COUNSELING SYSTEM INTEGRATED ON THE WEB UNIT COUNSELING SERVICES FOR THE DEPARTMENT OF INFORMATIC ENGINEERING AND COMPUTER FACULTY OF ENGINEERING, STATE UNIVERSITY MAKASSAR

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ABSTRACT
The aim of this research is to produce an integrated counseling information system on the web of the counseling service unit of the department of informatics and computer engineering, Faculty of Engineering, Makassar State University and find out the results of system testing using ISO 25010 with 8 testing aspects. This research is a type of software design research (software development) and uses a prototype design model with stages: gathering requirements, building a prototype, evaluating the prototype, coding the system, testing the system, evaluating the system, and using the system. The subjects of this research were students from the Department of Informatics and Computer Engineering, Makassar State University. Data collection instruments were carried out through validation test sheets, student response questionnaires, and system expert assessment instruments. The results obtained from this research are: (1) Functional suitability of the system created is 100% "Acceptable" criteria. (2) Performance efficiency obtained a result of 83.0% in the grade B "Good" category. (3) Usability obtained a percentage of 89% 98 respondents with the criteria "Very Good". (4) Compatibility shows that the system is made compatible with browsers so that it is expressed properly without causing problems. (5) Security obtained a grade of A+ "Very Good" in terms of security and no dangerous viruses were found on the system. (6) Reliability obtained as a percentage of 100% so it can be concluded that it meets the reliability aspect. (7) Maintainability obtained from the instrumentation, consistency and simplicity aspects can be categorized as good and meets the standards. Portability shows that the system can be accessed in a variety of different browsers. Based on the test results, it was concluded that the counseling information system integrated on the web of the counseling service unit of the informatics and computer engineering department, Faculty of Engineering, Makassar State University was suitable and acceptable for use.

Keywords: Information Systems, Counseling, Technology Innovation, Web

1. Introduction

Currently, advances in information technology have become an inseparable part of people's lives. Thanks to technological advances (globalization), we now have direct access to various information that occurs in various parts of the world. If in the past we knew the proverb 'the world is not as wide as a moringa leaf', now this proverb should have changed to 'the world is as wide as a moringa leaf'. This is because the ability to access information quickly from various parts of the world has made the world feel smaller, because we can be in Indonesia and see what is happening in the United States, for example.

Students in the Informatics and Computer Engineering Department cannot be separated from lecture activities. Lecture activities are the most basic activities, meaning that the success or failure of achieving educational goals depends a lot on how the students themselves experience the learning process, according to [1], learning is "a process of effort carried out by someone to obtain a change in behavior that new as a whole, as a result of his own experience in interaction with his environment." Meanwhile, according to [2], learning is "a process of effort carried out by a person to obtain a new change in behavior as a whole. The process of effort carried out by a person to obtain a new change in behavior as a whole as a result of his own experience in interaction with his environment. Nowadays, the pace of development of science and technology is very rapid. Advances in science in the world of education continue to improve its quality [3].
Website development is now an attraction in technological development and for broadcasting [4]. Considering that visual competition has grown so competitive, attractiveness has become an important requirement. Matter this necessitates the need to build a website more sophisticated.

Guidance and counseling services, as an integral and inseparable part of all educational activities, should enable students to actively and dynamically know and accept themselves and their environment, and effectively and productively choose, determine, direct and realize themselves in accordance with the demands of their role in the classroom. Future career guidance must enable them to do this.

The objectives of career guidance in the Information Technology Department are (1) developing career and life in the future, (2) maximizing one's potential and strengths, (3) adapting to the educational environment, society and the learning environment, and (4) overcoming obstacles and difficulties to learn and adapt to educational, social, and work environments. Counseling service programs in higher education do not differ significantly from services in secondary education and can be understood as a series of guidance activities that are planned, organized, and coordinated over a certain period of time, for example, one academic year. Tutoring services at public universities are intended to provide a forum for consultation and discussion about student issues and future career paths, to direct students toward their personal development and to encourage their growth.

The process by which an individual exceeds the limits of his abilities. It can be concluded that stress coping is an effort to overcome and deal with stressful situations. Students who are writing a dissertation can minimize stress by using stress coping strategies. Even though some students know coping strategies, others don't know how to minimize stress.

Based on awareness of this problem, the author wants to create a web-based guidance and counseling system to improve learning achievement in lectures and reduce student stress levels. With the existence of web counseling and guidance in the Department of Informatics and Computer Engineering, it will become a medium for students of the Department of Informatics and Computer Engineering to reduce their stress levels, a means of motivation to improve the quality of their education and reduce stress levels which cause poor student achievement in the Department of Information and Computer Engineering. The hope is that this can be realized.

2. Materials and Methods
   a. Types of Research
      This research uses a type of software design research (software development) for an integrated counseling system on the web of the counseling service unit of the informatics and computer engineering department, Makassar State University engineering faculty.
   b. Place and Time of Research
      This research was conducted on the Makassar State University campus, specifically in the Informatics Engineering Department, Faculty of Engineering, Makassar State University. The research will be carried out from June to September 2023.
   c. Design and Build Model
      The model used in the design of this web-based information system is a prototype model. There are seven stages used in implementing the prototype design model, namely analysis and collection of system data, building a prototype, evaluating the prototype, coding the system, testing the system, evaluating the system and using the system. Here's what the prototype model looks like.
   d. System design
      Following system design is used in this research:
      1) Use case diagram
         In the use case diagram model, it explains how the actor interacts with the system. There are 3 actors in the use case diagram, namely user (student), admin, and counselor.
      2) Context diagram
         A context diagram is a general diagram of a system connected to a wider environment, and a context diagram has only one view to describe processes in the system. Context diagrams describe the input and output of a system.
      3) Data flow diagram
         Data flow diagrams are used to describe the flow of data from interconnected processes in existing systems or new systems being developed in a logical, structured and explicit way.
      4) Flow chart
         A flow chart is a flow chart that describes a process sequence in detail and is related to a process. Processes in flow diagrams are represented by symbols, which are the basic rules of flow diagrams. In other words, flowchart is a diagram of the flow of work in a system. In general, a flowchart functions as a document that describes the logical workflow of a system or network. Each step is drawn in diagram form and connected with lines or arrows. Flow chart plays an important role in determining steps and functions.
      5) Story boarding
         Storyboards visualize the application that will be built and can later provide an overview of the application.
3. Results

The following is a description of the design process for a web-based bullying violence complaint service information system at the Department of Information and Computer Engineering, Makassar State University. Prototype stages as a design model in this research:

a. Gathering requirements

The first thing in this research is collecting needs. Needs were gathered directly by observing and conducting interviews with Lecturers in the Counseling Services Unit of the Informatics and Computer Engineering Department online via the Google meet room meeting platform on June 30. Interviews were conducted with the aim of obtaining a collection of materials that will be used in creating a website. The following are the results of the initial requirements gathering process: a. The Informatics and Computer Engineering Department requires.

1) online-based media (website) that is used as a forum for conducting counseling guidance as well as a place for students to do things consultation with the counseling service unit.

2) Counselors consist of counseling service unit lecturers who can follow up on applications for counseling guidance as a step to help students overcome the problems they face.

3) Admin consists of counseling service unit lecturers

4) The system is made simple and easy to use so that users have no difficulty in applying for counseling services. And it is made private so that the counselor's data not spread and unknown to other parties.

5) Student login is integrated with the IDS account that has been created previously.

b. Develop a prototype

After the data collection stage, the second stage was to prepare a prototype. In this second stage, a temporary design has first been created which is shown to the client/customer. The design created includes the input, process and output of the system, using Unified Modeling Language (UML) modeling and the design of the system's user interface.

c. System coding

The next stage is coding the system, where the system coding stage has been designed and mutually agreed to be made in the form of a programming language. This application uses PHP as a programming language, MySQL as a database and Laravel as a framework. Visual Studio Code is used as a code editor. Below is the coding used to create this system:

![Figure 1. Display of the login page](image)
d. System testing

1) Aspects of functional suitability

System testing uses functional suitability aspects to determine the level of suitability of the system being created. The assessment was carried out based on test cases, with a total of 66 questions related to the function of each feature created on the web-based system. The Counseling System that is Integrated on the Web of the Counseling Service Unit in the Department of Information and Computer Engineering, Faculty of Engineering, Makassar State University, was assessed by 2 (two) system experts. The Guttman scale is used in the answers to each question item. The system expert will carry out a checklist for each question if the function can run well. However, if the function of each feature does not work then the system expert will check the "No" column. The following are the test results from the functional suitability aspect in table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Answer</th>
<th>Score by validator</th>
<th>Score by validator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Validator 1</td>
<td>Validator 2</td>
</tr>
<tr>
<td>1</td>
<td>Yes</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1. Recapitulation of test results for functional suitability aspects

Based on the results of the system expert testing above, it can be concluded that the two validators stated that all features could run well and a score of 132 was obtained. The following is the functional suitability test score if measured in percentage using a formula.

\[
\text{Eligibility percentage(\%)} = \frac{\text{Earned score}}{\text{Maximum score}} \times 100\% \quad \text{...........................................(1)}
\]
Eligibility percentage(%) = \frac{132}{132} \times 100\% \hspace{1cm} (2)

Eligibility percentage(%) = 100\% \hspace{1cm} (3)

In accordance with these calculations, the percentage results obtained are more than 50%, so if the results are converted to qualitative data and adjusted to the assessment scale of the feasibility percentage, it can be concluded that the quality of the Counseling System Integrated on the Web Counseling Service Unit in the Department of Informatics and Computer Engineering, Faculty of Engineering, University Makassar State is acceptable and meets the functional suitability aspect.

2) Performance efficiency testing

Performance efficiency testing was carried out with the help of the GTmetrix site. This test is carried out to determine the average value of each page and the response time tested. The following are the results of performance efficiency testing using the GTmetrix site:

![Figure 3. Results of performance efficiency testing](image)

Based on the results of quality characteristic testing efficiency using GTmetrix obtained an average score of 83% or the grade is "B" so it was concluded that the system was declared good in terms of quality efficiency.

3) Usability testing

Usability testing was carried out using a questionnaire and using a Likert scale as an assessment. Usability testing is carried out to find out how users respond to the website created. The usability instrument consists of 20 statement items, the questionnaire was filled in by active students of the Informatics and Computer Engineering Department with a total of 30 students as respondents. Users of the Counseling System that is Integrated on the Web of the Counseling Service Unit in the Department of Information and Computer Engineering, Faculty of Engineering, Makassar State University will provide an assessment from point 1 (Strongly Disagree) to point 5 (Strongly Agree). The following is a recapitulation of usability testing results in Table 2.

<table>
<thead>
<tr>
<th>No</th>
<th>Percentage (%)</th>
<th>Category</th>
<th>Respondent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81% - 100%</td>
<td>Very Practical</td>
<td>23</td>
<td>76.67%</td>
</tr>
<tr>
<td>2</td>
<td>61% - 80%</td>
<td>Practical</td>
<td>7</td>
<td>23.33%</td>
</tr>
<tr>
<td>3</td>
<td>41% - 60%</td>
<td>Less Praktis</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>0%&lt; 20%</td>
<td>Impractical</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

Based on the data in Appendix 2.2 based on this data, the score obtained from usability testing is 2.662. Then if it is measured in percentage assessment using the following equation formula.

Percentage of user responses(%) = \frac{\text{Earned score}}{\text{Maximum score}} \times 100\% \hspace{1cm} (1)

Percentage of user responses(%) = \frac{2662}{3000} \times 100\% \hspace{1cm} (2)

Percentage of user responses(%) = 88.73\% = 89\% (rounded) \hspace{1cm} (3)
Based on the calculations above, it can be concluded that the percentage of user response to the system created is 89%. The percentage of respondents can be converted to qualitative data with the criteria "Very Good" because it is in the range 81-100%. So, the Counseling System that is Integrated on the Web of the Counseling Service Unit in the Department of Information and Computer Engineering, Faculty of Engineering, Makassar State University meets the usability aspect.

4) Compatibility testing

Compatibility testing was carried out using the PowerMapper web tool. How web tools work powermapper, which will run a web information system for complaints of bullying violence in various browser versions.

![Figure 4. Test Results Using Powermapper](image)

Compatibility testing shows that the counseling service information system is compatible with Edge version 118, Firefox version 118, Safari version 17, Opera version 102, Chrome version 118, iOS version 16, and Android version 118. So, it can be concluded that the Counseling System is Integrated on the Web Unit Counseling Services in the Department Informatics and Computer Engineering, Faculty of Engineering, Makassar State University, was successfully run in several browser versions well and did not cause problems on the web.

5) Security testing

Security testing is carried out to determine the security level of the system. By using web testing tools from ssllabs.com and virustotal.com.

![Figure 5. Results of security testing using ssllabs.com](image)
In security testing using Ssllabs, results were obtained with grade A+, which can be stated that the system created is good in terms of security. Then, testing using virustotal showed that there were no dangerous viruses found on the system.

6) Reliability testing

This test uses the loadImpact web tool, used for system testing when receiving requests from several users simultaneously. In this case, 20 users are used who can access the web for 5 minutes 30 seconds.

![Figure 7. Reliability testing results](image)

**Table 3. Recapitulation Of Reliability Testing Results**

<table>
<thead>
<tr>
<th>No</th>
<th>Results</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The number of requests that were successfully executed</td>
<td>3000 requests</td>
</tr>
<tr>
<td>2</td>
<td>The number of requests that failed to execute</td>
<td>0 request</td>
</tr>
<tr>
<td>3</td>
<td>Number of requests executed per second</td>
<td>14 requests/second</td>
</tr>
<tr>
<td>4</td>
<td>Average time required for responded to requests</td>
<td>1526 ms</td>
</tr>
</tbody>
</table>

Source: (Data processing result, 2023)

\[
k = \frac{n - f}{n} = 1 - \frac{f}{n}
\]

\[
k = \frac{3000 - 0}{3000} = 1 - \frac{0}{3000} = 1
\]

Percentage = 1 x 100% = 100%

It was declared reliable because it obtained test results with a percentage of 100% and the system testing was declared to meet the reliability aspect.
7) Maintainability testing
The system that has been created is observed directly in this test. This test is carried out based on three aspects including instrumentation, consistency, and simplicity.

Table 4 Recapitulation of maintainability test results

<table>
<thead>
<tr>
<th>Aspek</th>
<th>Penilaian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation</td>
<td>This system has an error notification if an error occurred while accessing the system</td>
</tr>
<tr>
<td>Consistency</td>
<td>This system uses models and views Consistent design every page</td>
</tr>
<tr>
<td>Simplicity</td>
<td>This system uses the MVC concept so easy to repair and makes the manufacturing process more efficient.</td>
</tr>
</tbody>
</table>

Source: (Data processing result, 2023)

The maintainability test results obtained met all three aspects of the assessment, so it can be concluded that the information system for complaints of bullying violence in the Department of Informatics and Computer Engineering meets standards.

8) Portability testing
Portability testing uses a web browser testing tool, namely browserstack.com. This test is carried out by checking the system using a browser different. In this test, 5 types of browsers were used with 3 different types of operating systems.

Table 3.6 Recapitulation of portability test results

<table>
<thead>
<tr>
<th>No.</th>
<th>Browser Type</th>
<th>Type</th>
<th>Operating System</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Microsoft Edge</td>
<td>Desktop</td>
<td>Windows 11</td>
<td>No Errors Found</td>
</tr>
<tr>
<td>2</td>
<td>Mozilla Firefox</td>
<td>Desktop</td>
<td>MacOs</td>
<td>No Errors Found</td>
</tr>
<tr>
<td>3</td>
<td>Chrome</td>
<td>Desktop</td>
<td>Windows 11</td>
<td>No Errors Found</td>
</tr>
<tr>
<td>4</td>
<td>Opera</td>
<td>Desktop</td>
<td>Windows 11</td>
<td>No Errors Found</td>
</tr>
<tr>
<td>5</td>
<td>Chrome</td>
<td>Mobile</td>
<td>Android 12</td>
<td>No Errors Found</td>
</tr>
</tbody>
</table>

The portability test results of the system can be opened and run smoothly and there are no errors if run on different browsers. So, it can be said that the system meets the portability aspect.

e. System evaluation
After carrying out the system testing stage, the next step is to evaluate the system. This stage is the stage of improving the system based on comments and suggestions given by users. As for the final calculation results of usability testing, the percentage obtained was 89% and functional suitability testing obtained a value of 100%, so it was found that the quality of the Integrated Counseling System on the Web Counseling Service Unit in the Department of Informatics and Computer Engineering, Faculty of Engineering, Makassar State University was appropriate and could be continued to the next stage. Furthermore.

f. System usage
After the system evaluation stage, the final stage of system creation is system use. The Integrated Counseling System on the Web of the Counseling Service Unit in the Department of Informatics and Computer Engineering, Faculty of Engineering, Makassar State University which has been created is then ready to be used by students of the Department of Informatics and Computer Engineering who wish to provide counseling guidance.

4. Discussion
The system created still needs development in the future, including a system model that can still be developed in terms of appearance to make it more attractive for users to use and the menus contained in the system will be complete and more detailed in the future. It is hoped that future researchers will be able to develop the system so that it can be integrated with the IDS account of the Engineering Department. Informatics and Computers

5. Conclusions
Based on the results of research conducted by researchers, it can be concluded that:

The results of designing a Counseling System that is Integrated on the Web of the Counseling Service Unit in the Department of Information and Computer Engineering, Faculty of Engineering, Makassar State University, made using a prototype model. This information system is used as a place to submit counseling schedules within the scope of the Department of Informatics and Computer Engineering, as well as a place for students to conduct counseling with counselors. This system is used by 3 actors, namely Admin, Counseling Guidance Lecturer as Counselor, and Students. This system uses the Laravel framework, with the PHP programming language and uses MySQL for the database.
Test results using the ISO 25010 standard with 8 test aspects, obtained for functionality suitability test results with a feasibility percentage of 100% so that they are declared acceptable, then the performance efficiency test gets a result of 83% which is in the grade B "Good" category and has met the load time less than 10 seconds. Usability testing was carried out by distributing questionnaires to 30 respondents, resulting in a percentage score of 89% with the criteria "Very Good". Suggestions that can be conveyed based on the results of research on the development of learning media in the Android-based technology innovation course include, for other researchers, it is recommended that this research be used as a source of input so that later learning media developed not only for Android but also can be accessed by iOS or others. In addition, researchers can also add some additional features to improve the excellence and quality of applications that have been developed. For students, it is recommended to take advantage of android-based learning media to support the learning process both on campus and off campus.

Compatibility testing shows that the system is compatible with Edge, Firefox, Opera, Chrome and Android and is stated to be good because it can run successfully in several browser versions and does not cause problems on the web. Security testing results obtained with grade A+ which can be stated that the system created is very good in terms of security and does not show the presence of dangerous viruses on the system. Reliability testing obtained a percentage result of 100% so it can be concluded that the test meets the reliability aspect. Maintainability testing is carried out based on aspects of instrumentation, consistency and simplicity which can be categorized as good and meet the standards. Portability testing uses five different browsers, namely Microsoft Edge (Windows 11), Mozilla Firefox (Windows 11), Chrome (Windows 11), Opera (Windows 11), and Chrome (Android 8) and shows that the system can be accessed in various browsers. different whether using desktop or mobile.

References