

APPLICATION OF TALENT TEST USING AN EXPERT SYSTEM IN DETERMINING EXTRACURRICULAR ACTIVITIES FOR PUBLIC TSANAWIYAH STUDENTS (MTSN) 3 SOUTH COAST USING A FORWARD CHAINING APPROACH

Luchy Rahmadani¹, Resmi Darni¹, Dony Novaliendry¹, Jusmardi¹

Department of Electronics, Universitas Negeri Padang, Padang, Indonesia

Abstrak : Education is a learning process that involves knowledge, skills and habits that are passed down from one generation to the next. In education, there are various kinds of knowledge that can be learned, which can be a bridge for each individual to achieve their dreams. Every child has unique talents and personalities, so it is important to support and develop their potential to the maximum. This research uses the waterfall method to speed up the process of determining extracurricular activities at MTsN 3 Pesisir Selatan with the help of technology. Application testing is carried out to ensure the suitability and accuracy of the program that has been developed. With an expert system-based application that uses a forward chaining approach, it is hoped that it can help determine extracurricular activities that suit students' interests and talents automatically, thereby reducing the burden on teachers or staff who usually carry out assessments manually.

Keywords—expert system, forward chaining, extracurricular.

1. INTRODUCTION

Education is the learning of the knowledge, skills and habits of a group of people that are passed down from one generation to the next. In education you can also find various kinds of knowledge that can be studied. Knowledge that can later become a bridge to achieve the goals, interests and talents of each child as they develop. Every child is born with their own unique talents and personality. As parents, of course you want to provide a good education for their children. Sometimes good education is not necessarily the right one for the child because every child has different talents (Firdaus & Irawan, 2023).

An effective education system relies not only on students' academic abilities but also on the development of their non-academic skills. Extracurriculars play an important role in shaping students' character, social skills and interests.

At MTS 3 Pesisir Selatan, choosing the right extracurricular for each student is a challenge in itself considering the variety of interests and talents that students have. Therefore, we need a tool that can help teachers determine appropriate extracurricular activities for each student (Mardiani, et al, 2021).

In the context of aptitude test applications to determine students' extracurricular activities, forward chaining can be used to collect initial data through questionnaires or aptitude tests designed to identify student interests and talents. Students fill out a questionnaire containing questions about their interests, hobbies and experiences (Kanedi & Siswanto, 2020). This data is then processed by a system that has been programmed with a knowledge base that includes various rules and relationships between interests, talents, and the types of extracurriculars available. For example, if a student shows a strong interest in art and has experience in painting, the system may recommend fine arts extracurriculars or a painting club.

An expert system with a forward chaining approach works in stages from the data obtained to the intended conclusion. In this process, each relevant rule is applied sequentially to evaluate student data and determine the most appropriate extracurriculars. This ensures that the recommendations provided are based on an in-depth and comprehensive analysis of the student's interests and talents. The implementation of an aptitude test application using an expert system with a forward chaining approach at MTS 3 Pesisir Selatan is expected to be an innovative solution to optimize student potential in the extracurricular field.

The benefits of this system include greater efficiency and accuracy in the process of identifying student talents and interests, better personalization in extracurricular selection, and savings in time and resources for teachers and school staff. In this way, students can develop holistically, not only in academic aspects but also in their personal skills and interests. This in turn can increase student motivation and achievement,

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Corresponding author: Luchy Rahmadani,

Universitas Negeri Padang

Email: luchyrahmadhani01@gmail.com

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creating a more dynamic learning environment and supporting the development of their full potential.

II. METHODOLOGY

The aim of designing the system is to be able to design an expert system-based application that is capable of automatically testing students' talents to determine the extracurricular activities that best suit their talents.

A. Expert system

Expert System or other language Expert System, is a computer program that contains knowledge from one or more human experts who have the ability to solve problems in certain specific fields such as in the fields of science, medicine, education, and so on (Patmawati, 2020).

In general, an Expert System is a system that attempts to adopt human knowledge to a computer that is designed to model the ability to solve problems like an expert. With this Expert System, even ordinary people can solve their problems or simply look for quality information that can only be obtained with the help of experts in their field.

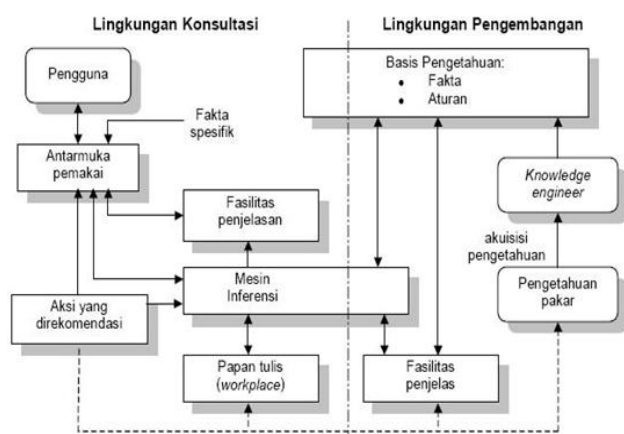


Figure 1 Expert System Structure

B. Expert System Components

Expert Systems generally have three elements, namely: knowledge base, Inference Engine, and User Interface framework. The relationship of these three elements can be seen from Figure 2.2 below:

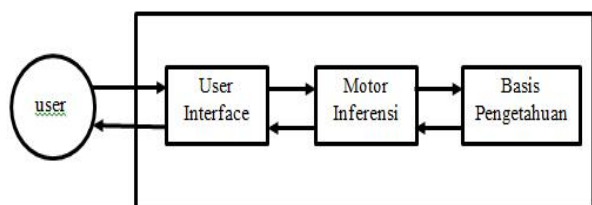


Figure 2 Expert system components

1. Graphic System in Websites

The graphic system on a website is a technology that allows users to see and interact with visual elements on a web page. This graphical system allows users to view images, videos,

animations and graphics on web pages. In addition, graphic systems also allow users to interact with these visual elements, such as clicking buttons or moving the cursor over images. In creating websites, graphic systems can be implemented using programming languages such as HTML, CSS, and JavaScript (Anggraini, et al, 2020).

a. Web Programming

A program is an algorithm written in a computer language. Programming is the process of implementing a sequence of steps to solve a problem using a programming language. Program writing usually uses an editor program provided by the chosen programming language (Dipraja & Fauzi, 2021).

b. PHP

PHP is an open source language from the server side that is used to create dynamic websites. PHP can be included in HTML. PHP is usually used in conjunction with a MySQL database for Linux/Unix servers. PHP is the most popular language currently (Dipraja & Fauzi, 2021). PHP is a complementary language to HTML that allows the creation of dynamic applications that allow for data processing and processing. All syntax provided will be fully executed on the server, while only the results will be sent to the browser

c. PHP Basic Structure

The basic components of PHP can be explained as follows (Ayu & Permatasari, 2018):

1. Basic PHP syntax

Several syntax rules must be met when creating a PHP program file.

a. PHP opening and closing tags

b. PHP supports comments like the 'C', 'C++', and Unix shell-style languages. (Perl style)

2. Constants in PHP

We can define a constant using the define () function which is one of the function features of PHP.

3. Arithmetic in PHP To make it easier to use operands and operators in PHP

C. XAMPP

XAMPP is a complete web program package that can be used to learn web programming, especially PHP and MySQL. Its function is as a localhost server (localhost), which consists of the HTTP Server Apache program, MySQL Database, and Language Translator written in a programming language PHP. Important parts of XAMPP that are commonly used (Anggraini, et al, 2020):

1. Htdoc is a folder where files to be executed are placed, such as PHP files, HTML and other scripts.

2. Php myadmin is the part for managing the MySQL database on the computer. To open it, open a browser then type the address <http://localhost/phpmyadmin>, then the phpmyadmin page will appear.

3. Control Panel which functions to manage XAMPP services. Such as stopping (stop) services, or starting (start).

D. Database

A database is a collection of information stored on a computer that can be systematically checked using a computer program. Conceptually, a database is a collection of data that

forms files which are connected to one another using certain procedures to form new data.

E. MySQL

MySQL is the name of the database server. A database server is a server that functions to handle databases. A database is an organization of data with the aim of making it easier to store and access data. MySQL is classified as a relational database. in this model, data is expressed in two-dimensional form, namely specifically called tables, tables are composed of rows and columns (Anggraini, et al, 2020).

MySQL is software contained in the MySQL database management system (database management system) or what is usually called a multithreaded, multi-user DBMS, with around 6 (six) million installations worldwide. In making MySQL available in software that is under the GPL or what is usually called the General Public License. And but MySQL can be sold under commercial conditions in cases where users do not comply with the General Public License (Dhika, et al, 2019).

III. RESULTS AND DISCUSSION

A. Analysis and Design

In analysis and design, the first thing to do is analyze the system. Information system analysis aims to obtain knowledge and rules related to problems in academic problems in students at school with the Forward Chaining method. Based on the research framework contained in the research methodology, where the stages of the research framework consist of identifying the scope, determining objectives, studying literature, collecting data, analyzing data using the Forward Chaining method, designing systems, implementing systems and testing results.

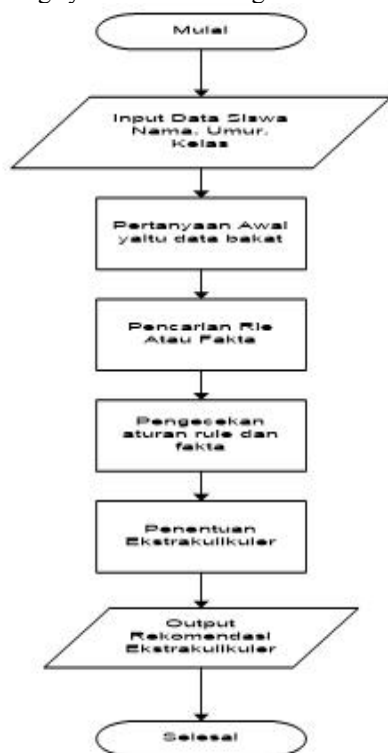


Figure 3 Chart of Analysis and Design

1. Process Analysis

The rule structure logically connects one or more conditions (premise) in the IF section (which will test the truth of a set of data) with one or more conclusions contained in the THEN section.

a. Rule Determination

The rules of the 5 extracurricular activities studied can be seen in the explanation below.

1. IF G1 AND G2 AND G3 AND G4 AND G5 THEN P1
2. IF G6 AND G7 AND G8 AND G9 AND G10 THEN P2
3. IF G11 AND G12 AND G13 AND G14 AND G15 THEN P3
4. IF G16 AND G17 AND G18 AND G19 AND G20 THEN P4
5. IF G21 AND G22 AND G23 THEN P5 5.

b. Decision Tree

To describe more clearly the research flow using the Forward Chaining method. Based on the data that has been compiled, a decision tree is given to facilitate researchers in compiling their research. The decision tree can be seen in the following figure.

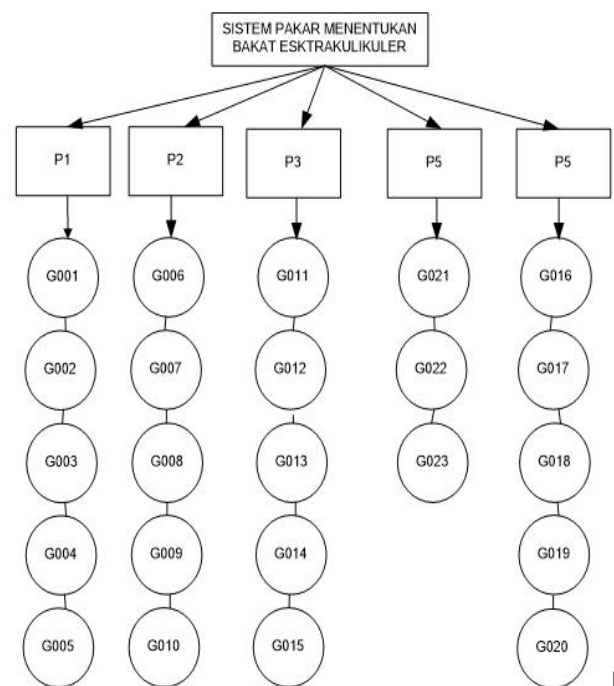


Figure 4 Tracking Tree

B. System Design

The following is a system design that is designed using a system design tool, namely UML, while the form of the design can be seen in the following explanation.

1. Usecase Diagram

Here is a view of the system design, namely the usecase diagram

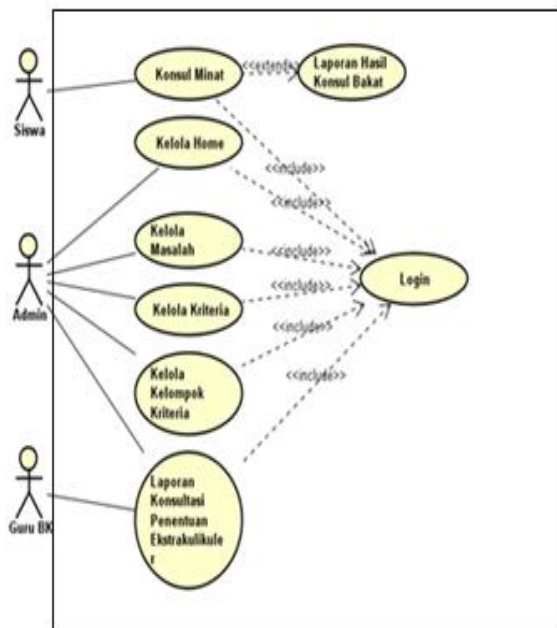


Figure 5 Usecase Diagram

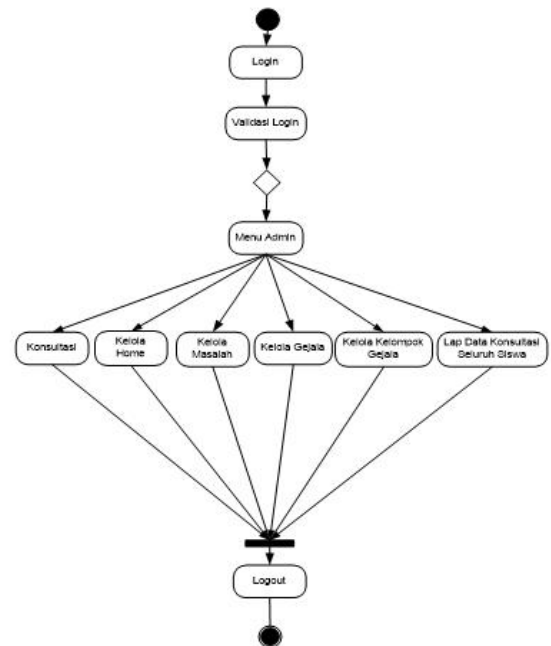


Figure 7 Activity Diagram Admin

2. Class Diagram

Here is a view of the system design, namely the class diagram

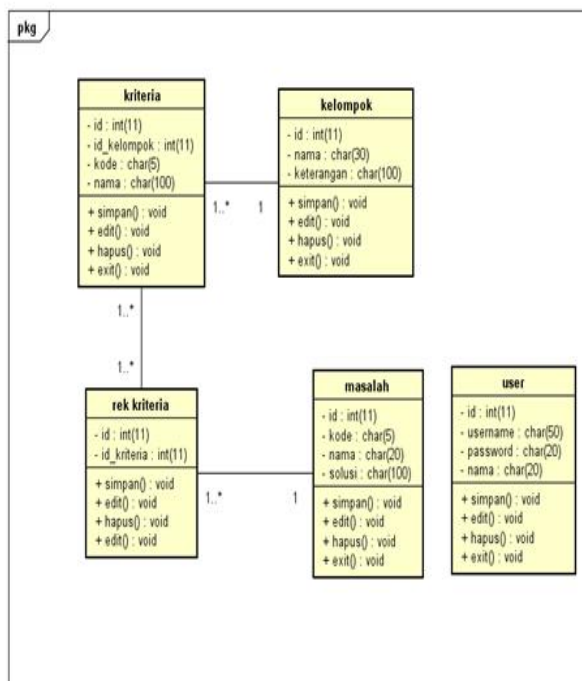


Figure 6 Class Diagram

3. Admin Activity Diagram

Here is a view of the system design, namely the Activity diagram

IV. TESTING AND RESULTS

A. Hardware Requirements

In order to run the system created, certain hardware specifications are required. To run this application as a client requires a computer with the following minimum specifications:

1. Lenovo laptop
2. AMD Ryzen 3
3. 8 GB Memory
4. 8 GB sandis flashdisk
5. Other supporting hardware

B. Software Requirements

Software is a non-physical component that is used to make a computer system run and do its job. The software needed and has been tested on client computers, namely:

1. Windows 8 Operating System
2. PHP (Hypertext Processor)
3. Xampp
4. Mysql- 32 bit
5. Notepad++
6. Google Chrome
7. Other Supporting Software

This system test is carried out by running the menus in the Information System program which forms the display program as follows:

a. Home Menu

The following are the pages in the system where in the system there are several menus and the menus are integrated

with one another. The appearance of the expert system for determining student talent using the forward chaining method can be seen in the following figure. seen in the following figure.



Figure 8 Home menu

b. Talent Info Menu

This page displays the talent info menu that has been determined using the forward chaining method.



Figure 9 Talent Info Menu

c. Instructions Menu

Display the instructions page to tell you how to enter the application The appearance of the expert system for determining student talent using the forward chaining method can be seen in the following figure.



Figure 10 Instructions Menu

d. Student Registration Menu

The registration menu is the initial part of the student to enter the application, registering so that the student account is recorded.

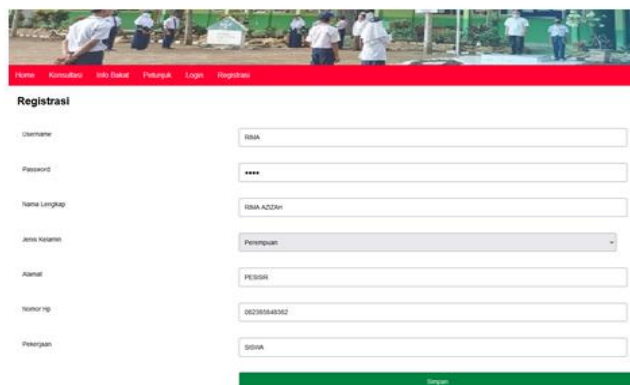


Figure 11 Student Registration Menu

e. Student login menu

on the login menu there is a username and password to log in to the application. The appearance of the expert system for determining student talent using the forward chaining method can be seen in the following figure..

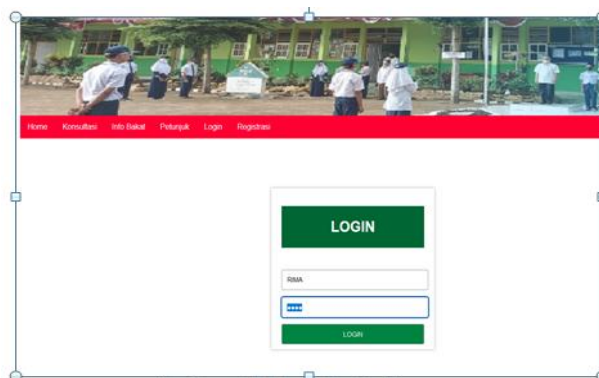


Figure 12 Student Login Menu

f. Consultation Menu

choose a consultation to be recorded by the expert system so that the talent can be displayed .The appearance of the expert system for determining student talent using the forward chaining method can be seen in the following figure.

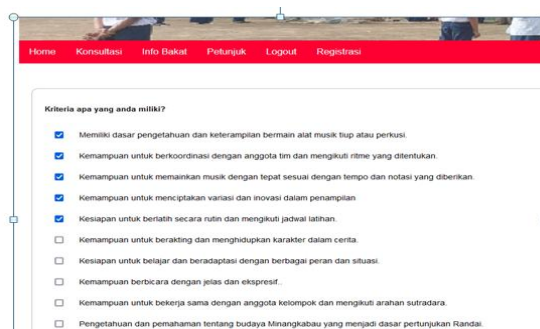


Figure 13 Consultation Menu

g. Consultation Result Menu

Talent consultation results that can be displayed by the expert system.

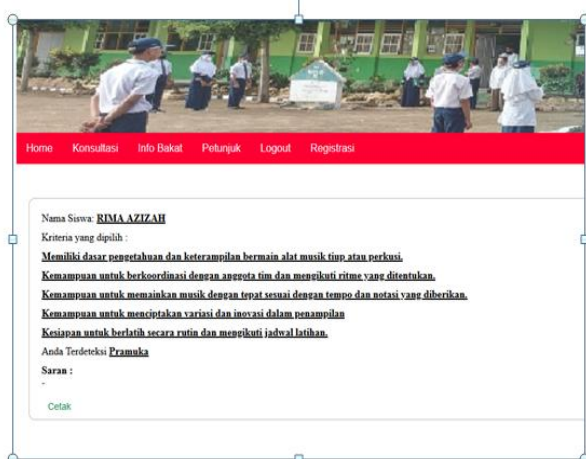


Figure 14 Consultation Results

h. Consultation Overall Result Menu

The consultation results menu displays the results obtained using the forward chaining method.

| No | Nama Siswa | Waktu Konsultasi | Kriteria | Hasil Konsultasi | Aksi |
|----|-------------|---------------------|--|------------------|------|
| 1 | ... | 2024-08-10 10:22:38 | Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk memainkan musik dengan tepat sesuai dengan tempo dan notasi yang diberikan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. | Pramuka | Page |
| 2 | ... | 2024-08-10 10:23:33 | Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk memainkan musik dengan tepat sesuai dengan tempo dan notasi yang diberikan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. | Pramuka | Page |
| 3 | ... | 2024-08-10 10:28:02 | Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk memainkan musik dengan tepat sesuai dengan tempo dan notasi yang diberikan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. | Pramuka | Page |
| 4 | RIMA AZIZAH | 2024-08-14 07:10:26 | Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk memainkan musik dengan tepat sesuai dengan tempo dan notasi yang diberikan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. Kemampuan untuk berkolaborasi dengan anggota tim dan mengikuti ritme yang ditentukan. | Pramuka | Page |

Figure 15 Overall Consultation Results Menu

V. CONCLUSIONS

With the development of an expert system-based application that is able to automatically conduct student aptitude tests to determine extracurricular activities that are most suitable for their interests and talents, using a forward chaining approach to process aptitude test data and provide accurate and precise extracurricular recommendations, as well as increase the level of suitability of students' talents with the extracurricular activities they choose, so as to support the development and potential of students to the fullest.

After the design of the expert system, determining student talent has facilitated the process of determining extracurricular activities at MTsN 3 Pesisir Selatan with the

help of technology, so as to reduce the burden on teachers or staff who usually carry out assessments manually.

The designed expert system has increased student satisfaction and motivation by providing extracurricular recommendations that match their interests and talents, so that they can more actively participate and enjoy these activities.

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