media	Waktu	Ref.
1	1. To introduce students about computer network with function and purposes. 2. The students know about computer network model.	Computer Network Introduction	1. Computer Network Definition 2. Kind of computer network such as (LAN, WAN, MAN, wireless, etc)	Tatap muka	3x50 menit	Ch. 1
2	1. To introduce students about reference model of computer network.	Network Structure	1. Network Structure 2. Network Type	Tatap muka	3x50 menit	Ch. 2

Figure 3. Design of Semester Learning

2.2. Diagram Design

By making use cases diagram the relationship and communication between actors and the mobile application system can be determined, which provides an overview in accordance with the activities of the actors using this mobile application, according to Mudasir Manzoor Kirmani [8] "The basic building block in any object oriented design is Use Case diagram which are prepared in the early stages of design after clearly understanding the requirements. Use Case Diagrams are considered to be useful for approximating estimates for software development projects. " Therefore the use case is very important to use, as seen in the picture below

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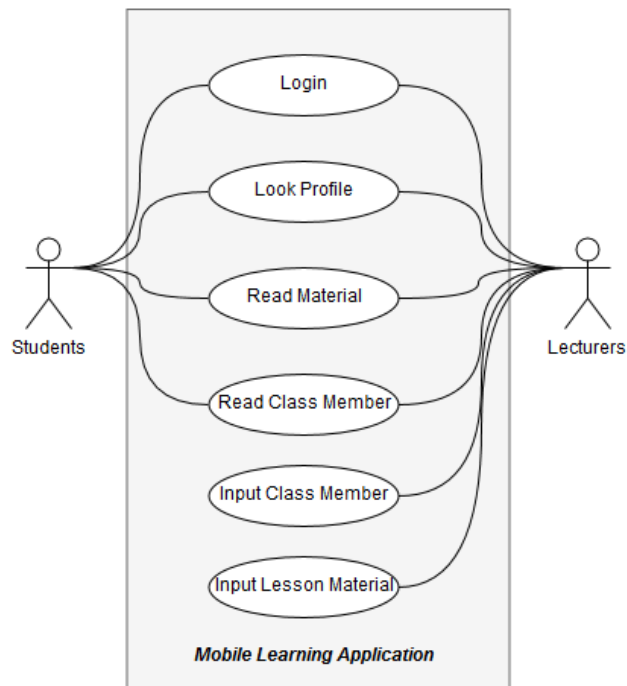


Figure 4. Use Case Diagrams

From the picture it can be seen that students cannot input the data contained in it, students can only log in with the username and password provided by the administrator, in this application lecturers who act as administrators as well, have not been differentiated between lecturers and administrators of this mobile application. In the use case, students can only see their respective profiles and read the teaching material provided, including seeing colleagues who are in the same class as the student, while lecturers can input the names of people who are members of the group. Classes taught include input link material taught, which has been placed in Google Drive.

When users or users in this case students carry out all processes and activities in the use of the mobile application, and the interaction between lecturers and administrators in this case is the lecturer, it can be seen in the activity diagram as shown in the picture below

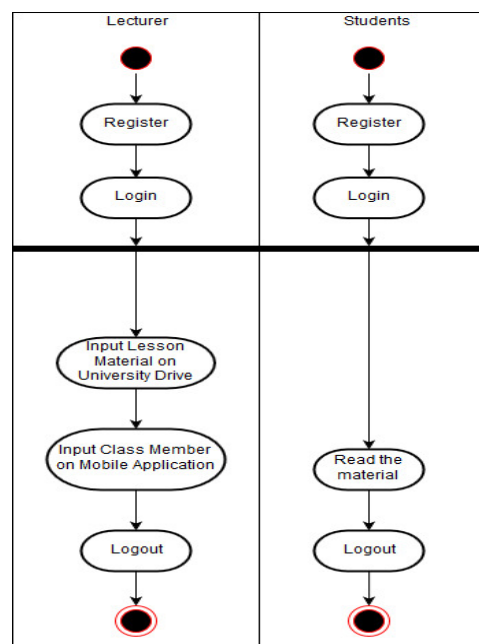


Figure 11. Activity Diagram

In the activity diagram, it is seen that both students and lecturers must register first on the login page, then enter the application, for lecturers to enter the teaching material to be displayed and enter the names of students who took the course, whereas for students can only see and read material that has been entered into the system, if you want to read it offline then can download the .pdf file by first logging into each e-mail.

2.3 Implementation

The design process is implemented by first determining the programming language used, and the result is making this application using javascript and cascading style sheets (CSS) which uses the nativescript framework as its main basis. According to Nathanael J. Anderson [9] "NativeScript is totally unique in the cross-platform mobile device market, and how it is radically revolutionary for mobile JavaScript development.", So with the nativescript framework it will make it easier for further development, there are several reasons for choosing nativescript as a framework according to Kang Cahya [10], namely:

- Beautiful and easily accessible UI (User Interface).
- Any code that we type in JavaScript, Angular or TypeScript will be easily generated in Native Java language (if for Android).
- Lots of plugins that can be used, many are available at npm, for the official ones at <https://market.nativescript.org/>.
- Easy to learn, for those who are familiar with JavaScript, there is no need to learn a new language, just use JavaScript. But if you want to try others, you can also use Angular or TypeScript.
- Supports two of the most popular mobile OSs, IOS and Android.
- NativeScript is licensed "Apache 2 License", that means unlimited free application, may be used by anyone.

3. RESULTS AND DISCUSSION

From the design or software design the results are implemented for the maker of application programs. [11] Software design is implemented and each unit is tested before it is actually performed on students, all things are examined for accuracy before making improvements where the mobile learning application program is made with nativescript with divided into several pages, namely the login page, teaching material page and class page

3.1 Login page

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Playground 14.05 86%



Mobile Learning

[Log In](#)[Forgot your password?](#)[Don't have an account? Sign up](#)

Figure 5. Login page

On the login page there is a textbox to input the user or user name that has been previously registered, on this page also a forgot password menu is available to make a password change request with confirmation on the e-mail address that has been registered and verified before, on this login page also provided Sign up menu for registering manually by filling in valid e-mail addresses and filling in a password to log into the mobile application, for typing the password must be done 1 time to prevent errors in typing the password that will be used to enter the system, such as seen in the picture below

Playground 14.08 85%



Mobile Learning

[Sign Up](#)[Back to Login](#)

Figure 6. Sign Up Menu

3.2 Home page

If you have successfully logged in as registered previously, the next page will appear, namely the home page, which will display the profile of each user or user, displayed only menus and e-mail addresses, as shown in the picture below :

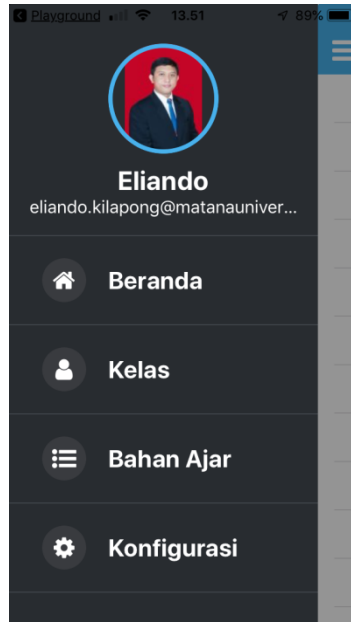


Figure 7. Home page

On the home page you can see the user's profile, to enter a photo, all you have to do is click on the photo and then enter the image that is inside each user's mobile phone, on this homepage you can see all the available features.

3.3 Class Page

If the home page is clicked on the class it will enter the class page, as shown in the image below

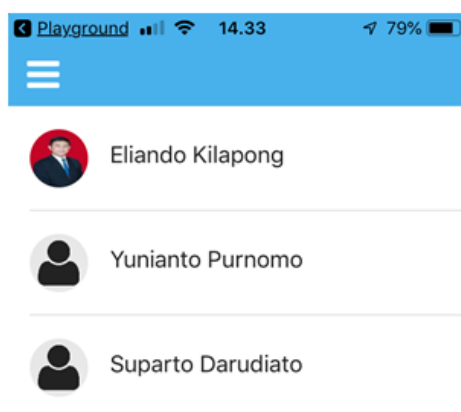


Figure 8. Class Page

On the class menu there is a class page that will display members from each class the course is taking, as seen in the picture, for classes with computer network courses there are 3 registered members namely Eliando Kilapong, Yunianto Purnomo and Suparto Darudianto, so students know the

names of everyone who takes the same course as the student, making it easier for students to get to know each other and communicate after knowing the names and photos of each student, but for photos if the student does not include a photo then it will look like in the picture, only icons without photos are displayed.

3.4. Teaching Materials Page

On this teaching material page will be displayed courses that are being taken and if clicked in accordance with the courses taken it will be connected to Google Drive to display teaching materials in accordance with what has been clicked, as shown in the picture below

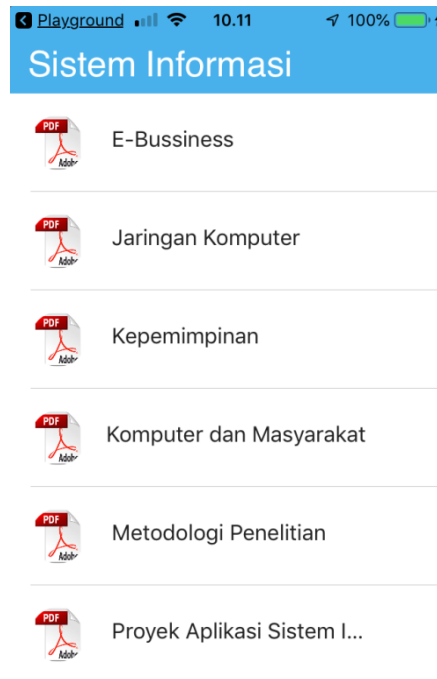


Figure 9. List of Courses

On the course list page you can see the names of the courses in the information system study program, according to the courses taken by students, if the name of the course is clicked, it will open the .pdf teaching material file format, which can be downloaded for learning offline, because [12] an application must be easily aligned with lecture material, syllabus, or RPS (Semester Learning Plan), and the data can be adjusted by lecturers, or students as shown in the picture below

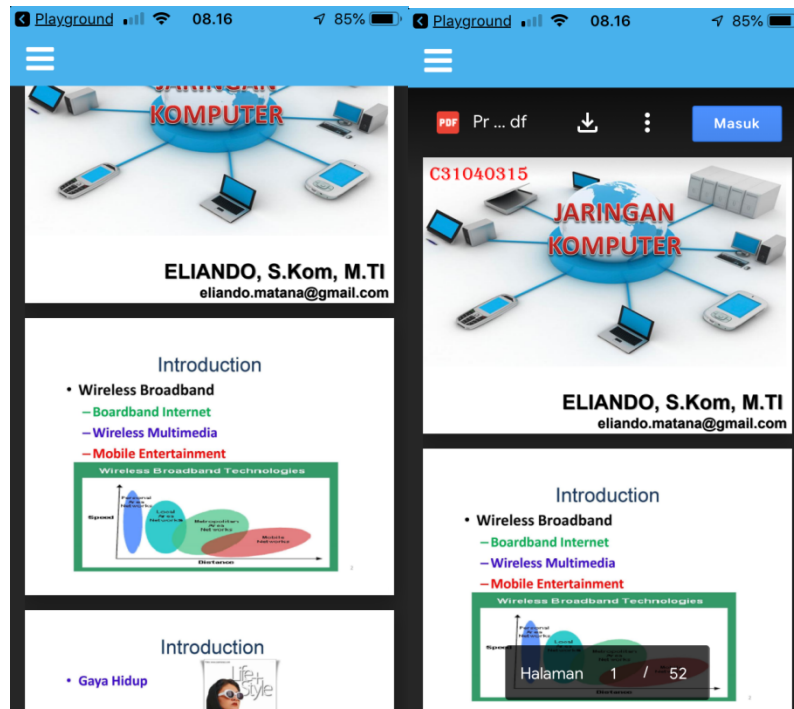


Figure 10. Teaching Material

Pages In the picture of the teaching material page, it can be seen that students can download the .pdf file format but must log into the university e-mail that has been connected via Google, so only students at the university can download the .pdf file format to be studied offline on mobile each phone, the .pdf file has also been protected so that although it has downloaded, students cannot copy and paste the file, but can still share it with their colleagues via e-mail, but cannot copy or change the contents from the teaching material file.

4. CONCLUSION

Applications such as mobile learning are needed by students and lecturers to facilitate teaching and learning process between lecturers and students, so that the material delivered can be read by students at any time without limited time and place, while for lecturers and teaching staff can archive the material to be delivered in google drive so that it can be used both in mobile learning applications and display only through the internet only for percentages in the classroom, because the features of google can still be used for teaching and learning in class, without the need to use additional devices to store data on a laptop or External devices such as USB / flash disk and external disks, with this application lecturers can share teaching materials only by using a cellular phone and students can also read the material for the following meeting with a device that is always carried at all times ie cellular phones.

5. SUGGESTIONS

This mobile learning application still needs to be tested and tested for the sake of attacking this application, so that it is easy to use and convenient to use both by students and lecturers as teachers, because basically this mobile learning application is to help the smooth teaching and learning process that is in College. So that this application is getting closer to the desires of lecturers and students there needs to be testing for a broader scale, if there are larger funds this application can be used on a national scale for testing, so that "online" learning can actually be carried out due to learning mobile phones can replace computers that exist today.

REFERENCES

- [1] Gilchrist, A., 2016, Industry 4.0_The Industrial Internet Of Things, Apress, New York.
- [2] Laudon, C.K., Jane, P.L., 2014, Management Information System, Pearson Education Limited, England.
- [3] Rahardja, U., Saefullah, A., Ram, A., 2008, Desain Sistem Pembelajaran Pada Jurusan Sistem Komputer Konsentrasi CCIT (Creative Communication And Innovative Technology), Creative Communication and Innovative Technology Journal, Vol.1 No.3.
- [4] Hamidi, H., Chavoshi, A., 2017, Analysis of the Essential Factors For The Adoption Of Mobile Learning In Higher Education: A Case Study Of Students Of The University Of Technology, Journal of Telematics and Informatics, Elsevier, vol 35, Issue 4, hal 1053-1070.
- [5] Al-Emran, M., Elsherif, H.M., Shaalan, K., 2016, Investigating Attitudes Towards The Use Of Mobile Learning In Higher Education, Journal of Computers in Human Behavior, Elsevier, vol 56, hal 93-102.
- [6] Langer, A.K., 2016, Guide To Software Development Designing And Managing The Life Cycle, Ed.2, Springer, New York.
- [7] Kossiakoff, A., Sweet, W.M., Seymour, S.J., Biemer, S.M, 2011, Systems Engineering Principles And Practice, Ed.2, John Wiley & Sons, Inc., New Jersey.
- [8] Kirmani, M.M., Wahid, A., 2015, Revised Use Case Point (Re-UCP) Model for Software Effort Estimation, International Journal of Advanced Computer Science and Applications, vol 6, no 3, hal 65-71.
- [9] Anderson, J.N, 2016, Getting Started with NativeScript, Packt Publishing, Birmingham.
- [10] Cahya, K., 2018, Membuat Aplikasi Mobile Native Dengan Javascript By Nativescript, Lokomedia, Yogyakarta.
- [11] Ajinaja, M., 2017, The Design and Implementation of a Computer Based Testing System Using Component-Based Software Engineering, International Journal Of Computer Science And Technology, vol 8, hal 58-65.
- [12] Purnomo, Y., Kurniawan, W.B., 2018, Cogito Smart Journal Aplikasi Reservasi Kamar Hotel Untuk Praktikum Front Office Operations Pendidikan Pariwisata, vol 4 no 2, Desember, hal 283-293