# The Development of Expert System Application for 10th Grade Accounting Program Students' Behavior Consultation at SMK Negeri 16 Samarinda

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***Abstract*— Developing students' behavioral expert system program then consulting behavior with students and knowing strategies in decisions that must be made by the teacher to handle students' behavior. This study uses a qualitative approach. Data was collected by interviewing counseling tutors, literature studies, documentation and questionnaires distributed to 5 teachers of SMK Negeri 16 Samarinda and 1 lecturer of Educational Computer Sciences. In developing this application researchers use MySQL as a database and for the programming language used is PHP written using Adobe Dreamweaver CC 2015 16.1.2. From the results of the program testing questionnaire given to 5 teachers of SMKN 16 Samarinda, the percentage value of 86.80% was obtained with a very good category and the results of the questionnaire testing program test given to the lecturers obtained a percentage value of 84% with a very good category. Based on the results of these percentages, it can be concluded that the counseling of the Student Behavior Consultation Expert System is in accordance with the goal of being able to facilitate users in behavioral consultations in accounting class X students of SMK Negeri 16 Samarinda in the odd semester of 2016/2017 and provide solutions as a result of consultation for handling student problems.**

**Keywords**— ***expert system, student behavior consultation, forward chaining, MySQL database, PHP.***

## I. INTRODUCTION

The rapid progress of computer technology, is very helpful for humans in all fields including learning processes and working group [1, 2]. No exception also in the field of expert systems [3]. The world of education today faces a variety of very complex problems that need attention [4]. According to counseling teachers, SMKN 16 Samarinda, the rampant variety of deviations in religious and social life norms manifested in the form of deviations in students at 16 Samarinda Vocational High School. In addition, this deviation of students of SMK Negeri 16 Samarinda tends to be in the category of violating the rules of SMKN 16 Samarinda. So that, this problem if not addressed immediately will increasingly threaten the teaching and learning process, especially at SMK Negeri 16 Samarinda. Expert system is one solution used to consult student behavior. This expert system was made to consult the behavior of accounting class X students of SMK Negeri 16 Samarinda in the odd semester of 2016/2017 academic year through web-based media applications to teachers, so that time efficiency for further handling of these problems can be quickly carried out. Therefore, the problem of this research is:

1. System applications are only used for behavioral consultations in class X accounting students of SMK Negeri 16 Samarinda in the odd semester of 2016/2017 academic year and how to handle them.
2. This study focused on class X students of SMK Negeri 16 Samarinda in the odd semester of the 2016/2017 academic year.

## II. METHODS

The Expert systems are systems that try to adopt human knowledge to computers, so that computers can solve problems as can be done by experts. Expert systems are computer-based applications that are used to solve problems as thought by experts. Experts in question are people who have special skills that can solve problems that cannot be solved by ordinary people [5].

Forward Chaining is a rule that takes precedence and ends with an action. Determination of rules begins by adjusting the data and needs, the process will continue until it finds the results that are intended. The advanced continuous inference method is suitable for use in controlling and forecasting problems. The list of rules or "R" can be seen in Figure 2 Forward Chaining [6]:

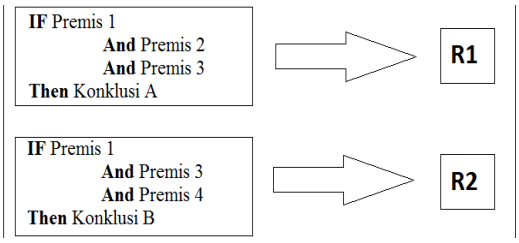


Fig. 1. *Forward Chaining*

Forward chaining is matching facts or statements starting from the left (IF first). In other words, reasoning starts from the fact first to test the truth of the hypothesis.

PHP (PHP Hipertext Propocessor) runs on the server side so PHP is also called the Server-Side Scripting language. This means that in every / to run PHP, there must be a web server. This PHP is open source so that it can be used for free and is capable of cross platform, which can run on Windows and Linux operating systems. PHP is also built as a module on the Apache web server and as a binary that can run as a CGI.

## III. RESULT AND DISCUSSIONS

A flowchart is a graphical representation of the procedure steps of a program. In this section we will explain the steps in running the application system for student behavior consulting experts who were built.

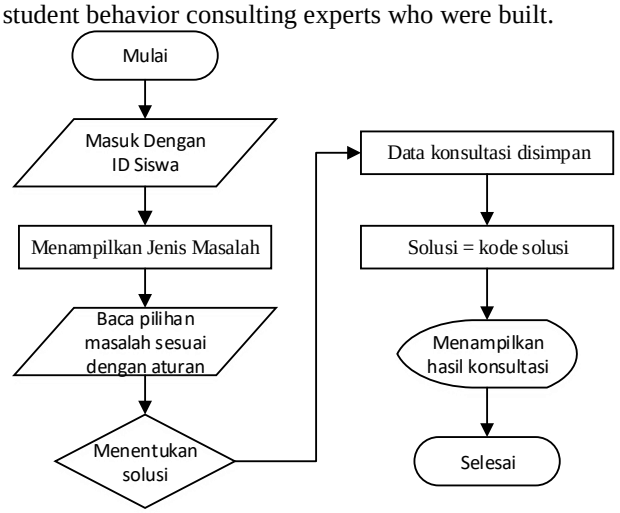


Fig. 2. *Flowchart* of System

Context Diagram merupakan gambaran sistem secara umum yaitu hubungan sistem dengan lingkungan sistem. Terdapat dua entitas yang terhubung langsung dengan sistem yaitu USER dan EXPERT.

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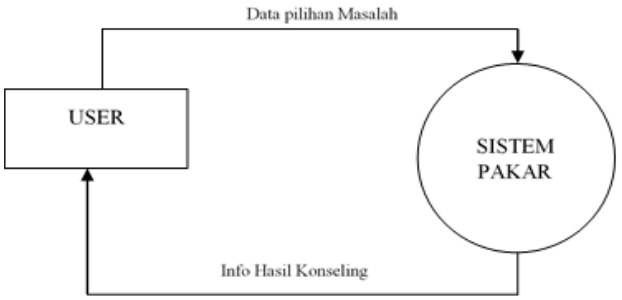


Fig. 3. *Context Diagram*

In the implementation phase, this is a design translation based on the results of the analysis in the previous chapter into a programming language that can be understood by computers. The programming language in this system uses the PHP language and MySQL database. The supporting software used in this system are:

1. Windows 7 Operating System
2. Adobe Dreamweaver CC 2015 16.1.2
3. Xampp 5.6.3 VC.11

The hardware used in this system is are :

1. Processor: Intel® Core i3 CPU M370 @ 2.40 GHz
2. RAM: 4.00 GB
3. Hard drive: 320 GB

1. Main page

On the main page, the definition, function, and purpose of the counseling guide are presented and there is also a form for writing Student ID.

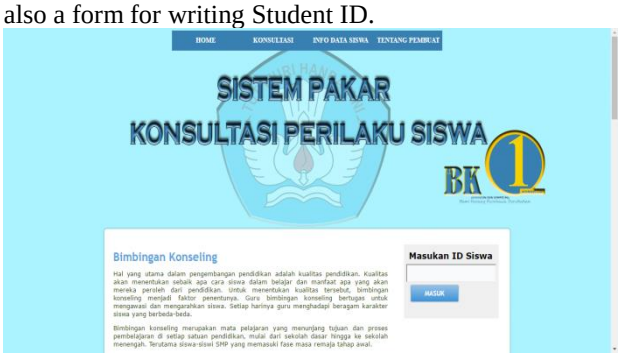


Fig. 4. Main Page

2. Student Information

On the student data information page, there is information about the data from the X accounting class of SMK Negeri 16 Samarinda in the 2016/2017 Academic Year, including names, student IDs, sexes and classes.


Fig. 5. Students Information

3. Registration Form

Registration Form is used to register new students by filling in the student data. Students who have registered are automatically saved and displayed on the student info page.


Fig. 6. Registration Form

4. Deletion Form

Form deletion is used to delete student data that is no longer needed, the way is to fill in the student ID of the student who wants to delete the data. Student data that has been deleted automatically will be deleted and cannot be displayed on the student data info page.

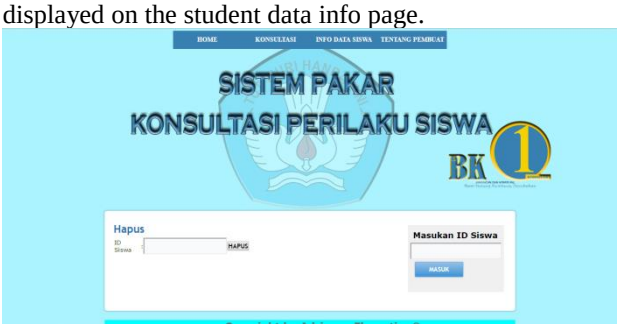


Fig. 7. Deletion Form

5. Pre-consultation Form

Before Entering Student ID This page appears and a warning message appears that if you want to use the consultation menu, the user must first enter the Student ID.


Fig. 8. Pre-Consultation Form

6. Consultation Form

On the next page, the user selects the problem he wants to consult, at least one choice of problem, then after that press the process button to find out the solution to the problem chosen. If the user does not select a single problem then the solution will not be processed by the system.


Fig. 9. Consultation Form

7. Consultation Results Form

On the this page displays the results of the consultation of the problem that the user has chosen. The results of this consultation will be stored and connected directly to the student's history page and history page.


**Fig. 10. Consultation Results Form**

8. *Edit Form*

Edit Form data is used to change data from students if there is an error when entering data when the registration process or indeed the student data has changed.


Fig. 11. Edit Form

9. History Page

On the history page displays data from the results of consultations of all students who have ever done completed with the consultation time. The data that appears on this page not only includes student IDs that are currently active but data from the results of consultations that have been obtained from all students.


Fig. 12. History Page

## IV. CONCLUSION

Based on the design and implementation of an expert system for behavioral consultation of class X Accounting students at SMK Negeri 16 Samarinda in the year of 2016/2017 Academic Year with the forward chaining method can be concluded as follows:

1. The Development of expert system applications for behavioral consultation of class X Accounting of SMK Negeri 16 Samarinda in the academic year 2016/2017 using the PHP programming language, and MySQL as its database. So that the diagnostic results can be accurate, the designer uses the "Forward Chaining" method.

2. This expert system can consult the types of problems experienced by students based on solutions originating from psychology experts in education and literature studies.
3. This expert system can produce a solution that can be used by teachers in decision making to handle the behavior of accounting students of class X in SMK Negeri 16 Samarinda in the odd semester of the 2016/2017 learning year.

Suggestions for future researchers are:

1. The need for collaboration with experts in this case the Counseling Guidance teacher to develop a system application expert student consultation expert so that the knowledge base and diagnosis results are more accurate.
2. In the stages of determining the inference method and determining the percentage value, the next researcher is expected to prepare the right analysis first and learn the existing methods so that the development stage can run smoothly and not require too long.
3. This expert system is a website-based application that can only be temporarily implemented on a local network, so that the school is expected to be able to make this expert system application that can be accessed online whenever and wherever by the teacher and the school.

## REFERENCES

[1] C. L. Schlebusch, "Computer Anxiety, Computer Self-efficacy and Attitudes towards the Internet of First Year Students at a South African University of Technology," *Africa Educ. Rev.*, vol. 15, no. 3, pp. 72–90, Jul. 2018.

[2] R. Haines, R. W. Scamell, and J. R. Shah, "The Impact of Technology Availability and Structural Guidance on Group Development in Workgroups Using Computer-Mediated Communication," *Inf. Syst. Manag.*, vol. 35, no. 4, pp. 348–368, Oct. 2018.

[3] W. P. Wagner, "Trends in expert system development: A longitudinal content analysis of over thirty years of expert system case studies," *Expert Syst. Appl.*, vol. 76, pp. 85–96, Jun. 2017.

[4] C. Cobo, "Skills for innovation: envisioning an education that prepares for the changing world," *Curric. J.*, vol. 24, no. 1, pp. 67–85, Mar. 2013.

[5] S. Hartati and S. Iswanti, *Sistem Pakar dan Pengembangannya*. Yogyakarta: Graha Ilmu, 2008.

[6] N. Merlina and R. Hidayat, *Perancangan Sistem Pakar*. Bogor: Ghalia Indonesia, 2012.