

CHAPTER 2

LITERATURE REVIEW

2.1 Student Satisfaction

According to (Kanca & Dartini, 2014), Satisfaction is the feeling of gladness or disappointment one feels after comparing one's perception of a product's performance or results to one's expectations. Customers, on the other hand, are defined as those who purchase and use the product. In a service company, the customer is the person who uses the service. According to (Kanca & Dartini, 2014) defines a customer as “any person who requires us or an institution to meet us or an institution to meet certain quality standards, and therefore will affect the performance of the institution”.

According to (Kanca & Dartini, 2014) Customer satisfaction is the perceived result or use of a product or service, perceived by consumers for the use of the product or service meeting or exceeding their desired expectations. Customer satisfaction is achieved when the needs, desires, and expectations of customers are met. Knowing the customer's perception of satisfaction is very important so that there is no perception gap between the company and the customer.

In this study, the customers in question are students because students are people who use services at universities. Of all the activities carried out by a university, in the end, it will lead to the value that will be given by students regarding the satisfaction they feel. Based on the above understanding, it can be concluded that student satisfaction is a comparison between student perceptions and student expectations of the academic services of the Department of Pharmacy.

2.1.1 Factors Affecting Student Satisfaction

According to (Shabri & Yanti, 2020) revealed that there are 5 determinants of service quality, namely:

- a. Reliability is the ability of lecturers/employees/managers to provide services as promised, reliable, accurate, and consistent.

- b. Responsiveness, namely the willingness of lecturers/employees/managers and institutional owners to help customers and provide services quickly and meaningfully as well as the willingness to hear and resolve complaints submitted by consumers.
- c. Assurance is in the form of the ability of lecturers/employees/managers to generate confidence and trust in the promises that have been made to consumers.
- d. Empathy is the willingness of lecturers/employees/managers to care more about giving personal attention to customers.
- e. Tangible, namely the appearance of physical facilities, equipment, and various communication materials.

2.2 Service Quality

According to (Shabri & Yanti, 2020) revealed that service quality reflects the comparison between level of service provided by the company compared to customer expectations. Service quality is realized through meeting customer needs and desires as well as the accuracy of delivery in balancing or exceeding customer expectations. Good service quality is not from the point of view of the service provider, but the point of view of service users (students). According to (Shabri & Yanti, 2020) said two factors affect the quality of services/services, expected service (expected service) and perceived service (service received). If the perceived service quality equals or exceeds the expected service quality, then the service is said to be of high quality and satisfactory. Conversely, if the perceived service quality is less than the expected quality, the service is said to be of poor quality or unsatisfactory.

2.3 Educational Facilities

According to (Kurbani, 2017) states that facilities are the provision of physical equipment to provide convenience to users in carrying out their activities or activities so that all these needs can be properly fulfilled.

The facilities owned by educational institutions such as universities should be facilities that can support teaching and learning activities so that they can run

well and achieve maximum results where these facilities can be used by students to study and carry out other activities that are useful as a means of developing talents and skills. student abilities. These types of facilities include libraries, laboratories, and computer and internet centers.

2.4 Quality of Academic Service

According to (Tuerah et al., 2015) Academic service quality is a comparison between the academic service perceived by the customer or stakeholders with the academic service quality expected by the customer. If the perceived academic service quality equals or exceeds the service quality, it is said to be of high quality.

The quality of academic services is the value given by customers to the extent to which the academic services provided are following customer expectations. Customers, in this case, students, will say that academic services are of high quality if they match their specifications. The quality of academic services in this study is the value given on how well the academic services provided by the University of Muhammadiyah East Kalimantan can meet student expectations.

2.5 Data Mining

According to (Rahayu et al., 2021) Data mining, also known as knowledge, is one of the rapidly growing fields due to the huge need for added value from large-scale database stacks that have accumulated in line with the rapid growth of information technology.

In its application, data mining is a part of the Knowledge Discovery in Database (KDD) process whose job is to extract patterns or models from data using a specific algorithm. The KDD process is as follows:

1. **Data Selection:** data selection from a set of operational data needs to be done before the information mining stage in KDD begins.
2. **Preprocessing:** before the data mining process can be carried out, it is necessary to carry out a cleaning process to remove duplication of data, check for inconsistent data, and correct errors in the data, such as typographical errors. An enrichment process is also carried out, namely the process of "enriching"

existing data with other relevant data or information needed for KDD, such as external data or information.

3. *Transformation*: namely the coding process on the data that has been selected, so that the data is suitable for the data mining process. The coding process in KDD is a creative process and is highly dependent on the type or pattern of information to be searched in the database.
4. *Data mining*: the process of looking for interesting patterns or information in selected data using certain techniques or modes.
5. *Interpretation/Evaluation* The pattern of information generated from the data mining process needs to be displayed in a form that is easily understood by interested parties. This stage includes checking whether the pattern or information found contradicts the facts or pre-existing hypotheses or not.

2.6 C4.5 Algorithm

According to (Rahayu et al., 2021) C4.5 algorithm is an algorithm used to build a decision tree (decision tree). The C4.5 algorithm is one of the decision tree induction algorithms, namely ID3 (Iterative Dichotomiser 3). ID3 was developed by J. Ross Quinlan. In the ID3 algorithm procedure, the inputs are training samples, training labels, and attributes. The C4.5 algorithm is the development of ID3. Some of the developments carried out in C4.5 include being able to overcome missing values, being able to overcome continual data and pruning.

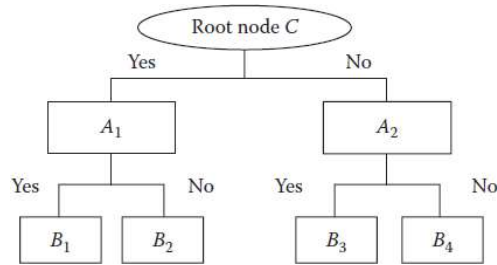
2.7 Decision Tree

A *Decision Tree* is a classification method that uses a tree structure representation where each node represents an attribute, the branch represents the value of the attribute, and the leaf represents the class.

In the decision tree there are 3 types of nodes, namely:

1. *Root Node*, is the top node. At this node, there is no input and can have no output or more than one output.
2. *Internal Nodes*, is a branching nodes. At this node, there is only one input and at least two outputs.

3. *Leaf nodes* or terminal node, is the end node. At this node, there is only one input, and no nodes.



Picture 1 Decision Tree Structure

2.8 Rapid Miner

RapidMiner is a data science software platform developed by the company of the same name, which provides a unified environment for machine learning, deep learning, text mining, and predictive analytics. These applications are used for business and commercial applications as well as for research, education, training, rapid prototyping, and application development to support all steps of the machine learning process including data preparation, result visualization, validation, and optimization. RapidMiner is developed with an open core model.

RapidMiner besides being used for business and commercial use, can also be used in research, education, rapid prototyping, training and application development and supports every step in the machine learning process including data preparation, visualization results, model validation and optimization.

Table 1 Literature Review

NO	NAME	YEAR	TITLE	METHOD	CONCLUSION
1.	Kiki Aldi Saputra, Jaya Tata Hardinata	2020	C4.5 Algorithm Classification in the Application of Student Satisfaction Levels with	C4.5 Algorithm	The results of research that have been carried out on the Application of the C4.5 Algorithm on

			Online Learning Media		<p>Classification level</p> <p>student satisfaction with online learning media. The problem of determining the factors of student satisfaction with online learning media can be solved using data mining techniques. Namely with the C4.5 Algorithm. Produce 20 (twenty) rules and the accuracy rate generated by this method is 86.67%</p>
2.	Wanda Rizki Fadillah, Dedy Hartama	2020	Implementation of Data Mining C4.5 in Measuring the	C4.5 Algorithm	The results of research conducted using the C4.5

			Level of Student Satisfaction on the Performance of Computer Laboratory Assistants		Algorithm can be predicted very accurately at 99.27%
3.	Sri Rahayu, Irfan Alreadyri Damanik	2020	Analysis of Community Satisfaction on Quality Services at the Simalungun District Court Using the C4.5 Algorithm Method	C4.5 Algorithm	The results of research conducted using the C4.5 Algorithm can be predicted with an accuracy of 96.67%