Development of Interactive Website for Vocational School Tracer Study Application

Yuyun Khairunisa[1], Sari Setyaning Tyas[2], Zakhi Firmansyah[3]

{yuyunkh@polimedia.ac.id[1], sarist@polimedia.ac.id[2], zakhi99@gmail.com[3]}

Departement of Game Technology, Politeknik Negeri Media Kreatif, Indonesia[1],
Departement of Multimedia Engineering Technology, Politeknik Negeri Media Kreatif, Indonesia[2],
Departement of Graphic Design, Politeknik Negeri Media Kreatif, Indonesia[3]

Abstract. Tracer study activities have to be carried out by vocational schools to measure the absorption of alumni in the business and industrial world. Graduate tracing or tracer study is also needed in measuring the performance of vocational schools and assessment points in school accreditation. Nowaday, the implementation of tracer studies is still manual and not yet integrated, so school administrators need extra efforts in data recapitulation and reporting. Therefore, the outcome of this research was to develop a website-based application designed by using UML (Unified Modeling Language) based design with use case diagrams and activity diagrams. The application will then be used by vocational high schools to carry out tracer studies using a systematic and integrated method. There are two users in this application, namely alumni and administrators. This Application helps the graduate users to fill out questionnaires interactively and the administrator can collect data and present reports in real-time. Implementation of the website using the PHP programming language with the CodeIgniter 4 framework. The interactivity feature needs JavaScript and jQuery libraries for the program implementation. Application testing uses the white box method with the conclusion that the designed application can run according to the program flow.

Keywords: Tracer Study, Interactive Website, Unified Modelling Language, CodeIgniter, Vocational School.

1 Introduction

According to the Directorate Vocational Ministry of Education and Culture [1], a *Tracer study* is a survey or research study addressed to graduate from unit Education. The goal is to track and keep record of their students once they have graduated from the institution. Tracer study in vocational school has a goal to collect information about competence owned by alumni the is in accordance with the needs of the business/industry. The benefit of *tracer study* is a database of alumni and build a network with alumni , collecting comprehensive data on alumni and their accomplishments is also crucial to raise the caliber of human resources that institutions create. Besides could Become score plus accreditation for unit education, *tracer study results* also becomes agency monitoring tool related as well as make it easy industry get information from graduate of which competent. Implementation *tracer study* Required held on unit education vocation good that college and vocational school. Nowaday, the vocational school still organize tracer study activity by manual so that there is difficulty in integration data nor distribution information to respondents.

Based on the problems above, a design system was formed to obtain alumni data information using website technology. The results of this study will produce a tracer study application information system design that can help overcome the problem of employment opportunity gaps and efforts to improve them for alumni at a university. The use of interactive websites is recommended for colleges or school to push more greater collaboration, and fast information distribution, anywhere and anytime along days [2][3]. Designing interactive websites that allow user for with easy navigate they through journey for learn Indian Sign Language with use YOLOv5 feature . [4] Develops an interactive website as means promotion tourism in Riau Province using the HTML5 framework.

The previous research which already develop website application for tracer study [5][6] use the implementation of CodeIgniter framework. A number of Interactive website development used the CodeIgniter framework, because a number of superiority will make it easy to create a secure website. CodeIgniter has the concept of Model View Controller (MVC) [6]. Development feature Interactivity on the website requires various libraries like javascript , ajax and jquery [7]. The innovation of this research has implemented the interactivity feature of website with JavaScript and jQuery libraries for the program implementation. The other advantages of this website has already implemented Instrument obtained from the Directorate 's website General of Vocational Higher Education [1].

2 Research Method

Methodology development system which used is System Development Lyfe Cycle (SDLC) with waterfalls method as visualized in figure 1. This method have five stages that is Step analysis , design , implementation / coding and Step supporters . The flow chart below :
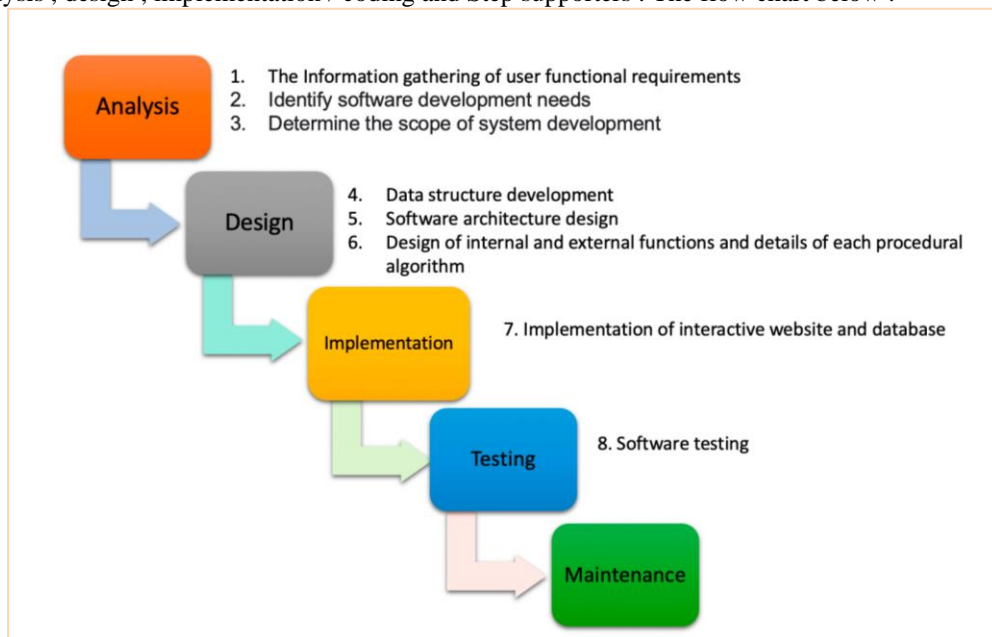

Fig.1. Waterfall method

Explanation from various stages is as following :

a. Analysis

Stages step analysis is beginning from the process is very important because influences stages next and whole process development . Task main on step analysis is :

1. Collecting the information what are the functional requirements of the user / users. Information on functional requirements from users was obtained by interviewing the Principal and Student Teachers who handled the Tracer Study.
2. Define the demands for system development. Software, hardware, and other auxiliary applications are required for software / system development.
3. Establish the system development's scope. Studies in the literature and libraries are used to determine the system development's scope.

b. Design

Design stage or planning system focus on activity following :

1. Development of data structures, namely how to organize databases to be used effectively
2. Architecture development and interactive website design . Interactive website development using Adobe Dreamweaver with HTML Programming language (Hyper Text Markup Language) as the basic framework of the web view. CSS Programming Language (Cascading Style Sheet) helps in the design of a more attractive web interface. PHP Programming Language (Hypertext Preprocessor) as a liaison between the database and the web view that can be seen directly by the user [8][9] . Javascript Programming Language that can facilitate user display settings. While the Database Management System uses Maria DB [10] . In addition to the above programming language , this system also uses Bootstrap which is a development of CSS so that it is easier to design the layout display . This system also allows export and import of data in CSV and Ms.Excel format.

c. Implementation

The next step is to implement the design and turn it into a software for an application after the design criteria for system functions have been established. Programmer-created implementation or coding that translates design or design outcomes into a particular computer language.

d. Test

After implementation code program complete, the next step is to ensure function application can run as should be and already there is error program . Program testing method will use black box testing where testing is more to test appearance outside and functions on the application interface menu .

Testing use white box with step as following [11]:

a. Perform system analysis based on flowchart tracer study
b. Create flow graph of the flowchart flow
c. Define independent path based on flow graph
d. complexity calculations cyclomatic of the independent path that has been traversed
e. Doing a test case

e. Stage supporters

Interactivity is a system interface that interactive, attractive, convenient and easy to use, and able to support forms of interaction what happens in the maintenance process bussines [12][13]. Changes can be made during the development of an application, including the function or menus being added, removed, or modified. This may occur as a result of testing failures or adjustments to user needs. A development process from analysis to implementation and testing, but not from re-creating an application, can be used for the support or maintenance stage.

3 Result and Discussion

Result of this study is a website application which help implementation of tracer study programs in Intermediate Vocational High School (SMK), namely: website System Information Alumni & Tracer Study. User Interface is visualized on figure 2 and figure 3.
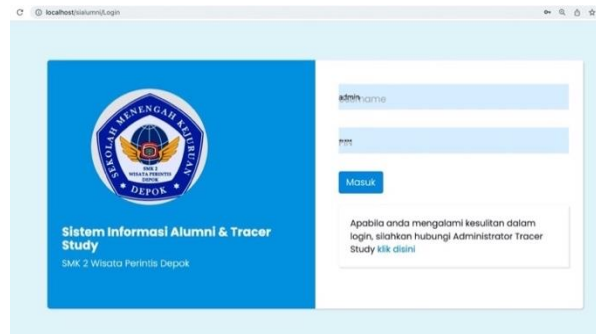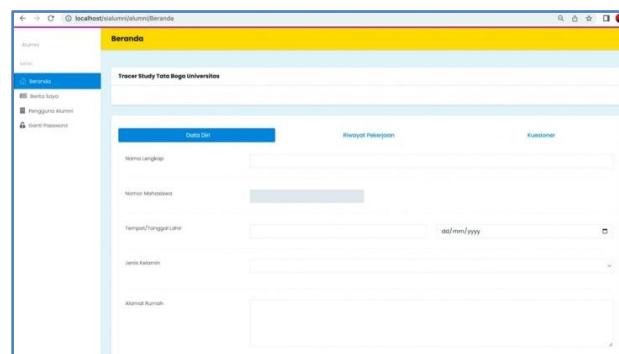

Fig. 2. Page Login

Fig. 3. Page Tracer Study

Testing system on 2 (two) main menu which there is on website tracer study. The test carried out include make flowchart , create flow graph , do calculation complexity cyclomatic , do calculation track independent and test cases

1. Login , at this stage the user accesses to enter the system. Source code for To do login validation is as following :

```
login-function ()

$data-login = validasi($input_login)
if($data-login)
  $status = $this->login-model->cek-login($data-login)
  if (status == 1)
      return view (home)
  then if
      return view (login)
  end
then if
    return view (login)
end
```

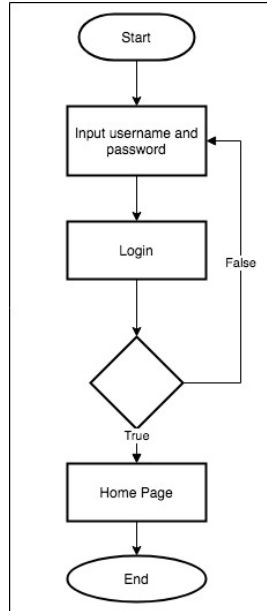Flowchart The login function is shown in Figure 4 and the flowgraph in figure 5 below
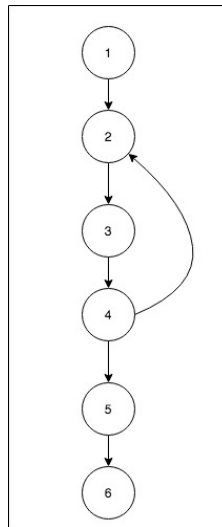:

Fig. 4. Login Flowchart

Fig. 5. Login Flowgraph

Cyclomatic complexity in the image above . Flowgraph The cyclomatic complexity login is calculated in three ways, namely:

a.Graph has 2 regions

b.V(G)= 6 edge – 6 node + 2 = 2

c.V(G)= 1 estimated node + 1 =2, thus the cyclomatic complexity of flow the graph described in Figure above is 2. With the independent path is

Line 1 : 1-2-3-4-5-6

Line 2 : 1-2-3-4-2-3-5-6

The next step is to do test case and graph matrices as described on table 1 and table 2 below :

Table 1. Login Test Case

Path	1
Track	1-2-3-4-5-6
Scenario	1.Start
	2. Enter username dan password
	3. click Login
	4. Validate data and correct
	5. Display the main page
	6.End
Test Result	Succeed
Path	2
Track	1-2-3-4-2-3-5-6
Scenario	1.Start
	2. Enter username dan password
	3. click Login
	4. Validate data and wrong
	5. On the login page an error message appears . Then user re- enter the correct username and password
	6. Click Login
	7. Display the main page
	8. End
Test Result	Succeed

Table 2. Login Graph Matrix

	1	2	3	4	5	6	N(E)-1
1		1					1-1=0
2			1				1-1=0
3				1			1-1=0
4		1			1		2-1=1
5						1	1-1=0
6							
QUANTITY+1							1+1=2

2. Page Tracer Study, at this stage the user fills out a tracer study form to be saved into the system . The source code for white box testing is general for add data after charging questionnaire is as following :

```
<!-- Forms Section-->
    <section class="forms">
     <div class="container-fluid">
      <div class="row">
       <!-- Basic Form-->
       <div class="col-lg-12">
        <div class="card">
         <form action="<?php echo site_url('pengguna/Kuesioner/addJawaban'); ?>" method="post">
          <input type="hidden" name="penggunaID" value="<?php echo $penggunaID ?>" class="form-control">
         <div class="card-body">
          <h4>Daftar Pertanyaan</h4>
          <?php
          foreach ($kuesioner as $k) {
           $pertanyaan = $this->m_kuesioner->getPertanyaanByKuesionerID($k->id);
           foreach ($pertanyaan as $p) {
            if ($p->jenis == 'skala') { ?>
             <table class="table table-striped table-hover table-responsive">
               <thead>
                   </table>
```
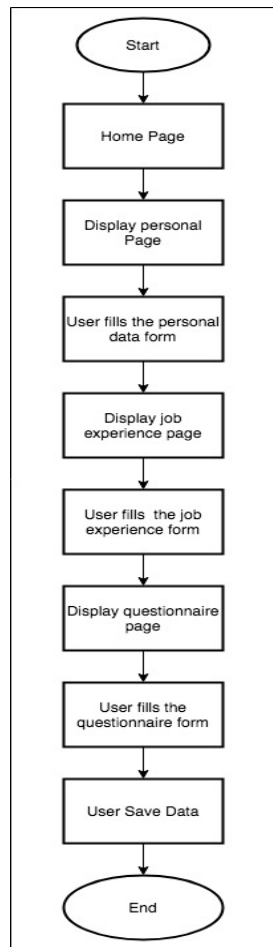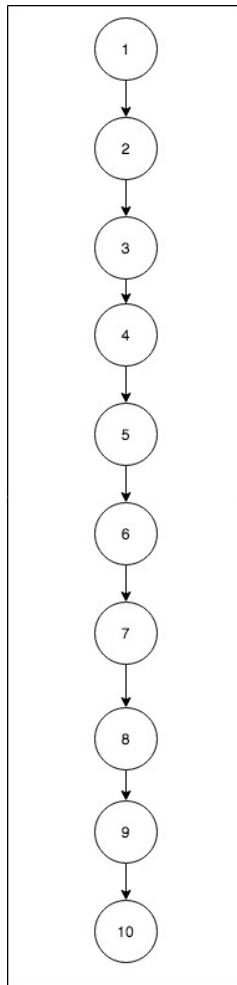
As for flowchart from charging questionnaire tracer study listed on figure 6.

Fig. 6. Flowchart Tracer Study

Fig. 7. Flowgraph Tracer Study

Cyclomatic complexity in the image of figure 7 above . Flow graph The cyclomatic complexity login is calculated in three ways, namely:

a.Graph has 1 region

b.V(G)= 9 edge – 10 node + 2 = 1

c.V(G)= 0 estimated node + 1 = 1, thus the cyclomatic complexity of flow the graph described in Figure above is 2. With the independent path is

Line 1 : 1-2-3-4-5-6-7-8-9-10. To test the path we use test case scenario described on table 3 and the result described on graph matrix tracer study on Table 4

.

Table 3. Test Case Tracer Study

Path	1
Track	1-2-3-4-5-6-7-8-9-10
Scenario	1.Start
	2. Enter the main page
	3. Show personal data form
	4. Filling in personal data
	5. Show work history form
	6. Fill in the work history
	7. Show questionnaires
	8. Filling out the questionnaire
	9. Save data
	10. End
Test result	Succeed

Table 4. Graph Matrix Tracer Study

	1	2	3	4	5	6	7	8	9	10	N(E)-1
1		1									1-1=0
2			1								1-1=0
3				1							1-1=0
4					1						1-1=0
5						1					1-1=0
6							1				1-1=0
7								1			1-1=0
8									1		1-1=0
9										1	1-1=0
10											
			QUANTITY+1								0+1=1

4 Conclusions

Based on study and testing which has conducted on two main menus from website System Information Alumni & Tracer Study , namely on page login and page tracer study with use white box testing based path can be concluded that

a. Applications that have been designed can run well according to the program flow

b. login process and tracer study are in accordance with the decision pathnamely 2 (two) login pages , and 1 (one) tracer study page. Then white test box can run well because it produces the same value.

References

[1] Direktorat Jenderal Pendidikan Tinggi Vokasi. https://tracervokasi.kemdikbud.go.id/ (2022)

[2] Sadiku, P.O., Ogundokun, R.O., Ogundokun, O.E., and Adebayo, A.A.: Interactive Website On Information Dissemination. Telecommunication Computing Electronics and Control. pp 115-123 (2021)

[3] Patil, N., Singh, D., Tamse, A., Prajapati, P.: SIGN SCHOOL-An interactive website to promote Indian Sign Language. Fifth International Conference on Computational Intelligence and Communication Technologies (CCICT), pp. 461-466 (2022)

[4] Dinda, D.R.: Design and Build a Web-Based Riau Tourism Interactive Promotion System Using HTML5 With the Prototype Method (Case Study: Pekanbaru Culture and Tourism Office) . Jurnal Aksara Komputer Terapan. 11 (2022)

[5] Ramadaniah, D., Fitra, J., Satria, F.: Design Of Library Information System Based On Framework Code Igniter Case Study Of Instidla. Asia Information System Journal. pp 15-20 (2022)

[6] Pambudi, RB.,Triayudi, A., Andrianingsih.: Perancangan Sistem Informasi Aplikasi Tracer Study Alumni Berbasis Website. Jurnal Media Informatika Budidarma. pp 642-649 (2020)

[7] Khairunisa, Y., Nurhasanah, Y., Verlaili, R.: Virtual Job Fair Information System Design Based on Augmented Reality/Virtual Reality. Sinkron: jurnal dan penelitian teknik informatika. Vol 7, pp 2449-2461 (2022)

[8] Putra, W.I., Yunica, T., Suhatsyah, M.: Sistem Informasi Developer Properti di PT Sinar Suman Pryanto Berbasis Android. Jurnal TIKAR .Vol 2, pp 107-120 (2021)

[9] Putra, A.D.:Rancang Bangun Aplikasi E-Commerce Untuk Usaha Penjualan Helm. Jurnal Informatika Dan Rekayasa Perangkat Lunak. Vol. 1, pp 17-24 (2020)

[10] Wijoyo, H.:Sistem Informasi Manajemen. (2021)

[11] Suprapti, D., Kamisutara, M., & Artaya, P.: Analisa Pengujian Sistem Informasi Penjualan Menggunakan Metode White Box. Seminar Nasional Ilmu Terapan , Vol. 1, pp. B05-1 (2017)

[12] Ahn, J., Park, J. M., Lee, W. H., & Noh, G. Y.: Website interactivity and processing: menu customization and sense of agency are keys to better interaction design. International Journal of Human-Computer Studies, 147, 10258 (2021)

[13] Haq, M. S., Wicaksono, V. D., Adhe, K. R., & Zawawi, A. A.: Development of Codeigniter-Based Tracer Study Application. In International Joint Conference on Science and Engineering , pp. 304-309 (2020)