3D Animation Tutorial Rightway Wearing Syar'ie Hijab

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ABSTRACT

Animation is a film that is loved by many children, adults and parents, because animation contains its own uniqueness so that many films are used to meet a general need for communication, both moral messages or a film that is parried from a true story. Learning is an activity of every god creature that is created the most special, that is, human beings who will not cease from second to second since humans are born until humans die, therefore learning is a need for every human being to know things they don't know yet and also to improve oneself. especially for women who have their own demands, especially about covering the genitals, the genitals for women are the whole body, except for the palms and faces, so many women are not concerned with the law and the obligation to cover the genitals, the hijab is very important to cover the genitals, but still many women wear clothes that have a negative impact that will spur sexual harassment. The purpose of making this 3-dimensional hijab syar'ie tutorial video is to make it easier for women to learn how to wear syar'ie without negative impacts, because today many hijabers make modern hijab tutorials and syar'ie forgetting Islamic rules on genitalia just because for the sake of viewers and followers, which will contain comments or have a negative impact on him.

Keywords: 3 dimension,animation, hijab shar'ie, tutorial.

1. Introduction

Learning is an activity of every creature that is created by God the most special, namely humans who will not be stopped every second from the moment humans are born until humans die, therefore learning is a need for every human being to know things they don't know and also to improve oneself. Humans from birth have received demands to learn, learn to know themselves and their environment, for God's creatures, especially women have their own demands, especially covering genitalia, genitalia for women are the whole body, except the palms and faces, so many women not concerned with the law and the obligation to cover the genitals, thousands of reasons they complained that the hijab is said to be very complicated to use, even though the hijab is very important to cover the genitals, but there are still many women using clothes that have a negative impact that will spur sexual harassment.

Throughout this year there are many cases that occur in women, adolescents, and children, there are a number of factors that influence a person to commit sexual crimes, one of which is caused by women's clothing that follows trendy foreign fashion styles so rarely sexual harassment crimes occur for adult women to avoid this act of rape is to wear very open clothing, Islam demands that women cover their genitals to avoid slander and crime.

Islam demands every Muslim Muslim to be better and more direct in life, the demands of life for Muslim women are based on the Qur'an and Hadith, many young Muslim women understand about the law and the obligation to cover the hijab / cover up the genitals, but often they ignore and do not avoid the restrictions that have been established in the religion of Islam, so that it cannot be blamed if there are complaints that we hear that come out from the laity. Like saying: "Wow smart religion, but how come the lid is closed hijab?" Or like this: "the religion is good, ahlaqnya less, he just ignored the rules of hijab?" And the like. Sayings like this should be a motivation so that we can introspect and improve ourselves, especially Muslim women, to avoid spreading their genitals.

2. Literature Review

With a variety of media information media with popular applications one of which, a film that uses 3D holographic animation, the process of delivering information will be easier to recognize and understand compared to just images (not moving), this study utilizes the facilities of Blender software and Camtasia Studio to design and create an animated character that can provide information about the diversity of which one of them is typical of the archipelago. [1]

The world of film is actually rooted in photography, while animation is rooted in the world of images (not moving), namely graphic design illustrations (visual communication design). It can be said that animation is a medium that was born from two conversions or disciplines, namely film and picture. To be able to understand and use animation techniques, these two conversions must be understood and understood. Films are usually used to record a situation or say something. Film is used to fulfill a general need, i.e. communicating an idea, message or reality. Because of

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its unique dimensions and because of its entertainment nature, films have been accepted as one of the most popular audio-visual media and are favored by the public. Because it is also considered as the most effective media [2]. Learning Media for Human Organs, for elementary school children grades 4 - 6, with the help of 3-dimensional animation that clearly has a unique element, so that it can attract the attention of children in learning as well as play, and without reducing boredom by being designed as good as possible [3]. Jilbab is one of the symbols of obedience for a Muslim woman towards the shari'ah of the Islamic religion and her love is also obedient to the creator (Allah). Hijab is not because you follow the trend or want to get praise, even if you want to get a good match. Hijab in Islam is interpreted as clothing that covers the entire body from head to toe, which is veiled but must still be dressed that covers her nakedness. The obligation of Muslim women to wear the hijab is shown in the Qur'an, which means: O Prophet say to your wives, daughters, and wives of believers, they should extend the veil throughout their bodies. That is so that they are easier to recognize, therefore they are not disturbed. And Allah is Forgiving, Most Merciful. (Surat al-Ahzab: 59) This is clarified again in Surat An-Nur: 31 viz. And let them cover the veil on his chest based on Surat An-Nur: 31 [4].

In Islamic religious rules, the veil is an obligation for every Muslim woman to cover her genitals. Jilbab can be used as a veil to cover the genitalia for Muslim women. In Islam, the veil is an obligation for a Muslim woman to cover genitalia. Hijab itself in the development of an era that has become a fashion trend, the hijab is often used at certain moments, when competing in events, weddings, recitals, etc. Hijab is used as an identity for Muslim women themselves and has been explained in the Holy Qur'an in the letter (Al-Ahzab: 59) [5]. The phenomenon for the use of hijab today is very shifting, often the hijab is not used to cover the genitalia of Muslim women according to the rules that have been set by Islam, but now it has become a fashion for women themselves, whereas the veil functions to maintain the honor of Muslim women, in terms of several aspects , the use of the hijab / hijab is an obligation for Muslim women, regardless of age or position, this obligation has been explained by religion and includes the rules of a woman wearing the hijab, not for style or want to get praise but has become a separate obligation for women [6]. Clothing has its own placement position on the human body, both in the form of maupin hijab clothes which identify Islam, but now the phenomenon of wearing the veil (hijab bohay) is a trend among Muslim women today, compared to the use of the hijab syar, ie in accordance with religious rules as a symbol of obedience. against Islam [7]. Hijab is not only used for adult women, but also used by teenage women, who always follow the trend and have become a lifestyle for women themselves, the slang phenomenon that has been selling in the market to meet the needs of women without prioritizing Islamic Sharia. Therefore several magazines competed to display the more fashionable hijab models [8]. This research is intended to describe the rules of hijab or cover the genitalia for women, because in the Qur'an itself it has been explained that every woman who has baligh cannot show her body bigian except her face and palms, other than that as Muslim symbols and also as a more polite behavior in dressing [9].

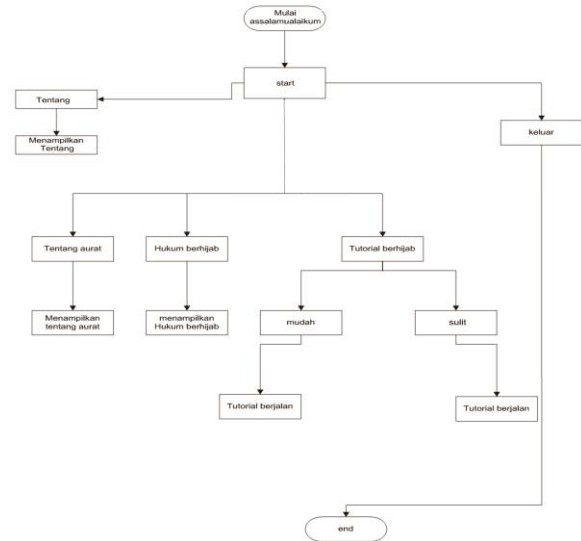## 3. Methods

This research methods flown like Figure 1.

Figure 1. Research Methods Flow

4. Implementation and Discussion

4.1. 3-dimensional set of loose hijab

Figure 2. 3 dimensional assets of loose hijab

4.2. 3-Dimensional Asset Tight Clothing

Figure 3. 3-dimensional assets of tight clothing

4.3. Open the Blender Application

Figure 4. How to open a blender application

A way how to make a 3D animation, then first open the blender application, by clicking on the blender icon.

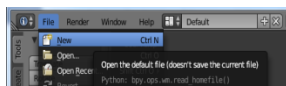### 4.4. Creating a New Page in Blender

Figure 5. How to Create a New File

In the picture above is an initial step to create a new file (new file) in the blender, click then new file.

4.5. Create a New Object in Blender

A way how to make 3d animation, click file, new file, then automatically there will be a cube shaped object shown on figure 6.
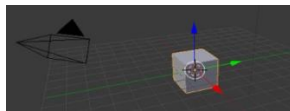

Figure 6. cube object

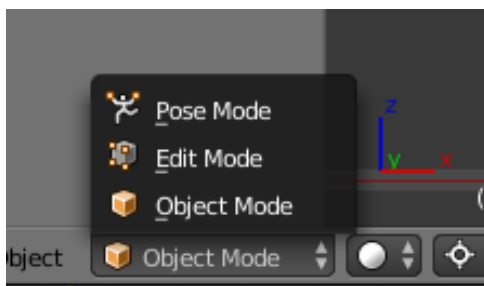### 4.6. Edit Cube Shape

Figure 7. cube object

A way how to edit the cube object that will be edited to become a human character.

4.7. Open the Unity Application

First strep to open the unity application on the computer shown on figure 8.

Figure 8. Opening Unity

4.8. Setting the Unity Application on Android

Click File-Build Settings, select Android, then click BUID, here the Android settings have several choices of Android versions, for this media itself uses the Jellybean Android version shown on Figure 9.
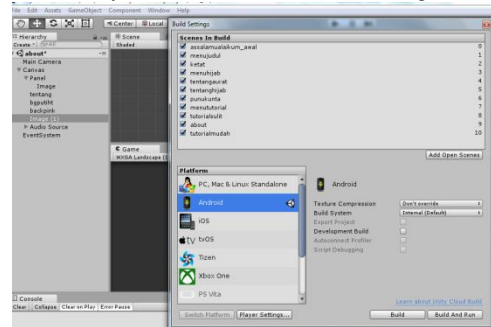

Figure 9. Open in Android

4.9. Give a canvas

Give the canvas on the unity view, for the background frame, first click on the main camera located on the left side of the program-UI-canvas.
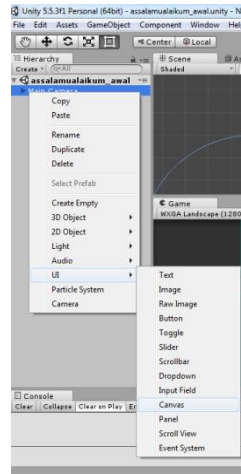

Figure 10. Giving Canvas

5. Conclusion

From the selection results of the Decision Support System for Election Candidates for KPU Members Using the FAHP Method are as follows:

1. This system is able to produce 10 best prospective members drawn from administrative data of each candidate.

2. The results of research and trials that have been conducted produce an accuracy rate of 40%.

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Employee Performance Assessment Design Based on Spencer Competency and Wage System in "Sumber Pocong" Drinking Water Company

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A B S T R A C T

Bangkalan Perusahaan Daerah Air Minum (PDAM) there are 2 types of employees. Among them are permanent employees and contract employees, employee performance appraisal is still done by using the DP3 system (Daftar Pelaksanaan Penilaian Pekerjaan). While on contract employees there has not been a measured system so that the assessment is done in accordance with the work that has been done. Assessment of contract employees is done by measuring using spencer competence. Selected some criteria that will be used are the spirit of achievement, Proactive, Organizational Awareness, Group Cooperation, Conceptual Thinking, Technical Skills / Professional, Flexible. Used AHP to perform performance appraisal, then do scoring with BARS and calculated wages earned on each employee. The weight value obtained by each criterion is the spirit of achievement has a weight (0.358), proactive criteria have weight (0.182), organizational awareness criteria (0.139) , Criteria for group cooperation (0.113), conceptual thinking criteria (0.085), technical / professional expert criteria have weight (0.057), flexibility criteria have weight (0,038), criteria of commitment to organization has weight (0.027) Keywords: Performance Assessment, Spencer Competence, Analytical Hierarchy Process, BARS, Wage Calculation

1. INTRODUCTION

In the Bangkalan Regional Water Company (PDAM) there are 2 types of employees. Among them are permanent employees and contract employees, the performance appraisal of permanent employees is carried out using the DP3 system (List of Work Implementation Assessments). Whereas the contract employees do not yet have a measurable system so that the assessment is carried out in accordance with the work done. Weaknesses in the DP3 system are assessments oriented to the past by providing ratings for subordinates from superiors, while in the future the appraisal of superiors must also involve subordinates. Contract employee assessment can be done by measuring using the competencies that each employee has. Competence according to Spencer and M. Spencer (1993) is part of and forever exists in one's personality and can predict behavior and performance widely in all situations and job tasks. The competency factors alone according to Spencer there are 20 factors. Some of the competencies are cooperation, leadership, achievement, commitment to the organization, serving and being proactive. With the right performance appraisal, employee productivity can be assessed and valued according to his business. So if employees are given incentives, the incentives received will be in accordance with their performance. Performance is the result of work that has a strong relationship with the strategic objectives of the organization, customer satisfaction, and contributes to the economy (Wibowo, 2007). With good performance, it can help improve and develop PDAM companies with profit gains.

2. Illustrations

Spencer competence

Competence according to Lyle M. Spencer and Signe M. Spencer is part of and forever exists in one's personality and can predict behavior and performance widely in all situations and job tasks. From the existing competencies there are 20 competency factors according to (Competence at Work, Spencer & Spencer 1993): A. Achievement and Action (Planning and Implementing) 1. Achievement Orientation (ACH) A competency spirit to excel in their work so that they are encouraged to work moregood or above the standards set by management. 2. Concern for Order (CO) A competence in job clarity and accuracy of work to ensure or reduce uncertainty with the assignment and accuracy or accuracy of the data. 3. Initiative (INT) A competency needed by workers in doing something without any prior order because it is done to improve or improve work results. 4. Information Seeking (INFO) A competency in the search for more information in connection with the implementation of work and decision making. B. Helping and Human (Service and Serving) 5. Interpersonal understanding (IU) A competence to understand things that are not expressed in words, can be an understanding of feelings, desires or thoughts of others. 6. Customer service orientation (CSO) A competency oriented to customers to serve customers or others. C. Leading 7. Impact and influence (IMP) An impact or influence competency on persuading or convincing others so that they want to support our plans. 2. Analytical Hierarchy Process (AHP) Basically, the procedures or steps in the AHP method include: 1. Defining the problem and determining the desired solution, then arrange the hierarchy of the

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problems faced. 2. Determine the priority of elements.

2. Analytical Hierarchy Process (AHP)

Basically, the procedures or steps in the AHP method include:

1. Defining the problem and determining the desired solution, then arrange the hierarchy of the problems faced.

2. Determine the priority of elements.

Table 2.3 Pair Comparison Rating Scale (Source: Kusrini, 2007)

Intensitas Kepentingan	Keterangan
1	Kedua elemen sama pentingnya
3	Elemen satu sedikit lebih penting daripada elemen lainnya
5	Elemen satu esensial daripada elemen lainnya
7	Satu elemen jelas lebih mutlak penting daripada elemen lainnya
9	Satu elemen mutlak penting daripada elemen lainnya
2,4,6,8	Nilai-nilai antara dua nilai pertimbangan yang berdekatan
Kebalikan	Jika aktivitas I mendapatkan satu angka dibandingkan dengan aktivitas j, maka j memilki nilai kebalikannya dibandingkan dengan i

3. Synthesis

4. Measuring Consistency

5. Calculating Eigenvector Eigen Value is a value that shows the weight of importance (priority) of a criterion against other criteria in the hierarchical structure. The following is the formulation of the Eigenvector:

$$Pi = \sum_{j=1}^{n} \frac{vij}{n}$$

6. Calculate the consistency index (CI) with the formula:

$$CI = (\lambda \text{ maks} - n)/n..(2)$$

where n = number of elements

7. Calculate the consistency ratio (CR) with the formula:

$$CR = CI/RC$$

where

CR = Consistency Ratio

CI = Consistency Index

IR = Indeks Random Consistency

8. Check the consistency of the hierarchy. If the value is more than 10% then the judgment judgment data must be improved. However, if the consistency ratio is less than or equal to 0.1 then the calculation results can be declared correct.

3. Behaviorally Anchor Rating Scale (BARS) The performance appraisal method with the Behaviorally Anchor Rating Scale model is an assessment method that combines work behavior approaches with personal traits. The Behaviorally Anchor Rating Scale method consists of a series of 5 to 10 vertical behavior scales for each performance indicator. For each dimension, arranged 5 to 10 anchors. Anchor in question, namely the behavior that shows performance for each dimension. The Behaviorally Anchor Rating Scale method in its implementation requires at least five stages, namely:

a. Make a critical incident. This is done by asking someone who knows the job (incumbent and / or supervisor) to explain special illustrations (critical events) performance that is effective and ineffective or can be done by way of analyzing the position.

b. Developing a performance dimension where in this stage the events are grouped into smaller groups of work dimensions and defined each dimension, such as "selling skills".

c. Reallocate events. Another group of people who also knew of this work then reallocated this critical incident from the start. They make definitions of groupings and critical events, and must reassign each event to the group they think is most appropriate.

d. Scale events. Ranking the behavior explained by the event by how effective and efficient it is. Each behavior represents performance in its dimensions.

e. Developing the final device. Choose about five to ten events as the standard behavior of that dimension.

3. RESEARCH METHODS

Type of research consists of based on the results to be achieved, research according to the method, according to the level of explanation, and according to the type of data. This type of action research according to the method is an investigation or research in a business context that focuses on improving the quality of the organization and its performance. Usually the design is done by practitioners who analyze data to improve the quality of their practice. Action research is used in this study, because observations are made directly to determine the performance of employees at the water treatment plant in PDAM Bangkalan. Time of the study was carried out for 3 months. The place for the research was the "Sumber Pocong" Regional Drinking Water Company (PDAM) on Jl. Attorney General Suprapto No.175 Bangkalan and Production Office on Jl. Raya Tangkel Bangkalan.

Primary data is data obtained from a direct observation and through direct observation, interviews and questionnaires on the research object. Secondary data is data obtained from indirect observations of the object to be examined. Data obtained from the Regional Water Supply Company (PDAM), namely: water treatment plant employee data, employee wage data, and employee absence data. Data retrieval obtained from observation, interviews, determination general competencies for employee performance appraisal systems, providing questionnaires, determining competency weighting models, determining for scoring performance appraisals, calculating employee wages.

Analytical Hierarchy Process (AHP) That is a MADM (Multi Attribute Decision Making) technique that allows for better selection of priority criteria. BARS (Behaviorally Anchor Rating Scale) Performance appraisal method with the Behaviorally Anchor Rating Scale model is an assessment method that combines work behavior approach with personal traits. An acceptance in return from the employer to the workforce for a job or service that has been or will be done, expressed or valued in the form of money determined according to an agreement or legislation and is paid on the basis of a work agreement between the employer (employer) and work including benefits both for workers themselves and their families

4. RESULTS AND DISCUSSION

a. Analytical Hierarchy Process

Pairwise Comparison of Criteria in Assessment of Employee Performance in Bangkalan PDAM Obtained by the weight of the assessment of each variable in the scale table for pairwise comparison assessment. The weight of the assessment is as follows:

	Semangat Berprestasi	Proaktif	Kesadaran berorganisasi	Kerjasama Kelompok	Berpikir Konseptual	Kualifikasi/teknikal/professional	Fleksibilitas	Komitmen Pada Organisasi
Semangat Berprestasi	1	5	5	5	5	3	5	7
Proaktif	0,200	1	2	3	3	5	5	5
Kesadaran berorganisasi	0,200	0,500	1	2	4	3	5	3
Kerjasama Kelompok	0,200	0,333	0,500	1	2	5	3	5
Berpikir Konseptual	0,200	0,333	0,250	0,500	1	3	3	5
Kualifikasi teknikal/professional	0,333	0,200	0,333	0,200	0,333	1	2	3
Fleksibilitas	0,200	0,200	0,200	0,333	0,333	0,500	1	2
Komitmen Pada Organisasi	0,143	0,200	0,333	0,200	0,200	0,333	0,500	1
Jumlah	2	8	10	12	16	21	25	31

From table 4.1 the pairwise comparison matrix of the Spencer competency criteria can be seen that the criteria for achievement spirit and proactive criteria are worth 5, which means that the criteria for achievement spirit are more important than the proactive criteria. From the calculations, the ratio value is consistent with the spencer competency criteria, which is 0.0994, which shows a fairly rational level of consistency in pairwise comparisons. In table 4.6 is a weight table of each criterion:

Kriteria	Bobot
Semangat Berprestasi	0,358
Proaktif	0,182
Kesadaran Berorganisasi	0,139
Kerjasama Kelompok	0,113
Berpikir Konseptual	0,085
Keahlian Teknikal/professional	0,057
Fleksibilitas	0,038
Komitmen Pada Organisasi	0,027
Jumlah	1,00

After knowing the CR value we can also know the weight of each criteria in table 4.39:

No.	Kriteria kompetensi Spencer	Subkriteria	Bobot
1	Semangat berprestasi	Sub 1	0,8333
		Sub 2	0,1667
2	Proaktif	Sub 1	0,8333
		Sub 2	0,1667
3	Kesadaran Berorganisasi	Sub 1	0,8333
		Sub 2	0,1667
4	Kerjasama Kelompok	Sub 1	0,75
		Sub 2	0,25
5	Berpikir Konseptual	Sub 1	0,75
		Sub 2	0,25
6	Keahlian Teknikal/professional	Sub 1	0,8333
		Sub 2	0,1667
7	Fleksibilitas	Sub 1	0,8333
		Sub 2	0,1667
8	Komitmen Pada Organisasi	Sub 1	0,75
		Sub 2	0,25

b. BARS results

After the scoring is done, the average value of each contract employee will be calculated, the average value will be the standard value of the achievements of each contract employee.
X = (3.302171 + 3.278542 + 3.377943 + 3,1153 + 3,394643) / 5 = 16,6648 / 5 = 3.33
So the calculation that has been done produced a standard achievement value of 3.33. Employee achievement scale:
1.0 - 1.9 = Not good
2.0 - 3.9 = OK
4.0 - 5.0 = Very Good

From the calculations that have been carried out and obtained 3.33 results are included in the category of good employee achievement.
c. Wage System for Contract Employees
1. Determination of Wage
Amount In determining how much wage funds will be given in the year, an interview will be conducted to the company about how much wages are given in one year. In the Bangkalan PDAM, wage funds are given monthly, the amount given specifically in February 2017 amounted to Rp 85,481,640, and the standard work performance is 2.5.
2. Calculation of Employee Achievement Value
Calculations are made for the payment of wages to employees with a measure of the results of the achievement value obtained from the value of the weight multiplied by the scale of scores on each spencer competency criteria.
X = (3.302171 + 3.278542 + 3.377943 +3,1153 + 3,394643) x 100%
X= 16.6648 x 100%
X= 166.48
From the five contract employees' performance scores, if the incentives are received in a year are calculated as follows:
1. Contract employee 1 has a total work performance value of 3,302171. Then the amount of wages to be received by employee 1 is:
% increase in work performance value =

organizational awareness (0.139), group collaboration criteria (0.113), conceptual thinking criteria (0.085), technical / professional skills criteria have 32,086%
2. Contract employee 2 has a total work performance score of 3.278542. Then the amount of wages to be received by employee 2 is:
% increase in work performance value =
=

= 31.1417%
3. Contract employee 3 has a total work performance score of 3.377943. Then the amount of wages to be received by employee 3 are:
% increase in work performance value =
=

= 35,1177
4. Contract employee 4 has a total work performance score of 3,31153. Then the amount of wages to be received by employee 4 is:
% increase in work performance value =
=

= 32,461
5. Contract employee 5 has a total work performance score of 3,394643. Then the amount of wages to be received by employees 5 are:
% increase in work performance value =
=

= 35,785

CONCLUSION

The performance evaluation of contract employees at the Bangkalan PDAM is carried out using the spencer competency calculated by the AHP (Analytical Hierarchy Process) method. In the spencer competency criteria, there are 8 criteria and 16 sub-criteria used to do the assessment. Criteria for achievement spirit have weight (0.358), proactive criteria have weight (0.182), criteria weight (0.057), flexibility criteria have weight (0.038), commitment criteria for organizations have weight (0.027).

Weighting on each criterion and sub-criterion is used to rank the five employees with the weighted value already obtained. After scoring, the total value of each employee's achievement is obtained. Contract employee 1 has achievement value (3.302171), contract employee 2 has achievement value (3.278542), contract employee 3 has achievement value (3.377943), contract employee 4 has achievement value (3.31153), contract employee 5 has an achievement value (3.394643).

The achievement value obtained by each contract employee is used to calculate the wages earned by each contract employee in the year. For contract 1 employees, a wage of Rp. 16,458,833 was obtained. For contract 2 employees, a wage of Rp. 15,974,011 was obtained. For contract 3 employees, a salary of Rp. 18,013,511 was obtained. For contract 4 employees, a salary of Rp. 16,650,855 is obtained. For contract 5 employees, a wage of Rp. 18,356,158 was obtained.

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Application of Google Maps API on Smart City for Searching Distance Nearby Health Facilities in Bangkalan

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A B S T R A C T

Health facility is a facility which engaged in health in an effort to provide services from government and society to inform about health, prevention of disease, treatment, and bring back the sicks to their main environment. The health informaion which is provided by Google Maps is not complete yet. So, the problem that arises is the media that provide health information is still small. And society in Bangkalan cant reach the health information in overall. That problem can solve with an aplication which is build by Framework Codeigniter and Google Maps API. This application can accomodate and provide health data facility completely. So the society in Bangkalan can search by their own self about location with the nearest distance and know all about health information. Such like health facility, the addresses, and doctor's schedules in hospital and community health centre. The applocation which has been build is effective to help society to know all location and information about health in Bangkalan. This proven by quality of this application to 10 respondent with resultd 77,3%

Keywords: Health Fascility, Google Maps API, Nearest Distance.

1. INTRODUCTION

People do various kinds of activities every day without knowing the time, so that it can affect their quality of life and make their health condition decline. When the soul, body, and social environment are in good condition that allows each individual to work in a manner active, social and economic, so humans are in a healthy condition. People in a state of illness will look for facilities that can restore their body condition to be healthy by visiting health facilities that have been provided. According to the Regulation of the Minister of Health of the Republic of Indonesia No. 71 of 2013 concerning Health Care in National Health Insurance Chapter I General Provisions Article 1 Paragraph 5, health facilities are facilities engaged in health in an effort to provide services in the form of a series of activities carried out by the government and the community in terms of disseminating information about health, prevention against health problems (disease), treatment, and returning patients to the community.

Based on Bangkalan in Numbers (2016), Bangkalan Regency is a Regency located in Madura Island which is located at 112o 40 '06 "- 113 o 08' 04" East Longitude and 6o 51 '39 "- 7 o 11' 39" South Latitude, and has several health facilities spread across 18 sub-districts including: Kamal, Labang, Kwanyar, Modung, Blega, Konang, Galis, Arosbaya, Tanah Merah, Geger, Tragah, Kokop, Socah, Tanjung Bumi, Bangkalan, Sepulu, Burneh, and Klampis Health facilities in Bangkalan Regency can be categorized into several types, including: hospitals, puskesmas, and pharmacies.

Health facilities scattered in Bangkalan Regency can be searched through Google Maps, but the information provided is only in the form of location, name and address of the health facility. Therefore, the problem that arises in finding the location and information on health facilities with Google Maps is that media which contain information about health facilities is incomplete, so that people in Bangkalan cannot find out information on overall health facilities

The search for information on health facilities must be supported by technological advances in the distribution of information that is fast, accurate, and accurate. Information is a statement in the form of information containing messages containing facts and explanations, delivered in electronic and non-electronic information and communication technology.

Electronic information requires the development and use of technology that will lead to complex interactions of integrated systems for a better quality of life in the future society. The concept is called Smart City (smart city). According to IBM (a world-class enterprise company that houses the establishment of Smart City), Smart City is divided into 6 parts, namely:

1. Smart Mobility is a Smart City that can be realized with the existence of a smart transportation and mobility process, so as to create good public services.
2. Smart People are Smart City that can be realized if Smart People can be fulfilled, because in humans there are criteria of creativity and social capital processes that can improve the quality of human resources, quality of life, and community income.

3. Smart Economy, implementation and assessment in this section covers 2 things, namely the process of innovation and competitiveness. Both of these functions as the main capital for the future progress of the nation.

4. Smart Governance, this section specializes in governance requirements and criteria, aiming at the empowerment and participation of the community and government together. The hope to be achieved is that the government can run well and transparently by utilizing technological assistance, and the public can also know broadly all what policies have been carried out by the government in accordance with the aspirations of the people.

5. Smart Living, where this part of the smart city aims to process quality of life and culture to be better and smarter by utilizing information technology.

6. Smart Environment is a part that specializes in creating a smart environment that is a process of continuity and good processing of resources.

Smart City can be implemented in Bangkalan Regency by developing the Smart Living section. Smart Living can help people manage their quality of life better by utilizing technology in seeking information about health. Smart Living can be realized by having a web-based application using the Codeigniter Framework which has its own definition. Framework is a basic conceptual structure that functions to solve a complex problem, so that in building an application will be easier. Codeigniter is a web application framework that is open source and already provides libraries for building dynamic php applications. Codeigniter has a Model-View-Controller (MVC) concept with the following explanation:

1. Model The model is the part that connects with data and interactions in the database. The model represents the data structure of the application in the form of a database and is connected with SQL query commands, usually the model has classes and functions to retrieve, update, and delete data.

2. View View is connected to the end user view in the form of a web page

3. Controller Controller is the link between data and view. On the controller there are classes and functions that can process requests from the View into the data structure in the Model.

The application built can also display maps digitally on the web using the Google Maps API which contains classes and methods in javascript files. It is expected that with the application that has been built, it can help the community to find the location of the health facility with the closest distance and find information about the name of the health facility, address of the health facility, doctor's schedule at the hospital and puskesmas

2. RESEARCH METHODS

The research methods used to build applications by implementing the Google Maps API in searching the closest distance to health facilities in Bangkalan include:

Analysis

Analyzing the problems that occur in the search for information, especially in the search for health information using Google Maps so that it requires other media that can accommodate information on overall health facilities. After analyzing the existing problems, the next step is to analyze what data is needed and the features used in the application to solve the problem, and analyze the hardware and software requirements in designing the application that has been made.

Literature Study

Study research and collect data from written sources obtained from books, journals, and articles available on the internet.

Data Collection

The author made observations at the health department in Bangkalan District to find data on health facilities. Data on health facilities that have been obtained, the authors seek information on health facility services related to how to go directly to the destination location and look for information through the website owned by the health facility. Then the authors observed health facilities in Bangkalan Regency through Google Maps.

System Design

After carrying out the stages of analysis, literature study, and observation, the next step is to design the system. The system design built includes:

a. Application Design

The application design can be seen in Figure 1, by collecting data from the health department and looking for information on health services and the location of health facilities. Data that has been matched will be entered into the database, including admin data. Admin data is user data that can manage the application as a whole such as viewing, searching, adding, deleting, and changing data. The application is built using the Google Maps API, with input in the form of a user's location search and output in the form of the closest distance to the health facility from the user's position. User position search means finding the location of the admin and the
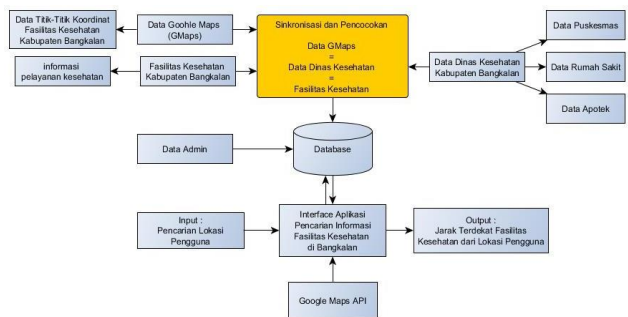
community when using this application. The public (user) can only see and search for health facility information and find out the nearest distance of the health facility from its location position.

Figure 1. Application Design

b. Data Modeling in the form of Physical Data Modeling (PDM)

PDM is used to make this application function as a description of the relationships between tables in the database. PDM can be seen in Figure 2.

Figure 2. Physical Data Modeling (PDM)

After analyzing, studying literature, collecting data, and designing the system, what needs to be done next is the implementation of the design in the form of applications and testing. Stages of testing are based on testing the functionality of the application which is used as a reference whether the system can run well or not and testing the application user on the user, where this test is carried out to determine the effectiveness of the system whether this application can help the public to find out information on health facilities in Bangkalan Regency. The assessment on application user testing was carried out by distributing questionnaires to 10 respondents from Trunojoyo Madura University (UTM). Trunojoyo Madura University Student Respondents (UTM) were chosen because the average UTM student did not come from Bangkalan, so information about facilities in Bangkalan Regency, especially facilities about health, was still unknown by Trunojoyo Madura University students.

3. Results And Discussion

Application Interface Results

Application design that has been made, is applied to the health facility information search application. The application interface results as follows:

1. Information Interface of Health Facility Services

   Figure 3 is a picture that displays an information page on one of the health facility services in Bangkalan Regency.

Figure 3. Health Facilities Service Information Interface

2. Interface of Doctor's Practice Schedule

   Figure 4 is a page that displays doctor's practice schedules at hospitals and health centers in Bangkalan Regency.
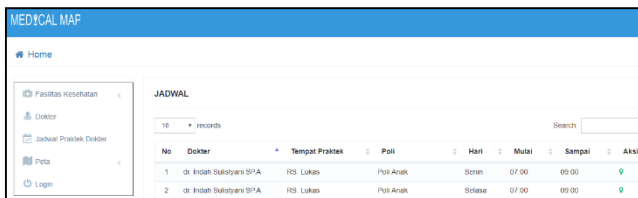
Figure 4. Interface of Doctor's Practice Schedule

Page Distance Nearest Health Facilities from the Position of the User's Location Figure 5 is a picture that displays the closest distance to the location of hospitals, puskesmas, and pharmacies in Bangkalan Regency from where the user is located.
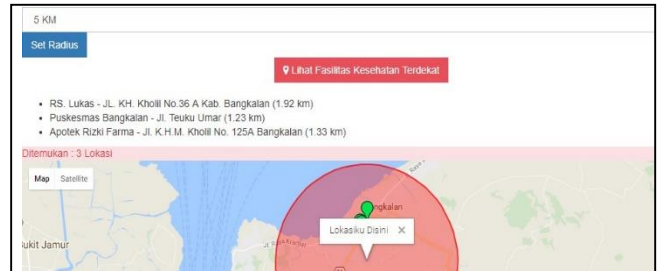
Figure 5. Closest Interface of Hospitals, Puskesmas, and Pharmacies from User's Location Position

Application User Testing Results on Users

The assessment phase given in the questionnaire will consist of several processes for each question, namely:

1. Determine the answer score, explained in Table 1

Table 1. Answer Scores

Skala Jawaban	Nilai
Sangat Tidak Setuju	1
Kurang Setuju	2
Cukup Setuju	3
Setuju	4
Sangat Setuju	5

2. Calculating the ideal score

   Ideal Score = Scale Value x Respondents

3. Calculating the rating scale, to find out the results of the questionnaire data in general and the overall

   scale of all answers = the number of answers x the value of the scale

4. Calculate the percentage of approval

$$p = \frac{f}{n} \; x \; 100\%$$

Note:

p = percentage

f = frequency of each answer questionnaire

n = ideal number of scores

5. Grouping the results of calculations that have been obtained into 5 categories, including the following:

a. An average value of more than 86%, the results are very effective

b. An average value of 76% to 85%, the results are effective

c. An average value of 61% to 75%, the results are quite effective

d. The average value of 51% to 60%, the results are less effective

e. The average value is less than 50%, so the results are not effective

In table 2 there is a percentage of all questions from distributing questionnaires to Trunojoyo Madura University students.

Table 2. Presentation Results for Questions attached to the Questionnaire

No	Requrement	Result
1	Apakah interface (tampilan) aplikasi pencarian lokasi fasilitas kesehatan sudah menarik ?	78 %
2	Apakah aplikasi pencarian lokasi fasilitas kesehatan mudah diakses ?	66 %
3	Apakah aplikasi pencarian lokasi fasilitas kesehatan mudah digunakan ?	74 %
4	Apakah informasi pada aplikasi pencarian lokasi fasilitas kesehatan mudah dicari ?	84 %
5	Apakah dengan penggunaan aplikasi ini anda merasa terbantu dalam mencari informasi tentang fasilitas kesehatan	82 %
6	Apakah merasa puas dengan fitur-fitur yang disajikan dalam aplikasi pencarian lokasi fasilitas kesehatan ?	80 %
	Hasil Rata-Rata	77,3%

From the average results for each question obtained is this application included in the effective category in helping the community to find out the location and information of health facilities in Bangkalan Regency.

4. CONCLUSION

Conclusion on the application of the Google Maps API application in Smart City in finding the closest route to a health facility in Bangkalan that this application can be built using the Codeigniter Framework and the Google Maps API, so that it can be said to be effective in assisting the public in knowing the location and information of health facilities in Bangkalan. This is evidenced by the results of the assessment of the quality of the application to 10 respondents who showed results of 77.3% and included in the effective category.

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Experimental Design of Biogas Production with Chicken and Cow Feces

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ABSTRACT

Biogas production is carried out by utilizing livestock waste collected from the Sumenep dungkek area of Madura Island. Research was conducted in the area of power because the majority of the people live their daily lives by farming and raising cattle and chickens. The number of livestock in the dungkek area is more than 100 cows and 3000 chickens. However, almost all waste generated from livestock is only used as compost for agricultural land. Meanwhile, rural communities in their own way still use traditional methods, namely firewood and kerosene for cooking activities. Furthermore, the study will calculate the exact composition of a mixture of chicken and cow manure used in making biogas. The exact composition of chicken and cow manure is 50% chicken and 50% cow manure where in this study using 1.5 kg cow and 1.5 kg chicken manure. As in replication 1 and treatment 2 where biogas volume value 4.71 cm3 and methane gas 3.938 were obtained, which is the highest value obtained from all experiments. This shows that biogas from chicken manure is better than cow manure, but the amount of cow manure is more than chicken manure, so a combination of chicken and cow manure for biogas is used in this study. This study uses a completely randomized design (CRD) method with 2 factors, cow dung and chicken dung. Results of the composition of the mixture of selected cow and chicken dung to produce biogas, will be the basis for making biogas reactors for home units.

Keywords: Alternative Energy, Biogas volume, methane gas production, Completely Randomized Design (CRD)

1. Introduction

Lapa Daya community, Dungkek sub-district, Sumenep district, in their daily lives by farming and raising chickens or cows. There are quite a lot of farms in the village, the majority of each house has at least two cows and several chickens. Waste generated from these farms is used to fertilize their land. Lapa Daya community still uses traditional methods, one of them is cooking, which still uses wood, although there are many obstacles, one of them is during the rainy season, a lot of wood is wet due to rain, cooking using wood can cause pollution air. Based on the above problems, to reduce environmental and air damage caused by kitchen smoke and due to expensive LPG gas, biogas is made that is environmentally friendly and affordable. The composition used in making biogas consists of a mixture of chicken and cow manure. Cow and chicken manure is taken from residents' farms in Lapa Daya Village because in that place the majority of the residents are farmers and have cattle or chicken farms. Making Biogas as an alternative to wood or LPG in cooking. In addition, waste from the biogas process can be used as plant fertilizer for soil fertility. The use of biogas is expected to be an alternative energy source in assisting villagers in terms of gas requirements, so that biogas is the best solution rather than using wood which can pollute the environment any more when the rainy season will get wet so the woods find it difficult to find dry wood. Besides that, the cost used is very cheap, the material used is very easy because it is around us. Therefore, with the existence of these problems in the process of making biogas, it will mix with chicken and cow manure materials because the material is easily obtained and the biogas produced is more nice. So that it can be utilized by the community it should and can reduce spending on gas needs.

1.2. Formulation of the problem

Based on the background above, the problem formulation of this study is as follows:

a. How to design an experimental design from making biogas

b. What is the volume of biogas produced.

c. How much methane gas is produced.

1.3. Research purposes

Based on the problems mentioned above, then below are the research objectives to be achieved:

a. Can find the right weight combination of chicken and cow manure to produce the most biogas.

b. Can know the volume of biogas produced from various weight combinations of chicken and cow manure.

c. Can find out the content of Methane Gas contained in the biogas.

1.4. Research Benefits

a. Below are the benefits of the research carried out:

b. He knew the right weight combination of chicken and cow manure to produce the most biogas

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c. Knowing the volume of biogas produced from various weight combinations of chicken and cow manure.

d. Knowing the methane gas content contained in the biogas.

1.5. Research Limits

In the research to be carried out there are some research limitations that need attention :

a. This study is limited only to the laboratory scale where in this study using trials in 1 unit of home.

2. Literature Review

2.1. Biogas

Biogas is a gas mixture produced by methanogenic bacteria that occurs in materials that can decompose naturally in anaerobic conditions Alternative energy such as biogas is very important to be developed, to support energy needs. Biogas is one of the best alternative energies that can be developed.

2.2. Complete Random Design (CRD)

Complete Random Design (CRD) is a design used for homogeneous experimental material. If we want to study t as a fruit of treatment and use r unit experiments for each treatment or use the total rt unit experiments. CRD is seen as more useful in laboratory experiments or in experiments on certain types of experimental material which have relatively homogeneous properties (Gaspersz, 1991).

2.3. Experimental Design

2.3.1. Experimental design

In this study using two factors in which each factor used each uses three levels of treatment. This factor is the amount / weight of chicken manure and cow manure. While the level used is (0, 1.5 and 3) kg for cow dung factor, the chicken dung factor is (3, 1.5 and 0) kg.

2.4. Planning Analysis

In conducting data processing which is part of the research design process to achieve the objectives it is necessary to identify the analysis method. There are two reasons for identifying this. First, identification of the dependent variable that determines the research objectives and specifications of how these objectives can be achieved. Second, to ensure that random diversity among the experimental units in the study will be estimated with appropriate accuracy. (Antara, 2012).

2.5. Biogas Volume

Samples analyzed were biogas volume, methane gas content, and methane production. The volume of biogas formed is measured by observing changes in the volume of water in the burette (assuming: the resulting biogas is the same as the change in gas-driven water in the hose). The volume of the gas is calculated using the formula:

$V = \pi \times r2 \times t$

Information:

V = cylinder volume of gas

$\pi = 3.14$

r2 = circle radius

t = cylinder height

t = cylinder height

Methane gas levels were analyzed by using the Gas method Chromatography. Sample preparation done using syringe 10 ml is injected into the hose out the gas and then immediately put in a 10 ml vacutainer which is already in a vacuum.

Methane production is obtained by means of calculate the amount of gas production that is produced with methane content based on the amount of gas production (z) and levels of methane (y), thus obtained calculation with the formula: Methane Production =

Information:

y: value of methane content

z: the volume of gas produced

3. Research Methods

3.1. Type of Research

The types of research in the experiments are will do is research quantitative using design experiment. This research is used for know the effect of a treatment certain where in this study there are 3 treatment fruit. in the study There are two factors, namely chicken manure and cow dung while for the response namely the volume of gas produced.

3.2. Research Time and Place

The research will be carried out for 5 that is, in March - July 2018 starting from the beginning of determining the problem until the research report is complete. This research is located in Lapa Village Kec. Dungkek Kab. Sumenep.

3.3. Research Variables

Below this is a variable used in this study:

3.3.1. Variabel Independen

In this research independent variable used is the weight of chicken droppings (x1) and weight cow dung (x2)

3.3.2. Dependent Variables

In this study the dependent variable is the volume of gas produced (y1). The volume of gas produced from the cylinder biogas will be calculated usingmanometer.

4. Results And Discussion

Table 1. Biogas Volume

Replikasi	Perlakuan			TOTAL
	1. (3:0) (sapi)	2. (1.5:1.5) (campuran)	3. (0:3) (Ayam)	
1	2,355	4,71	3,14	10,205
2	3,925	2,355	3,925	10,205
3	2,747	3,925	2,355	9,027
Total	9,027	10,99	9,42	

Analysis of variance

Based on the table can be it was concluded that thank H0 because of Fcount $0.39623 \leq$ F table (5%: 5.1433) it means that there is no interaction effect between weight of chicken poop with heavy poop cattle significantly to volume biogas produced

Table 2. Analysis of variance

Sumber Keragaman	DB	JK	KT	Fhitung	F tabel (5%)
Perlakuan	2	0,719	0,359		
Galat	6	5,443	0,907	0,396	5,143
Total	8	6,162			

Table 3. Methane gas 1

Replikasi	Perlakuan			TOTAL
	1. (3:0) (sapi)	2. (1.5:1.5) (campuran)	3. (0:3) (Ayam)	
1	2,267	3,938	2,957	9,162
2	3,754	2,114	3,779	9,647
3	2,600	3,446	2,204	8,25
Total	8,621	9,498	8,94	27,059

Table 4. Methane gas 2

Sumber Keragaman	DB	JK	KT	F hitung	F tabel (5%)
Perlakuan	2	0,131	0,066	0,093	5,143
Galat	6	4,240	0,707		
Total	8	4,371			

Based on the compilation of the analysis of the above table, it is known that the results of methane gas production resulting from the testing of methane gas levels, namely accept H0 due to F count $0.093 \leq$ Ftable (5%: 5,143) means that there is no significant interaction effect between chicken manure weight and cow manure weight to the production of methane gas produced.

5. Conclusion

Below this is the conclusion of the experiments that have been carried out :

1. Based on the results of experiments that have been done mixing chicken and cow manure is a good mixture of biogas producers because the highest results obtained from the calculation of biogas volume and methane gas production lie in the mixture of chicken and cow manure, which is the first replication and the second treatment.

2. The exact composition of chicken and cow manure is 50% chicken manure and 50% cow manure where in this study using 1.5 kg of cow manure and 1.5 kg of chicken manure. As in replication 1 and treatment 2 where biogas volume value of 4.71 cm3 and methane gas of 3.938 were obtained, which is the highest value obtained from all experiments. Although this value is not too significant different from other experiments, it is still the highest value of mixing chicken and cow manure.

Suggestions

1. For the next determination, it is expected that the selection of the container or gas cylinder is more thorough because it greatly influences the research.

2. For further research, it is better to find the optimal point of mixture of chicken and cow manure which can produce the best methane gas. Because there are differences in the mixture of chicken and cow manure, although not significant.

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Virtual Reality for Introducing Informatics Laboratory on University of Trunojoyo Madura

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A B S T R A C T

Nowadays, the development of increasingly advanced technology, one of the rapidly evolving technology at this time that smartphones based on Android. However, the development of technology is not comparable with the needs of students, for example in the introduction of the laboratory environment. During the introduction of the lab environment is still done manually without involving a technology to introduce a laboratory environment and it is less effective and efficient because need effort and a long time. For of these problem is make a Virtual Reality(VR) based android of 3D architectural visualization with a study area of information Technology Laboratory (TIF) UTM. From this application, students can explore and get to know Laboratories TIF simply using a smartphone based on Android, so students do not need to come lively. From the test result data, laboratory TIF VR applications can run well in 6 test device but the device Andromax R1 gyroscope is not functioning properly. From the results of testing applications using a questionnaire obtained, the average value of the respondents based user verification is 89% good, 11% Less good, and 0% unfavorable. And the average value of the entire question by 95%.

Keywords: Author, Guide Line, Journal, Keyword, Submit, Website.

1. Main text

Laboratory (Lab.) Is a building in which is equipped with equipment and materials based on certain scientific methods to conduct scientific experiments, research, learning practices, testing activities, calibration, and production of certain materials. In a narrow sense, the laboratory is a means and infrastructure to assist students in conducting practical and research activities. In UTM itself there is a Laboratory building named Lab. Integrated. Lab. Integrated is a collection of several Labs. from different study programs, including Marine Sciences, Agribusiness, Informatics Engineering, Industrial Engineering and Others. Because the incorporation of Lab. from some of the Study Programs including Lab. Informatics Engineering (TIF), causing many students confusion in finding the location of the Lab. TIF. This causes students to visit the Lab incorrectly. that should be addressed. To facilitate the introduction of the Lab. TIF to new students requires a Virtual Reality (VR) Technology.

"Virtual Reality (VR) or Virtual Environment (VE) is a technology that allows one to simulate an object using a computer that is able to generate a three-dimensional atmosphere that makes the user as if physically involved [1]". To realize 3D objects in VR, a supporting tool is needed. One of the supporting tools of VR is Google Cardboard. Google Cardboard was released by Google to support users trying out new experiences namely 3D Experience VR that uses Smartphones as a platform. Previously there was a similar VR support device, the Ouculus Rift. The oculus rift functions the same as Google Cardboard. However, because the price of Ouculus rift is expensive so it cannot be reached by the middle to lower classes. Therefore, Google released Google Cardboard as a support tool for VR at a price that is affordable for everyone so everyone can try the 3D Experience VR experience.

From this description, VR using Google Cardboard can be used as a solution to provide new experiences for students who want to explore the Lab Building. TIF. For making VR applications using Unity3D software. Whereas for making 3D modeling using Blender Software.

This study aims to create an Android-based 3D VR application that is an architectural visualization type with a Lab area study. TIF UTM. It is expected that the research results can provide additional insight in the form of new concepts in the introduction of a building by utilizing VR technology. It is also hoped that with the 3D modeling facilities students can find out the visualization of the place or Lab space. TIF to be addressed.

2. Literature Review

In this study an application was made that could introduce Lab. TIF UTM in virtual 3D by implementing VR technology using Unity3D. This study refers to research number one and three in Table 1. In research number one it is explained that in the implementation phase there are two

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parts, namely integration outside of Unity3D and integration within Unity3D, for integration outside of Unity3D including data collection and modeling, for the phase integration in Unity3D includes lighting, level design, sound, animation and others. In research number three for making VR applications built using Unity3D and Blender, as well as explaining the stages in making VR applications that are determining application boundaries, making level maps of the Majapahit Hotel Surabaya building, making 3D objects, making the characters of heroes, doing scripting using C # programming language and application testing. This research was also built using the Unity3D and Blender applications as research number three, at the implementation phase two parts are needed, namely integration outside of Unity3D and inside Unity3D as research number one. However, this research combines Unity3D with Carboard SDK for creating virtual Labs. TIF, as well as using Google Cardboard as a VR support tool with a smartphone as the screen so the user seems to be inside the VR application. Besides being able to browse the Lab Environment. Virtual TIF in 3D users can also play game features

2.1. Virtual Reality

VR is a technology that allows users to interact with an environment that is simulated by a computer (computer-simulated environment), where an actual environment is emulated or really an environment that only exists in the imagination. Another case with Augmented Reality (AR) where the environment displayed is still in the form of the original environment but added a new virtual object, to display AR objects in the real environment requires markers and markesless as input devices. VR application is mostly in the form of visual experience displayed on a computer screen, stereoscopic lens and smartphone. In some simulations many include additional information sensors such as accelerometer, gyroscope, magnetic and sound. Users can interact with the virtual environment through input devices such as keyboards, mice, joysticks, magnetic sensors or through other electronic devices such as electronic gloves, virtual hand shoulders or treadmills. In this concept, it is explained that in this world there is a continuum that runs from the real environment to the virtual environment. They concluded that generic mixed Reality (MR) is one environment where the real world and virtual world are presented together on one screen. Augmented Reality is closest to the real environment and Virtual Environment is the farthest from the real environment, and Augmented Virtuality (AV) is closest to Virtual Environment [5].

2.2. Google Cardboard

Google Cardboard is a VR support tool developed by Google with cardboard material folded and using a smartphone as the screen. On Google Cardboard there are two 25 mm biconvex lenses with focal 45, besides that there is also a magnet and a ring-shaped metal that functions as a click command, if the user pulls and releases the ring, the magnetometer sensor will detect changes in the magnetic field and read it as input from the user. An example of using Google Cardboard is when a user is playing a VR game, then it is as if the user is in the game world, and when the user is watching 3D video the user is as if he was in a cinema [6].

2.3. Unity3D

Unity 3D is a cross-platform based game engine. Unity can be used to make games and applications that can be used on computer devices, smartphones, iPhones, PS3, and even X-BOX. Unity is an integrated tool for creating games, building architecture and simulations.

In this study Unity3D is used in the VR Lab simulation section. TIF, installation of 3D content that was previously created using Blender 3D Editor, and provides control to run automatically on the player and gives control to the player's movements by following the direction of the user's head. The advantage of using the Unity3D Game engine over using other Game engines in making VR is that Unity3D supports Google Cardboard by installing the Cardboard SDK plugin on Unity3D and many Unity3D documentations that discuss VR so that it's easier for authors to build VR applications.

2.4. 3D Blender

Blender is a software used to create animated films, visual effects, 3D print models, interactive 3D applications and video games. Blender has several features including 3D modeling, texturing, animation, video editing, and rendering. In this research blender is used in making 3D content such as buildings, chairs, tables, cabinets, printers, computers, CPUs, blackboards and other 3D objects.

2.5. Gyroscope Sensor

Gyroscope sensor is a device that is used to detect a motion in accordance with gravity by applying the principle of angular fixity. Gyroscope is often used on robots or helicopters and other sophisticated tools. In this study the device used to run the VR application must have a gyroscope sensor because without the gyroscope sensor the player in the VR game cannot adjust its movements to the user's head movements, if the user turns around or looks up, the player will not look back or look up according to the user's movements by therefore when the user will run the VR application the user is recommended to use a device that has a gyroscope sensor.

3. Methods

This reasearch methtds folwn using flowchat descibe in Figure 1. TIF. The first stage is analyzing the needs which include the needs of the device and data requirements. The intended device requirements are software and hardware. In this case the intended software includes 3D Editor, image editor and game engine while hardware includes Computers, smartphones and VR Viewing Devices. For data needs namely Lab Plan. TIF and architecture in the Lab. TIF. After that the system is implemented and the last application will be built on an android smartphone so that it can be tested to analyze errors in the application.
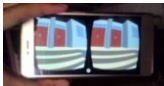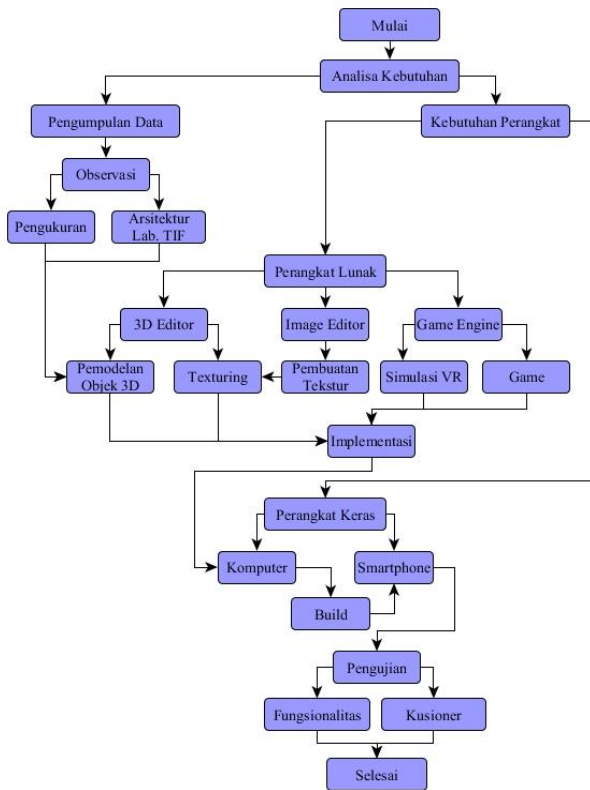
Figure 1. Reasearch methods flowchart

Device	Spesification	VR Test	Result
	Internal 16 GB		
Andromax R2	CPU Octa-core 1.4 GHz		Excelent
	Screen 1280 x 720 pixel (5 inch)		
	RAM 2 GB		
	Internal 16 GB		
Xiaomi Mi4	CPU Quad-core 2.5 GHz		Excelent
	Screen 1920 x 1080 pixel		
	RAM 2GB		
	Internal 16 GB		
Xiaomi Redmi Note 3	CPU Hexa-core 1.8 GHz		Excelent
	Screen 1920 x 1080 pixel (5.5 inch)		
	RAM 2 GB		
	Internal 16 GB		
Andromax R1	CPU Quad-core 2.1 GHz		Excelent, but gyroscope not work well
	Screen 1280 x 720 pixel (5.0 inch)		
	RAM 2 GB		
	Internal 16 GB		

From the test results in Table 1 it can be concluded that the VR Lab application. TIF is able to run well on various devices, but on Andromax R1 gyroscope sensors do not function properly but other features can run well.

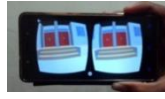| Device	Spesification	Scene Name	Loading Speed
Xiaomi Redmi Note 3	CPU Hexa-core 1.8 GHz RAM 2 GB Internal 16 GB	Scene Building Lab. TIF	4.76 Seconds
		Scene Lab. Mulmed & SIRPL	3.52 Seconds
		Scene Lab. CAI & Sister	3.54 Seconds
		Scene Lab. CC	3.58 Seconds
		Scene Lab. TIA+	3.63 Seconds
		Scene GameScreen	5.45 Seconds
Average			4.08 Seconds
Andromax R2	CPU Octa-core 1.4 GHz RAM 2 GB Internal 16 GB	Scene Building Lab. TIF	8.40 Seconds
		Scene Lab. Mulmed & SIRPL	4.25 Seconds
		Scene Lab. CAI & Sister	4.28 Seconds
		Scene Lab. CC	4.27 Seconds
		Scene Lab. TIA+	4.30 Seconds
		Scene GameScreen	9.17 Seconds
Average			5.77 Seconds

4. Result

Testing work to determine the functionality of the application whether it is in accordance with the theory and the purpose of the study if there are still errors, it will be made improvements to the application.

4.1. Functional Test

The Result of Functional test shown on Table 1.

Table 1. An example of a table

Device	Spesification	VR Test	Result
Xiaomi Redmi 3	CPU Quad-core 1.5 GHz		Excelent
	Screen 1280 x 720 pixel (5.0 inch)		
	RAM 2 GB		
	Internal 16 GB		
Xiaomi Redmi Note 2	CPU Octa-core 2.0 GHz		Excelent
	Screen 1920 x 1080 pixel (5.5 inch)		
	RAM 2 GB		

Device	Spec	Scene	Time
		Scene Building Lab. TIF	6.85 Seconds
Lenovo Vibe K4 Note	CPU Octa-core 1.3 GHz RAM 3 GB Internal 16 GB	Scene Lab. Mulmed & SIRPL	3.90 Seconds
		Scene Lab. CAI & Sister	3.91 Seconds
		Scene Lab. CC	3.95 Seconds
		Scene Lab. TIA+	3.97 Seconds
		Scene GameScreen	7.52 Seconds
Average			5.01 Seconds
		Scene Building Lab. TIF	7.13 Seconds
Sony Xperia Z1 Compact	CPU Quad-core 2.2 GHz RAM 2 GB Internal 16 GB	Scene Lab. Mulmed & SIRPL	3.82 Seconds
		Scene Lab. CAI & Sister	3.84 Seconds
		Scene Lab. CC	3.90 Seconds
		Scene Lab. TIA+	3.93 Seconds
		Scene Game Screen	7.78 Seconds
Average			5.06 Seconds

In Table 4 the data is the result of the trial speed of Loading VR Lab application. TIF on 4 devices. Testing is done to find out the minimum specifications of the smartphone so that the application can be smooth when running on the device. Testing is done by using 4 different devices in this case namely Xiaomi Redmi Note 3 and Andromax R2, Lenovo Vibe K4 Note, and Sony. From the test results in Table 4, the average value of each device is obtained. On Xiomi Redmi Note 3 devices, an average of 4.08 seconds is obtained, Andromax R2 is 5.77 seconds, in Lenovo Vibe K4 Note is 5.01 seconds, and in Sony it is 5.06 seconds. Therefore it can be concluded that the minimum specifications of the smartphone used are Hexa-core 1.8 GHz CPU, 2GB RAM and 16GB Internal.

4.2. Application Quality Result

We test reaction from some respondent shows that the number of respondents who had visited the Lab. TIF of 14 people, respondents who have never visited the Lab. There are 6 TIFs, 10 of whom have tried VR applications, and 10 of those who have never tried VR applications.

Table 2. Respondent feedback

Num	Respondent Feedback	Had been visit Lab. TIF		Had been trying VR	
		Yes	No	Yes	No
1	Excelent	13	5	9	9
	Bad	1	1	1	1
	Very Bad	0	0	0	0
2	Excelent	14	5	10	9
	Bad	0	1	0	1

Num	Respondent Feedback	Had been visit Lab. TIF		Had been trying VR	
		Yes	No	Yes	No
	Very Bad	0	0	0	0
3	Excelent	9	5	8	6
	Bad	5	1	2	4
	Very Bad	0	0	0	0
4	Excelent	14	6	10	10
	Bad	0	0	0	0
	Very Bad	0	0	0	0
5	Excelent	12	6	10	8
	Bad	2	0	0	2
	Very Bad	0	0	0	0
6	Excelent	9	5	7	7
	Bad	5	1	3	3
	Very Bad	0	0	0	0
7	Excelent	10	5	7	8
	Bad	4	1	3	2
	Very Bad	0	0	0	0
8	Excelent	14	6	10	10
	Bad	0	0	0	0
	Very Bad	0	0	0	0
Result		14	6	10	10
Total		20		20	

5. Result

Based on the trials conducted there are conclusions drawn, namely:

- Using VR applications is more effective and efficient compared to coming directly to the laboratory building.
- From the test results and analysis shows that the application can run well on 6 test devices, but on the Andromax R1 device Gyroscope sensor cannot function properly.
- From the results of testing the application using a questionnaire obtained the average value of respondents based on user verification that is 89% said Good, 11% said Not Good and 0% said Very Poor.
- From the results of testing the application using the questionnaire obtained an average value of all questions that is equal to 95%, and the majority of users agree to use the VR Lab application. TIF as an introduction to Lab Environment. TIF UTM with a satisfaction level of 100%.

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