CHAPTER VI

SYSTEM TESTING

6.1 System Testing Overview

System testing is one of important phase in system development life cycle. By testing the software, errors on the system code will be discovered. To ensure a zero defect software, a proper testing must be done to the system. Improper and inadequate testing will result in undetected errors that cause system failure and the software unreliable.

6.2 Test Case Design

One of the objectives in test case design is to uncover the most number of errors with minimum amount of time and effort. Three approaches have been proposed for this purpose. There are:

a. Functional/Black-box Testing

Test is design to ensure the functions specified in the software is functioning as intended and work properly.

b. Structural/White-box Testing

Test the logic aspect of the coding is run accordingly.

c. Interface Testing

Test the user interface design as intended in the program specification.
The on-line examination for Information Technology software is a web-based application. The system was tested in three phases that are unit testing, integration testing and system testing.

6.2.1 Unit Testing

Unit testing concentrates on individual module of the web page. Every web page is tested using Personal Web Server to ensure it runs as intended and without error. Error found was debugged using Microsoft Visual Interdev or Macromedia Dreamweaver web editor software.

6.2.2 Integration Testing

Integration testing is done to examine the integration of tested individual web-page unit is working properly when connected to its links page. This will ensure the commands such as submit button can post input data to the defined pages for further processing.

6.2.3 System Testing

System testing is the final stage on the software testing. The system testing main objective is to ensure the entire system requirements and logics are perform and validated. Test were also done to the database connection and the compatibility of the hardware defined.
6.3 User Acceptance Test

User acceptance testing is a test on the system to evaluate and demonstrate that the system is ready for operational use. The software customer or the mass public in their environment performs the test. Responses from the system user upon completing the test will be very valuable input to finalize development process. Final modification can be done according to the customer comments. It is a normal practice by major software warehouse to distribute beta version of their solution as a freeware or shareware over the Internet to get feedback from customer or interested public.

The on-line examination for Information Technology subject user acceptance test was done on a group of students taking Information Technology subject from Sekolah Menengah Pandan Indah, Ampang. Eleven students had taken part in the test. It includes a survey to get the respondents feedback on the developed software. The user testing process includes:

a) Mock test

b) Questionnaire.

The software produced a set of multiple-choice type of question web page with a number of randomize question. A server program will mark the user answer and input the result to a database. The survey respondents were given chance to take the mock test.
To start the test, the respondents had to login to the system main page and try the username and password given to them. If the login process were successful, they would be directed to the examination question web page. If not, they will be redirected to the login page to reenter the user name and password. The respondents were given 15 minutes to complete the test consisting of ten questions. A questionnaire were distributed to the respondents once their completed the test.

The questionnaire consist of 10 statement as the following:

a) Instruction given to use the web solution is sufficient.

b) Method use to authenticate candidate is appropriate.

c) User can use the web page once they are authenticated, without problem.

d) The web solution is user friendly.

e) Method use to submit response is practical.

f) There are errors on the web solution.

g) Web page download time is fast.

h) User can hack the server to get correct answer.

i) The web solution is suitable to be implemented in the SPM examination for Information Technology subject.

j) The responses submit for the examination is mark accordingly by the server.
The respondent must select a value of 1 to 5 to represent their opinion on every statement given on the questionnaire. The scale represents the following value:

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<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Very disagree</td>
<td>Disagree</td>
<td>Not sure</td>
<td>Agree</td>
<td>Very agree</td>
</tr>
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### 6.4 Data Analysis on Student Responds

The first item in the questionnaire was a statement pertaining to sufficiency of the instructions given on the software. A total of 64% of the respondents agreed that the instructions were sufficient while the next 36% selected the very agree option.

![Bar chart](image)

*Figure 6.1: Instruction given on the examination web page.*

The second item was on the appropriateness of checking valid user as the method to verify the candidates. About 9% of the respondents did not agree, 18% not sure, another 18% agreed with the authentication process while the rest were strongly agreed with the method used.
Figure 6.2: Authentication method applied on the web page.

On the statement about easiness in accessing the web page problems faced to access the web page after the correct user name and password keyed in, 18% did not agree, 27% and 55% agreed and strongly agreed respectively.

Figure 6.3: Smooth web browsing after candidates are verified

The following statement was on user friendliness feature of the examination web page. 9% of the respondents did not agree that the web solution is user friendly, 27% not sure with the user friendliness, while 18% agreed and 45% strongly agreed that the solution is user friendly.
To submit the examination response, mouse click event method is applied. All the respondents agreed with this method with 36 % voted for agree and the other 64 % voted strongly agree.

On the statement that there are errors on the solution, 27 % of the respondents were strongly disagreed, 9 % disagreed and 36 % of the respondents selected the not sure option. However, 18 % and 9 % selected agree and strongly agree options, respectively.
The seventh statement suggests that access time to the web page is fast. 9% of the respondents agreed with the statement while the other 18% were not sure. The next 27% of the respondents agreed while the other 45% strongly agreed with the statement on access time.
The next statement provokes the candidates that they can hack to get correct answer. 45% of them strongly disagreed, 9% disagreed, 27% not sure while the other 9% were strongly agreed with the statement.

![Figure 6.8: The possibility of web page hacking by the candidates](image)

Statement number nine suggested that the Information Technology subject could use the solution to substitute the existing system. 9% strongly disagreed, 27% agree while the other 64% strongly agreed with the suggestion.

![Figure 6.9: The suitability of the web solution to be implemented as the Information Technology examination solution](image)
The final statement suggests the examination response submitted will be marked correctly by the receiving server. 18% of the respondents were not sure with the statement, 9% agreed while the next 73% selected the strongly agree option to support the statement.

![Graph showing responses](image)

*Figure 6.10: Respondents trust on the marking done by the examination server*

From the analysis above, it is fair to conclude that the respondents favor the web solution proposed for the Information Technology on-line examination provided minor adjustment be made to the software.