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National Exam Try Out Application Design At SMP Negeri 35 Makassar

Dewi Angraini[1]*, Ernie C. Avila[2], Robbi Rahim[3], Supriadi Sahibu[4]

[1]*Department of Informatics, Akba Technology University Makassar, Makassar, Indonesia*
[2]*Polytechnic University of the Philippines, Manila, Philippines*
[3]*Sekolah Tinggi ilmu Manajemen Sukma, Medan, Indonesia*
[4]*Department of Computer Systems, Universitas Handayani Makassar, Makassar, Indonesia*

Abstract

The problem with the current system is that Try Out for the National Examination at SMP Negeri 35 Makassar is still done manually, therefore I provide a solution for designing the Try Out application, which produces an application that can help students in preparation for the National Examination. This research aims to design an effective and efficient national exam try-out application at SMP Negeri 35 Makassar, implementing the Dynamic System Development Method (DSDM) at SMP Negeri 35 Makassar. This data was obtained through literature studies and interviews. Data analysis uses PHP programming scripts and MySQL data. The results of this research show that the Try Out application is user-friendly, has an attractive appearance, and has complete features that can make things easier for students, especially in carrying out Try Outs, so that the process of processing test results is more effective and efficient, the Try Out Application is quite good, useful for users and so needed that it was declared feasible based on the tests carried out, with an average score of 86.00% from 44 respondents.

Keywords: Dynamic System Development Method (DSDM), Students, National Exam Try Out.

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Introduction

Continuous development needs to be carried out to improve the quality and services of education at the junior high school level, to make the process more effective and efficient, and to produce intelligent and high-quality students (Majir, 2020). Many tutoring institutions offer various try-out programs for national junior high school exams (Santoso, 2019). The aim is to improve students' performance in national exams and allow them to take quality high school entrance tests in line with their expectations (Gurubagi, 2021). Tryout is an exercise method to train and expand students' knowledge before facing the national exam (Yusuf, 2021), (Ujione, 2023).

Studying or taking courses at tutoring institutions is relatively expensive, and not all students' parents can afford it due to differences in financial levels. Tryouts are also a method of preparing students for the National Examination (Fauzan & Mukminan, 2019). Teachers who teach national exam subjects, such as science, mathematics, Indonesian, and English, provide additional tutoring or extra lesson hours outside school hours to improve learning achievement and National Exam results (Zagranski et al., 2008). Every year, SMP Negeri 35 Makassar holds a national exam simulation test at their school, which does not cause excessive financial burden for students. However, challenges arise in terms of the use of paper as a means of administering the test and the time required to evaluate answers and announce the results. This process has the potential to result in additional costs that must be borne by students.

Written exams or conventional exams have been held for years and are still applied today (Sitohang et al., 2023). The exam is held using writing equipment as a means of testing, such as answer sheets, question papers, pencils, pens, and general writing utensils. Learning assessment is carried out through exams to assess the extent of students' intelligence and skills in understanding the various subject matter that has been studied. If the achievements achieved by students have not reached their peak or are not in line with expectations, steps to improve learning need to be increased, both in terms of quality and quantity (Octavia, 2020).

Labulan & Effendi, (2012) (Nadmilail et al., 2022) define the Smart Try Out System (hereinafter abbreviated as STOS) as computer software designed to assist students in carrying out structured and guided practice problems, enabling them to solve various similar problems efficiently and accurately (Harto, 2021). The development of STOS is intended to

*Corresponding author.
E-mail address: dewiangraini@gmail.com (Dewi Angraini)

provide training to students so that they are better prepared for the real national exam (Purwanto et al., 2021). The use of computer-based assessment instruments is considered a potential means of measuring the quality of education more efficiently and effectively (Aisah & Harihayati, 2019). This computer-based exam model is designed to utilize multimedia and various available interaction facilities (Khoiron & others, 2021).

Several obstacles in implementing trials at SMP Negri 35 Makassar include the use of paper which is still dominant, where students take the tryout test directly (Dafitri et al., 2023), (Iskandar, Kartowagiran, Haryanto, Asma, et al., 2023) (Safi'ie & Prabawa, 2021). This results in the significant use of paper in testing, and there is no automated system or method to check the suitability of answers to the answer key (Sartika, 2023). The process requires significant duration and involves additional expenses that must be borne by the students (Caeira et al., 2020). Apart from that, announcing the results of the tryout also takes quite a long time.

From the previous explanation, it is recommended to develop a web-based national exam try-out application at SMP Negeri 35 Makassar (Firmansyah, 2018). This application is designed to provide support and convenience for schools and students in carrying out the tryout (Harmadya et al., 2015). The design of the national exam try-out application aims to prepare and evaluate the ability of third-grade students at SMP Negeri 35 Makassar to face the national exam (Sulaiman et al., 2020). This application provides practice questions on Science, Mathematics, Indonesian, and English, as well as makes it easy for schools and students to carry out national exam tryouts using computer-based exams (CAT) (Rusdiana, 2014), (Iskandar, Kartowagiran, Haryanto, Amiruddin, et al., 2023). Apart from that, this application also aims to improve students' understanding and provide scientific insight, so that they can pass the exam with optimal results. All questions in this tryout application are multiple-choice (Hartono & Kristiawan, 2015).

Based on this information, research will be carried out with the title "Designing the National Exam Try Out Application at SMP Negeri 35 Makassar." To build an effective and efficient system, the method that will be used is the Dynamic System Development Method (DSDM) (Stapleton, 1999). This method is a framework that emphasizes continuous user participation with an iterative and incremental development approach, to manage projects effectively and efficiently (Voigt et al., 2004). DSDM acts as a guide to improve functions optimally, provide functionality efficiently and effectively, and meet real needs in a project. By looking at the ineffectiveness and inefficiency of developing the national exam try-out system at SMP Negeri 35 Makassar, research entitled "Implementation of the Dynamic System Development Method (DSDM) in the Design of the National Exam Try Out Application for SMP Negeri 35 Makassar" was conducted (Tangui et al., 2016), (Iskandar & Rizal, 2018). The hope is that the implementation of the national exam try-out application at SMP Negeri 35 Makassar can overcome existing problems at the school and increase the effectiveness of the school.

Method

In this study, the author conducted research at SMP Negeri 35 Makassar located on Jalan Telegraf Utama No. 1 Telkomas Housing Complex, Berua Village, Biringkanaya District, from March-April 2020. The data collection methods employed encompassed various approaches to ensure a comprehensive understanding of the research context. Firstly, the observation method was utilized, involving direct observation and the examination of conflicts within the field. The focus of this method was to explore the relationships between observed conflicts and the research object under investigation, as emphasized by (Iskandar, Fitriani, et al., 2023).

Secondly, the interview method was employed as an interactive activity to engage in discussions and pose questions to diverse sources considered knowledgeable or experienced in matters related to the research problem. This approach, in line with (Siregar, 2002), (Iskandar, 2017) aimed to extract valuable insights and perspectives from individuals with expertise relevant to the research focus. Lastly, a literature review was conducted as a method to fortify the research foundation. This involved a thorough search for literature and sources that could contribute to elucidating the identified problem.

The review encompassed both traditional sources such as books and contemporary references from the internet, all of which were aligned with the specific object of the research problem. By integrating these diverse data collection methods, the research sought to provide a nuanced and holistic understanding of the dynamics and issues prevalent at

SMP Negeri 35 Makassar. Each method was strategically chosen to complement the others, contributing to the robustness of the study's findings.

In this method section, there are flowcharts, use cases, and activity diagrams as follows in Figure 1.

1. Flow chart

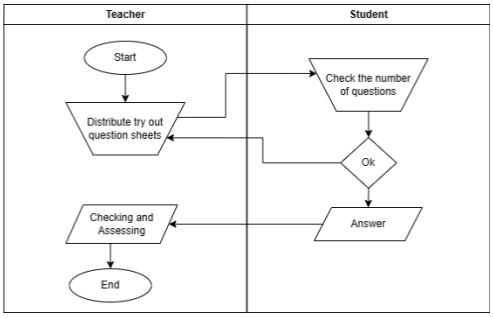

Figure 1. Flowchart of the running system

The tryout process is carried out according to the process above, after all the students have entered the room, the teacher distributes the question sheets, after that the students check whether the questions are not wrong or unclear, after that the students work on the practice questions (Setiawan, 2021). Once completed, the answers will be collected by the teacher and then checked and assessed.

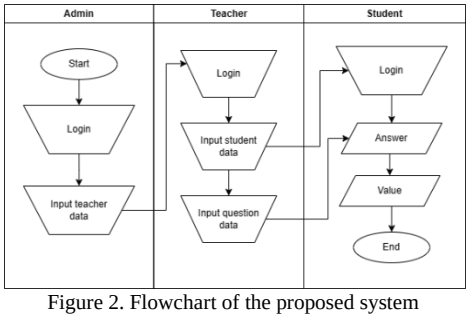

Figure 2. Flowchart of the proposed system

The proposed system is as in the picture above, where the admin first inputs teacher data, after being registered, the teacher can input student data and input question data. After that, students log in to answer the questions that have been activated by the teacher, after completion the student's grades will be displayed.

2. Use Cases

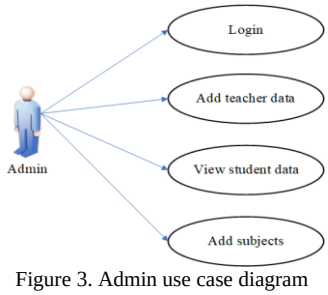

Figure 3. Admin use case diagram

The admin use case diagram describes the activities that can be carried out by the admin after logging in (Kurniawan, 2018). These activities include adding teacher data which can be used to add teacher data, changing teacher data, and

even deleting teacher data, viewing students which can be used to view registered students, and adding subjects is used to add subjects and delete subjects.

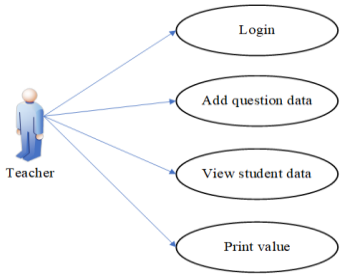

Figure 4. The teacher Use Case diagram

The teacher use case diagram describes the activities that can be carried out by teachers after logging in. These activities include managing question data which can be used to add question data, change question data, and even delete question data, managing student data which can be used to view students, add students, activate students, and delete students, and print grades which are used to print exam results.

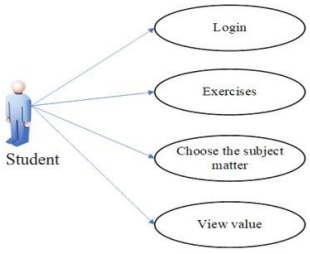

Figure 5. Student Use Case Diagram

The student use case diagram describes the activities that students can carry out after logging in. These activities include choosing subjects, selecting subject questions to be answered, and seeing the grades after answering practice questions.

3. Activity diagrams

The activity diagram for each Use Case is depicted in the following design Figure 6-14.

a. Admin Login Diagram

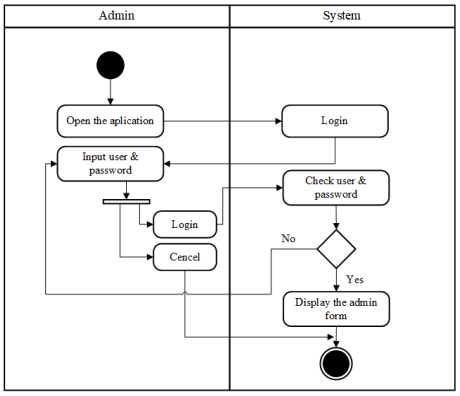

Figure 6. Admin login diagram

The login diagram illustrates the process that the admin must carry out before entering the application by entering the user and password correctly (Kulkarni & Srinivasa, 2022), (Tanoto, 2020).

b. Teacher Login Diagram

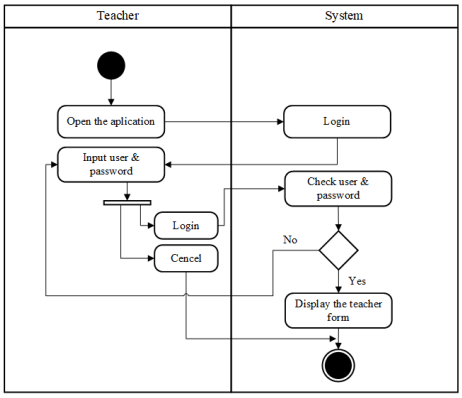

Figure 7. Teacher login diagram

The login diagram illustrates the process that teachers must carry out before entering the application by entering the user and password correctly.

c. Student Login Diagram

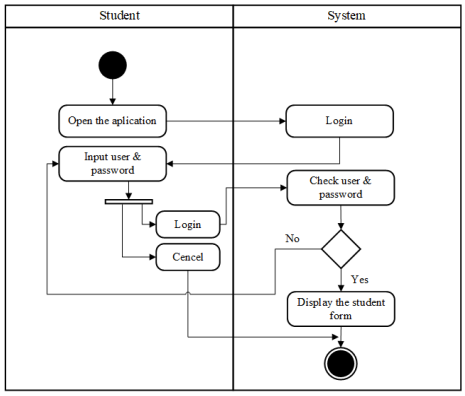

Figure 8. Student login diagram

The login diagram illustrates the process that students must carry out before entering the application by entering the user and password correctly.

d. Student Management Diagram

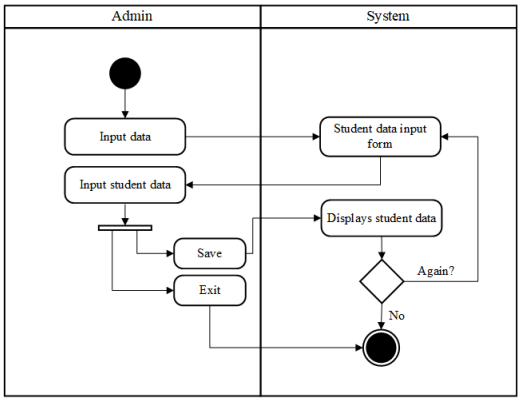

Figure 9. Student management diagram

The student management diagram describes the process that can be carried out by teachers, namely being able to input student data into a database.

e. Teacher Management Diagram

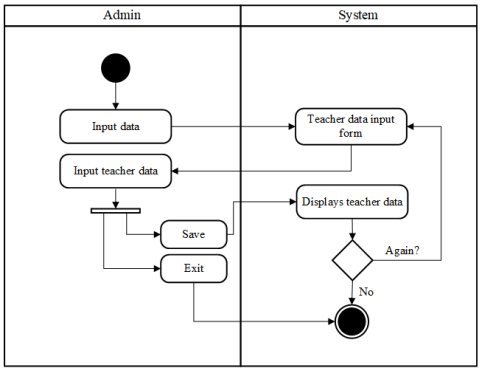

Figure 10. Teacher management diagram

The teacher management diagram describes the process that can be carried out by the admin, namely being able to input teacher data into the database.

f. Question Data Management Diagram

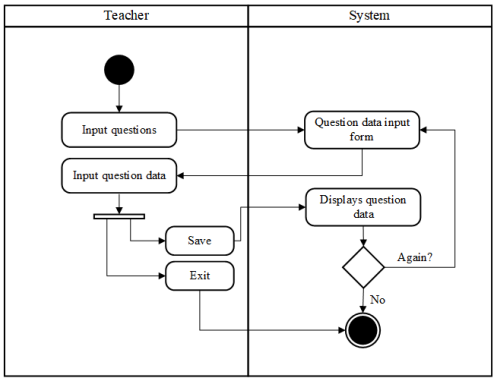

Figure 11. Question data management diagram

The question data management diagram illustrates the process that can be carried out by teachers, namely inputting question data into the database.

g. Subject Data Management Diagram

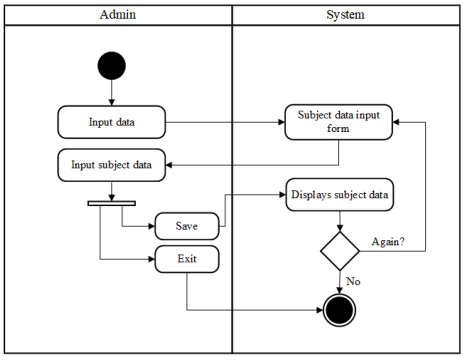

Figure 12. Subject data management diagram

The subject data management diagram describes the process that can be carried out by the admin, namely inputting subject data into the database.

h. Value Management Diagram

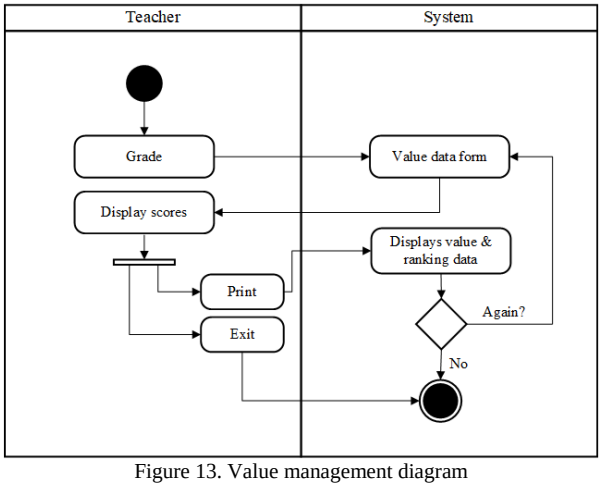

Figure 13. Value management diagram

The score management diagram describes the process that can be carried out by teachers, namely being able to print student exam scores.

i. Practice and Value Charts

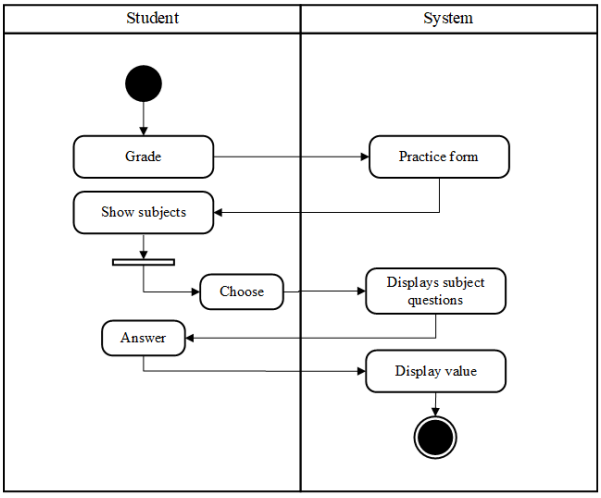

Figure 14. Training and value diagram

The practice and value diagram describes the process that students can carry out, namely answering practice questions and displaying the value of the practice.

White Box testing method

White-box testing or white-box testing is a test case design method that uses a control structure from procedural design to obtain test cases (Kumová & Pilát, 2021). The method used in white-box testing is the Basis Path method.

a. White box login testing

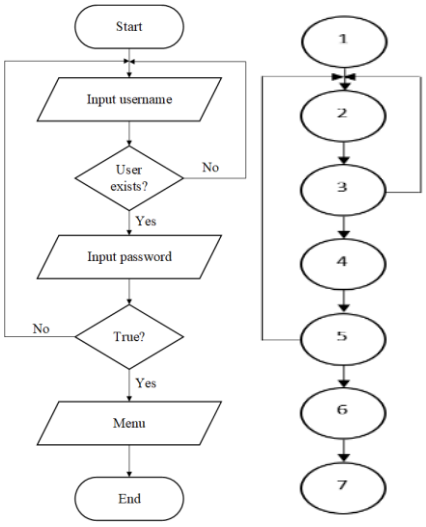

Figure 15. Login flowgraph

From the admin flowgraph as in the image above, the cyclomatic complexity value will be calculated as follows:
V(G) =E–N +2

Where:
E = number of edges in the flow graph = 8
N = number of nodes in the Cyclomatix flow graph complexity = 7
V(G) = 8-7+2 = 3
The paths contained in the flowgraph are:
Path 1 = 1-2-3-4-5-6-7
Path 2 = 1-2-3-2
Path 3 = 1-2-3-4-5-2

b. White box testing added by teachers

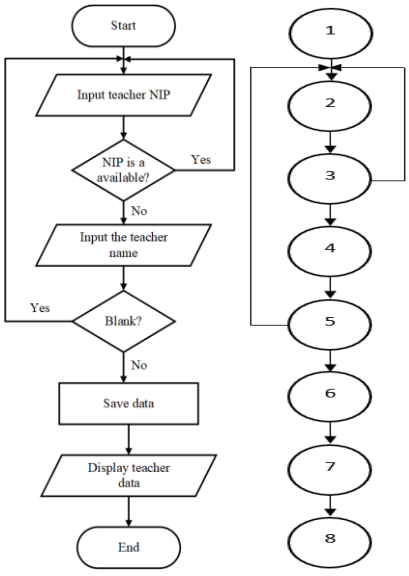

Figure 16. flowgraph added by the teacher

From the flowgraph added by the teacher as in the picture above, the cyclomatic complexity value will be calculated as follows:
V(G) =E–N +2

Where:
E = number of edges in the flow graph = 9
N = number of nodes in the Cyclomatix flow graph complexity = 8
V(G) = 9-8+2 = 3
The paths contained in the flowgraph are:
Path 1 = 1-2-3-4-5-6-7-8
Path 2 = 1-2-3-2
Path 3 = 1-2-3-4-5-2

c. White box testing adds students

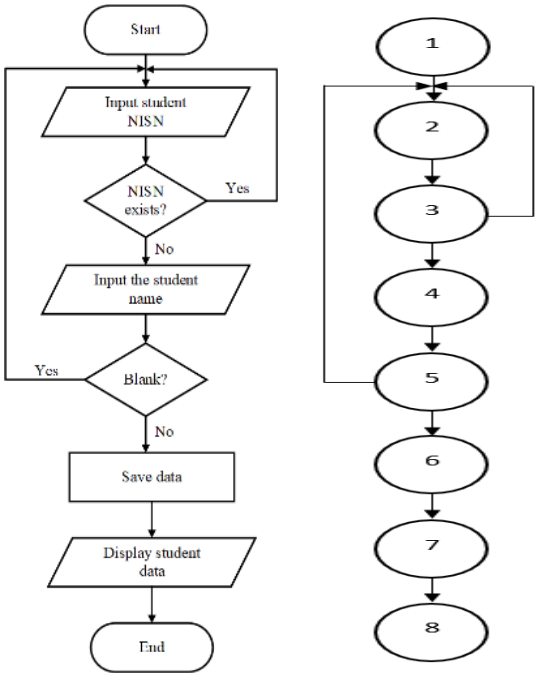

Figure 17 flowgraph added by students

From the flowgraph added by students as in the picture above, the cyclomatic complexity value will be calculated as follows:
V(G) =E–N +2
Where:
E = number of edges in the flow graph = 9
N = number of nodes in the Cyclomatix flow graph complexity = 8
V(G) = 9-8+2 = 3
The paths contained in the flowgraph are:
Path 1 = 1-2-3-4-5-6-7-8
Path 2 = 1-2-3-2 Path 3 = 1-2-3-4-5-2

d. White box testing adds questions

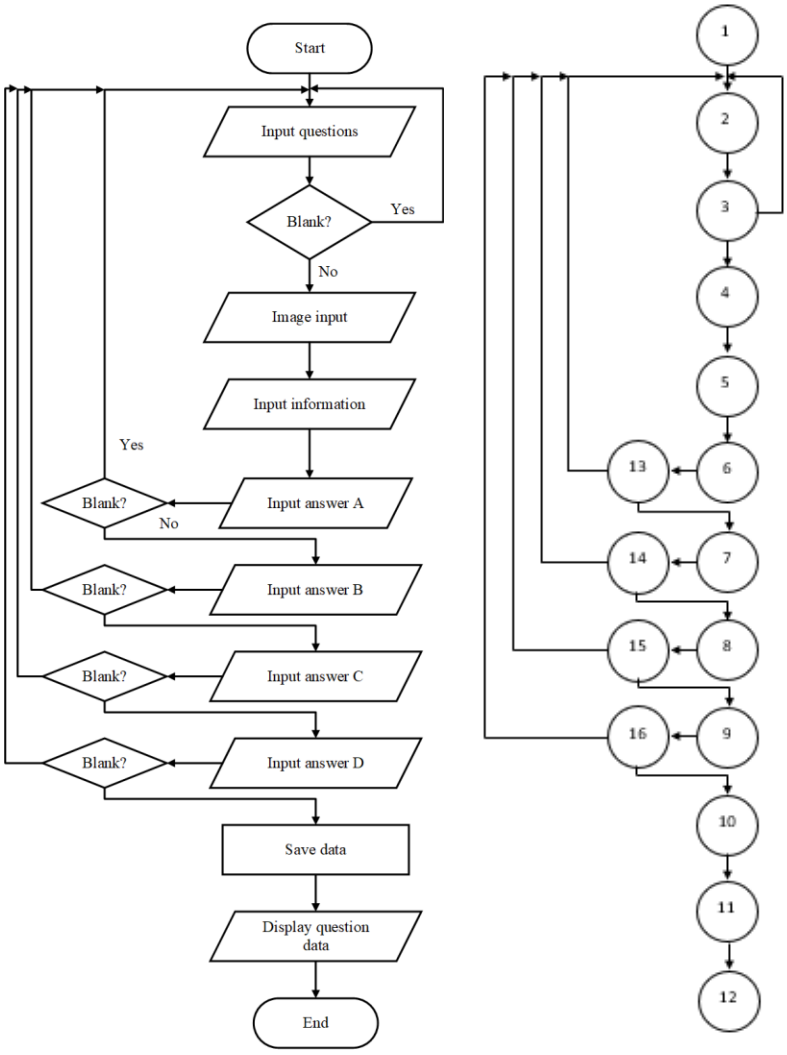

Figure 18. flowgraph added questions

From the flowgraph plus questions as in the image above, the cyclomatic complexity value will be calculated as follows:
V(G) =E–N +2
Where:
E = number of edges in the flow graph = 20
N = number of nodes in the Cyclomatix flow graph complexity = 16
V(G) = 20-16+2 = 6
The paths contained in the flowgraph are:
Path 1 = 1-2-3-2
Path 2 = 1-2-3-4-5-6-13-2
Path 3 = 1-2-3-4-5-6-13-7-14-2
Path 4 = 1-2-3-4-5-6-13-7-14-8-15-2
Path 5 = 1-2-3-4-5-6-13-7-14-8-15-9-16-2
Path 6 = 1-2-3-4-5-6-13-7-14-8-15-9-16-10-11-12

e. White box testing deletes teacher, student, and question data

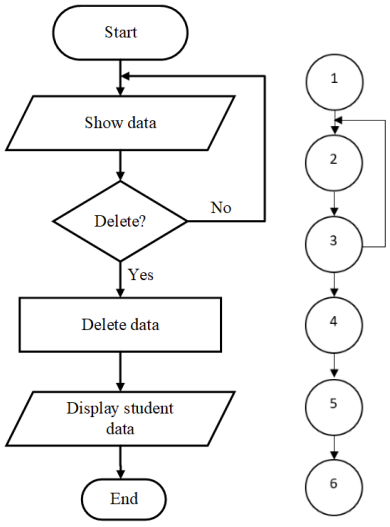

Figure 19. flowgraph of deleted data

From the data delete flowgraph as in the image above, the cyclomatic complexity value will be calculated as follows:
V(G) =E–N +2
Where:
E = number of edges in the flow graph = 6
N = number of nodes in the Cyclomatix flow graph complexity = 6
V(G) = 6-6+2 = 2
The paths contained in the flowgraph are:
Path 1 = 1-2-3-2
Path 2 = 1-2-3-4-5-6

Results and Discussion

Results

When building this system, it was designed based on user roles. The user in question is the Admin, namely the person who plays an important role in managing master data, the teacher is the person who manages student data and questions, and the student is the person who answers the questions. The display of the results of the program that has been created and the functions of the existing menus are as follows, Figure 20.

1. Login View

Figure 20 Login Display

This section is used by admins, teachers, or students to enter the system. If you log in as admin, you will go to the main admin page to manage system data. The page displayed after the admin login can be seen in Figure 21.

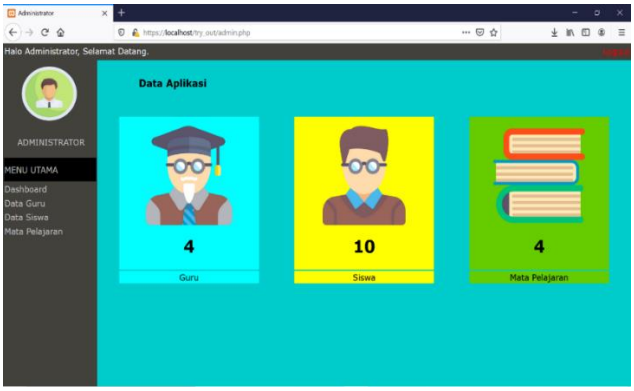

Figure 21. Admin Login Display

If you log in as a teacher, you will go to the teacher's main page to manage questions and student data. The page displayed after the teacher logs in can be seen in Figure 22.

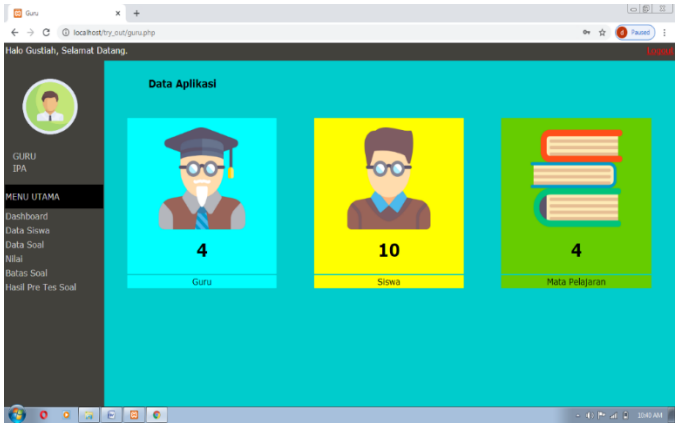

Figure 22. Teacher Login Display

If you log in as a student, you will go to the main student page to work on the questions. The page display after logging in can be seen in Figure 23.

Figure 23. Student Login Display

2. Display of the teacher data processing page

The teacher data processing display is used by the admin to view, add, or delete teacher data. The display of this page can be seen in Figure 24.

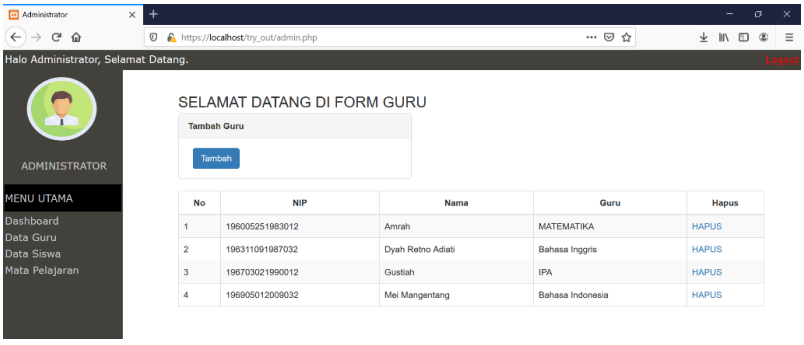

Figure 24. Teacher Data Processing Page

3. Display student data

This section is used by the admin to view student data that has been previously input by the teacher, shown in Figure 25.

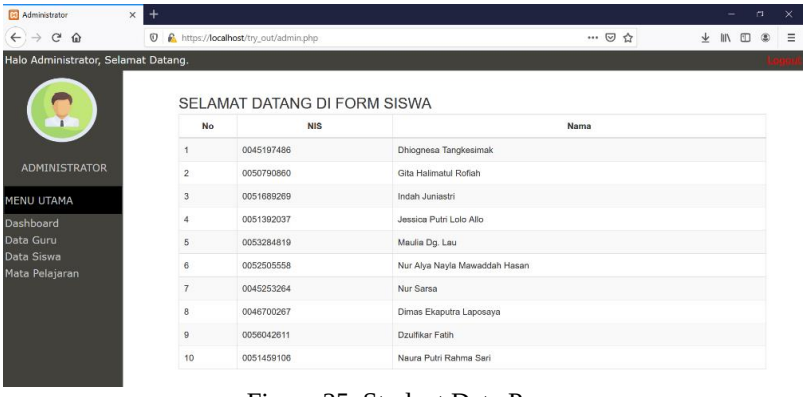

Figure 25. Student Data Page

4. Display of subject data

The lesson data display is used by the admin to view, add or delete lesson data as shown in Figure 26.

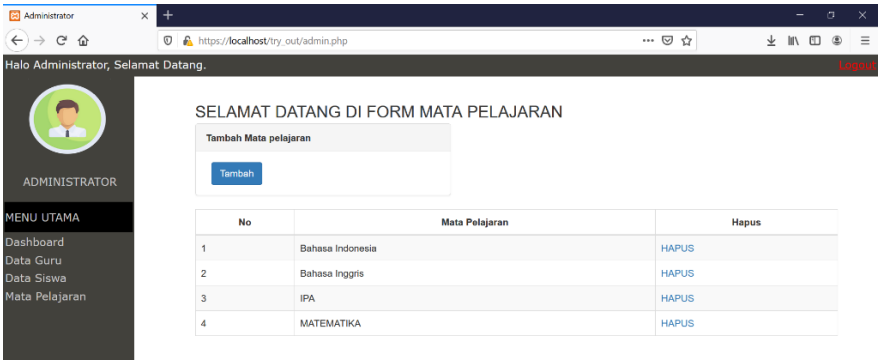

Figure 26. Lesson Data Page

5. Display of added teacher data

The added teacher data display is used by the admin to add teacher data as shown in Figure 27.

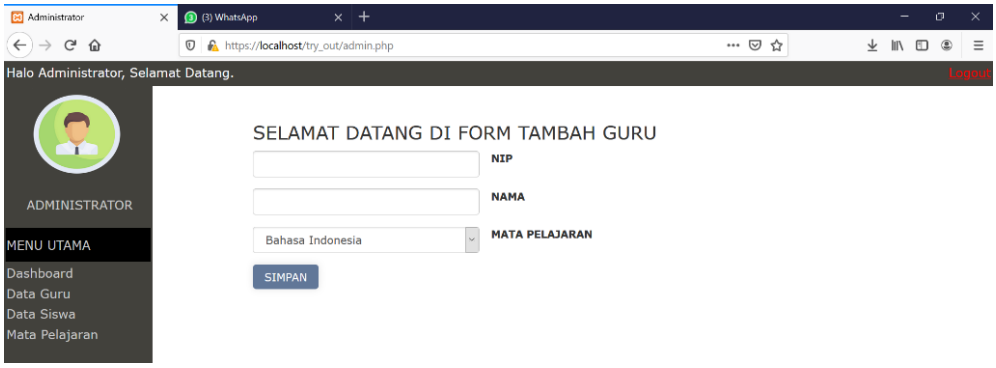

Figure 27. Added Teacher Data Page

6. Display data for adding subjects

The add lesson data display is used by the admin to add lesson data as shown in figure 28.

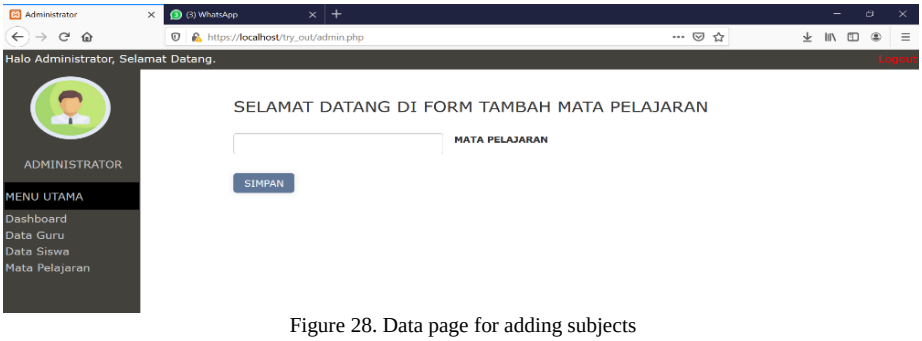

Figure 28. Data page for adding subjects

7. Display student data

The student data display is used by teachers to view and add student data as shown in Figure 29.

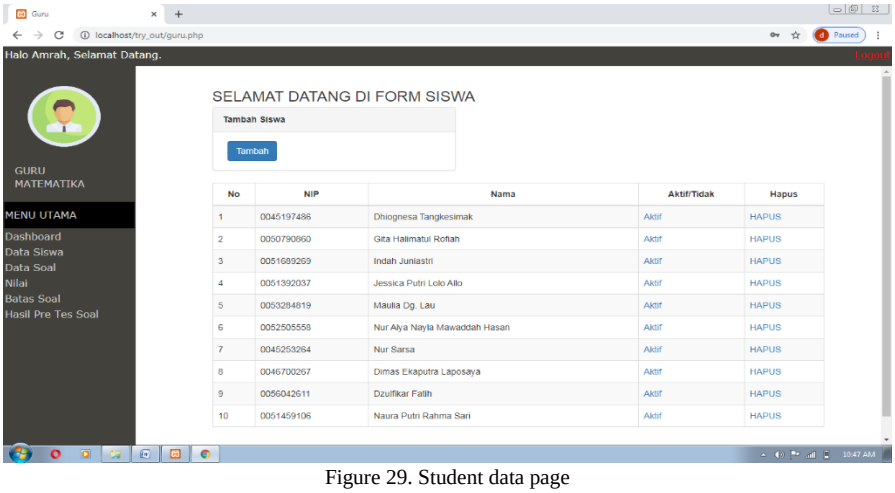

Figure 29. Student data page

8. Display of added student data

The added student data display is used by teachers to add student data as shown in figure 30.

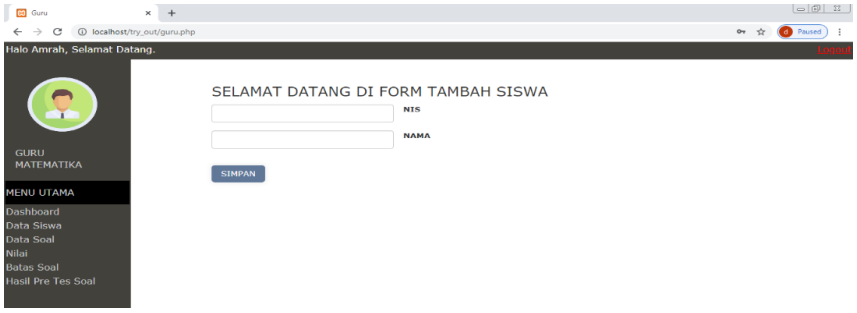

Figure 30. Added student data page

9. Display question data

The added question data display is used by teachers to view and add question data as shown in Figure 31.

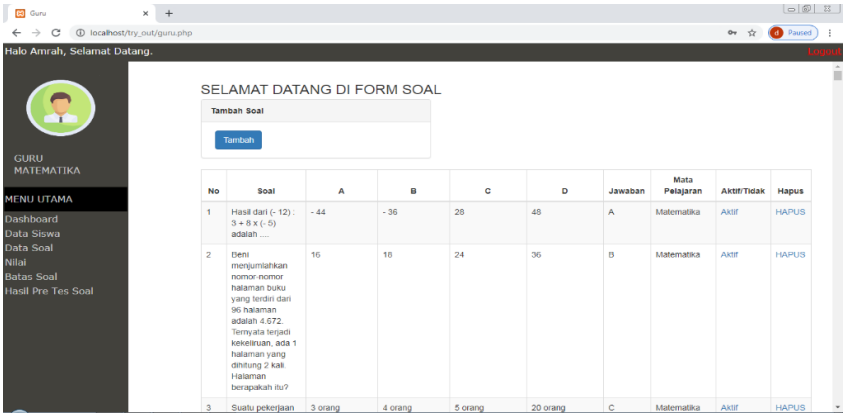

Figure 31. Question Data Page

10. Data display adds questions

The added question data display is used by teachers to view and add lesson data as shown in Figure 32.

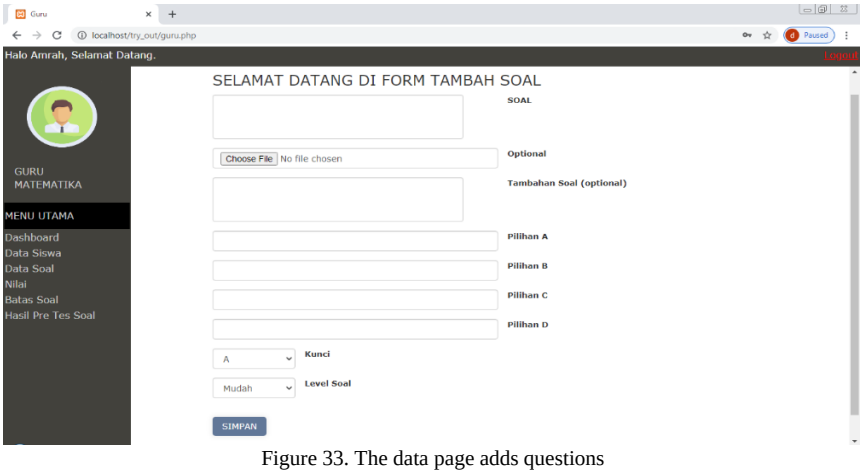

Figure 33. The data page adds questions

11. Value data display

The value data display is used by teachers to view and print value data as shown in Figure 34 below.

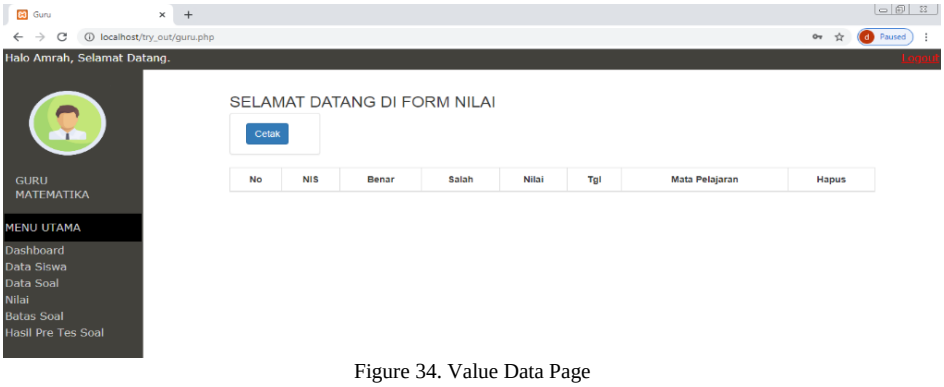

Figure 34. Value Data Page

Discussion

System testing was carried out using the webqual testing technique by distributing questionnaires to 44 students who were testing the TRY OUT Application at SMPN 35 Makassar (Andry et al., 2019), (Jundillah et al., 2019).

Table 1. Testing Questionnaire

Question	Respondent				
	STS	T.S	N	S	SS
I like using the National TRY OUT EXAM application	0	0	0	14	30
Use the TRY OUT NATIONAL EXAMINATION application according to the national exam	0	0	0	26	18
NATIONAL TEST EXAMINATION TRY OUT application, easy to use	0	0	0	32	12
I used the TRY OUT NATIONAL EXAM application on the teacher's recommendation	0	0	0	4	40
I use the TRY OUT National Examination application because it is fun	0	0	0	19	25
NATIONAL TEST TRY OUT Application Provides information/material/questions that are easy to understand	0	0	0	6	38
I am open to using new technology such as the TRY OUT NATIONAL EXAM application	0	0	0	5	39
Do you think this system makes it easier to process data for students who will take part in web-based tryouts?	0	0	0	17	17
Do you think this system helps students to immediately find out their try-out scores?	0	0	0	19	15
Can this web-based national exam try-out system help display the desired information?	0	0	0	20	24

From the data collected, each answer choice for each question for each choice is calculated. The calculation process is by multiplying the number of respondents for each question by the weighted value for that answer choice. From the recapitulation of the results of respondents' answers with the following calculations:

Average Score $= \frac{Total\ Score \times 100\%}{Sum\ of\ Items} + n$

Average Score = (420 X100%) + 44$\frac{420 \times 100\%}{10} + 44$

The result = 42.00% + 44

= 86.00%

After calculating the answers, the total score for each question is obtained. To calculate the score, you must know the highest score (Y) of the answer item choices using the formula.

Y = Highest Liket Score x Number of Respondents

Where the highest Likert score is 4 x 44 = 176

Table 2. Assessment Criteria

Intervals	Criteria
0 % - 24.99 %	Strongly Disagree
25%- 49.99 %	Don't agree
35%-59.92%	Neutral
50%-79.99%	Agree
75%-100%	Strongly agree

Table 3. Calculation Results for Each Question

Dimensions		Percentage	
S	SS	S	SS
14	30	1.4 %	3 %
26	18	2.6%	1.8%
32	12	3.2%	1.2%
4	40	0.4%	4%
19	25	1.9%	2.5%
6	38	0.6%	3.8%
5	39	0.5%	3.9%
17	17	1.7%	1.7%
19	15	1.9%	1.5%
20	24	2%	2.4%
162	258	16.20%	25.80%

Table 4. Value Results for Each Question Dimension

Dimensions	Respondent
162	16.20%
258	25.80 %
Total	42.00%
Total	42.00% + 44 = 86.00%

From the results obtained, 86.00% of the question dimensions consisted of 10 questions and 44 respondents. with a high percentage value, the Tryout Application is a system that gets a high level of perception, namely strongly agree.

Conclusions and Suggestions

Conclusions

The findings of this research illuminate the commendable qualities of the Try Out application. Demonstrating a user-friendly interface, an appealing design, and comprehensive features, the application significantly streamlines tasks for students, especially during Tryouts. The optimized process of test result processing contributes to heightened effectiveness and efficiency. Given its evident utility and apparent user demand, the Try Out Application is not only deemed quite good but also highly valuable, establishing its feasibility based on the conducted tests. The noteworthy overall satisfaction, reflected in an impressive average score of 86.00% from 44 respondents, underscores its role as an indispensable tool.

Furthermore, the design of the try-out information system has successfully delivered an application that serves as a valuable aid for students in preparing for the national exam. The implementation of the try-out information system has demonstrated its efficacy in enhancing students' abilities during the preparation for national exams. The results of the questionnaire calculations unequivocally indicate that 86.00% of respondents recognize the Try Out application as an excellent tool for conducting tryouts, signifying its positive impact on both students and teachers.

Suggestions

In consideration of the findings, the author provides valuable suggestions for future research endeavors:

1. Utilize high-quality server specifications to ensure the optimal performance of the information system.
2. Enhance loading speed by creating a dedicated database server, thereby expediting the overall system functionality.
3. Address and rectify any identified errors in the system that may have surfaced during testing, contributing to continuous improvement and bolstering the reliability of the try-out information system.

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