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Analysis of the Pattern of the Relationship the Intensity of Playing Onilne Games and Learning Interest Using Association Rule Mining (Apriori) at STMIK KAPUTAMA

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Abstract

The rapid development of information technology has a significant impact on the learning lives of students, one of which is through the increasing intensity of playing online games. This phenomenon raises concerns regarding its influence on learning interests, so it is necessary to conduct an in-depth analysis to see the pattern of relationships that occur. This study aims to analyze the relationship between the intensity of playing online games and the learning interest of STMIK Kaputama students using the Association Rule Mining method with a priori algorithm. The research data was obtained through questionnaires that were shared with students, then processed into binary tabular forms so that they could be processed using the RapidMiner software. The analysis process is carried out through the stage of forming frequent itemset, calculating support and confidence, to finding association rules that meet the minimum requirements. The results showed that there were several significant relationship patterns between the variables of the intensity of playing online games and learning interest. For example, the pattern "PS1 & WBS4 & TKG2 & UWB1" has support of 35% and results in a confidence value that shows a strong association between playing time factors, dependency levels, and learning efforts. In general, the higher the intensity of playing online games, the more it affects the decrease in students' interest in learning. These findings can be an input for the campus and students in managing gaming activities so that they do not have a negative impact on academics.

Keywords: *Online Games, Learning Interest, Association Rule Mining, A priori, RapidMiner.*

1. Introduction

In the era of technological advancement like today, the development of information and communication technology has had a significant impact on various aspects of life, including in the world of entertainment and education. One form of technological development that is very popular among people is online games. Playing games can now be done offline or online, regardless of age and group, ranging from workers, students, to schoolchildren On the other hand, the quality of education is inseparable from the quality of education applied in each educational institution. The quality of education can be achieved by measuring the level of success of learning outcomes and achievements obtained by each student. Students who have high achievement generally have a strong motivation to learn and a broad knowledge base [1]. However, in the midst of increasingly rapid technological developments, students face various challenges in managing the time and priorities of daily activities, especially in balancing online gaming and learning activities. Currently, STMIK KAPUTAMA students are faced with the problem of high intensity of playing online games, which has the potential to affect their learning habits. Excessive intensity of playing online games can lead to changes in student behavior, including lack of discipline in doing assignments, low attendance and participation in class discussions, and decreased academic results. Based on the explanation above, a person can be said to be addicted to playing online games if they spend more than 14 hours a week playing [2].Many college students tend to spend more time playing games than studying, which ultimately negatively impacts their interest in learning.

2. Theoretical Foundation

2.1. Troubleshooting Methods

Problem solving methods are one of the methods used in a research to solve a problem. The problem solving method that will be used in this study is using a data mining technique that uses a priori algorithm method.

2.2. Data Mining

Data mining is a series of processes to explore the added value of a data set in the form of knowledge that has not been known manually from a data set. Another definition of data mining is as the process of obtaining useful information from a large database warehouse. Data mining is also defined as the extraction of new information taken from large chunks of data that helps in decision-making [3].

2.3. Association Rule Mining

Association Rule Mining is a technique in data mining that is used to find patterns of relationships or relationships between items in a transaction database. This technique works by identifying combinations of items that often appear simultaneously in a dataset, so that they can be used as a basis for decision-making. Association Rule Mining is widely applied in various fields, especially in the analysis of business transaction data, grouping of behavior patterns, and recommendation systems.

2.4. Definition of Online Games

According to [4] online games are a type of game that utilizes the internet network as the main medium, allowing players to interact in a digital environment directly. The game can be played through a variety of devices, such as computers, consoles, or mobile phones, with a wide variety of genres, including action, strategy, simulation, and role-playing. In this study, online games were used as a variable to analyze how the level of playing intensity can affect a person's interest in learning. With its interactive features and its nature that can cause high interest, online games are often played for a long period of time, which can ultimately affect the cognitive, emotional, and behavioral aspects of players.

2.5. Definition of Study Time

Interest in learning is a person's desire and attention to a learning activity, which encourages him to be actively involved in the teaching and learning process. This interest or desire plays an important role in determining learning outcomes for students, where an increase in interest in learning can contribute to an increase in academic achievement that will be achieved by a person ([5].

2.6. Flowchart

According to ([6] Flowchart or often referred to as flowchart is a type of diagram that represents algorithms or sequential instructional steps in the system. A systems analyst uses a flowchart as a documentary evidence to explain the logical picture of a system to be built to programmers. That way, flowcharts can help to provide solutions to problems that may occur in building a system. Basically, flowcharts are depicted using symbols. Each symbol represents a specific process. As for connecting one process to the next process, it is depicted using connecting lines.

2.7. *RapidMiner*

RapidMiner is software that can be accessed by anyone and is open source. RapidMiner is used as a solution for the process of collecting, processing, organizing, transforming, and analyzing raw data into useful and easy-to-understand information. The application also provides comprehensive solutions for analysis on data mining, text mining and prediction. ([7]. Then in addition to standing as a data analysis application, RapidMiner can also be integrated as a data mining engine in other products. Because it is written using the Java programming language, RapidMiner can run on a variety of operating systems, making it a flexible data analytics solution that can be adapted to the user's needs. ([8]et al.

3. Research Method

3.1. Research Methods

The research method is an overview of the steps so that research can be carried out in a structured manner so as to achieve a goal of the desired research. This method consists of a systematic set of steps or procedures for planning, executing, and analyzing research. There are several stages of research methods carried out in problem solving. The stages are as follows:

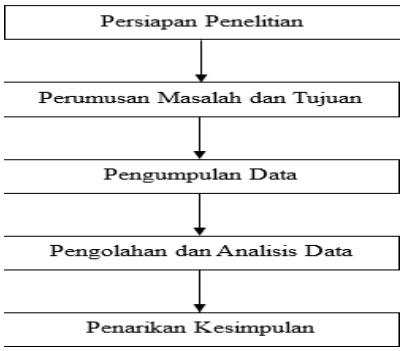

Fig. 1: Research Workflow

From the stages of the research methodology above used in this study, it includes several stages, namely:

1. Research Preparation This stage is the first step by determining the research topic, identifying the background, and setting research boundaries. The determination of boundaries aims to keep the research focused and not wide so that the results are more directed and can help the author in the next stages.
2. Formulation of Problems and Objectives At this stage, the researcher formulates the problem that is the main focus of the research and determines the goals to be achieved. The objectives formulated must be aligned with the background so that this research provides results that are beneficial to the research.
3. Data Collection The data collection carried out in this study is that data is collected through the distribution of questionnaires to students to be the main material that will be further analyzed in this Chapter III.

4. Data Processing and Analysis At this stage, the data that has been collected is organized and analyzed in order to provide meaningful information. The main purpose of data processing is to produce more accurate results, facilitate decision-making, and provide an understanding of a problem.
5. Conclusion Drawing The final stage in this study is the drawing of conclusions based on the results of the analysis that has been carried out in this study.

3.2. Research Supporting Data

In conducting research on the relationship between online gaming and learning interest in students, supporting data in this study is very important to ensure that the conclusions proposed are based on strong and accountable evidence. In the supporting data of this research, data was obtained from a questionnaire distributed to students at STMIK Kaputama, then the data will be processed to see the relationship between playing online games and students' learning interests as many as 20 data as samples.

Jenis Kelamin	Usia	Program Studi	Frekuensi bermain game online per minggu:	Durasi bermain per sesi	Waktu bermain yang paling sering	Tujuan bermain game online	Tingkat konsentrasi saat belajar setelah bermain game	Frekuensi mengulang materi pelajaran di luar jam kuliah	Ketertarikan terhadap materi kuliah	Pengaruh game online terhadap motivasi belajar	Upaya untuk menyeimbangkan waktu bermain dan belajar
Perempuan	> 20 tahun	Sistem Informasi	(1–2 jam/minggu)	(1–2 jam)	Malam hari	Hiburan	1 (Sulit fokus)	1 (Jarang)	1 (Minim)	Tidak berpengaruh	Menggunakan teknik manajemen waktu
Perempuan	< 18 Tahun	Teknik Informatika	(11–20 jam/minggu)	(1–2 jam)	Malam hari	Hiburan	5 (Tetap fokus)	5 (Sering)	5 (Tinggi)	Meningkatkan motivasi	Menetapkan jadwal khusus
Perempuan	< 18 Tahun	Sistem Informasi	(1–2 jam/minggu)	(<1 jam)	Sore hari	Hiburan	1 (Sulit fokus)	1 (Jarang)	1 (Minim)	Menurunkan motivasi	Menggunakan teknik manajemen waktu
Laki - Laki	19 tahun	Teknik Informatika	(6–10 jam/minggu)	(1–2 jam)	Sore hari	Sosialisasi dengan teman	5 (Tetap fokus)	1 (Jarang)	5 (Tinggi)	Tidak berpengaruh	Menggunakan teknik manajemen waktu
Laki - Laki	19 tahun	Sistem Informasi	(3–5 jam/minggu)	(1–2 jam)	Malam hari	Hiburan	5 (Tetap fokus)	5 (Sering)	1 (Minim)	Tidak berpengaruh	Menggunakan teknik manajemen waktu
Laki - Laki	> 20 tahun	Sistem Informasi	(11–20 jam/minggu)	(1–2 jam)	Malam hari	Pelarian dari stres	5 (Tetap fokus)	1 (Jarang)	5 (Tinggi)	Tidak berpengaruh	Menggunakan teknik manajemen waktu
Perempuan	19 tahun	Sistem Informasi	(1–2 jam/minggu)	(<1 jam)	Malam hari	Hiburan	5 (Tetap fokus)	1 (Jarang)	1 (Minim)	Tidak berpengaruh	Tidak ada upaya khusus
Perempuan	> 20 tahun	Sistem Informasi	(3–5 jam/minggu)	(<1 jam)	Malam hari	Hiburan	5 (Tetap fokus)	5 (Sering)	5 (Tinggi)	Menurunkan motivasi	Menggunakan teknik manajemen waktu

Fig 2: Sample Data

4. Results and Discussion

4.1. Discussion

The discussion in this study is focused on analyzing the pattern of relationship between the intensity of playing online games and the learning interest of STMIK Kaputama students. The data used are the result of questionnaires that have been disseminated and transformed so that they can be analyzed using the Association Rule Mining method, especially the A priori algorithm. The results of the data transformation resulted in a combination of itemssets that reflected various characteristics of students in terms of gaming habits and attitudes towards learning. Based on the analysis process, a number of itemsets were found that met the minimum support value of 30%, both for 1 itemset, 2 itemset, and 3 itemset. This association pattern illustrates that there is a significant relationship between the variables studied. For example, it was found that college students who played games more than 10 hours per week and played at night, for entertainment purposes, tended to have a low interest in learning. In addition, students who do not have a special effort to balance play and study time are more likely to have a low level of study concentration.

4.2. Implementation of a priori algorithm using RapidMiner

The implementation and testing process of association rule mining uses a total of 230 data. In the test of this system, we will discuss the RapidMiner process in determining the correlation between attributes. The results of the testing process can be seen in the image below:

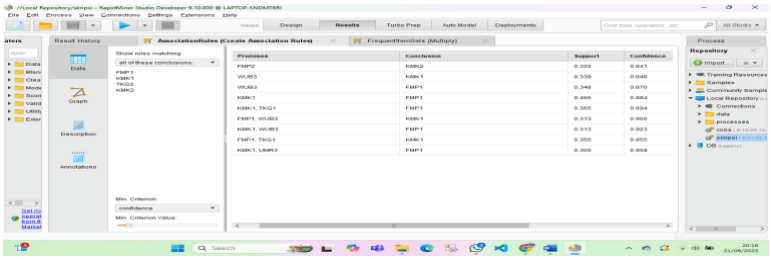

Fig 3: Test results

After all the tests are carried out, the results of the above test are obtained based on the Tabular Data table which includes the frequency of game play, duration of game play, most frequent game playing time, purpose of playing online games as well as for attributes of study time in the form of concentration level, frequency of course repetition, interest in courses, influence of online games and efforts to balance the time that has been processed using RapidMiner Then the results are obtained in the form of an association rule with the following details**:**

Table 1: Two-itemet pattern

Rule	IF antecedent THEN consequent	Support	Confidance	S*C
1	Jika tidak ada upaya untuk menyeimbangkan waktu bermain dan belajar (WUB3), maka frekuensi mengulang materi pelajaran jarang (FMP1)	34,8%	87%	30,27%
2	Jika ketertarikan terhadap meteri kuliah minim (KMK1), maka frekuensi mengulang materi pelajaran jarang (FMP1)	46,5%	88,4%	41,10%

Rule	IF antecedent THEN consequent	Support	Confidance	S*C
3	Jika tidak ada upaya untuk menyeimbangkan waktu bermain dan belajar (WUB3), maka ketertarikan terhadap meteri kuliah minim (KMK1)	33,9%	84,8%	26,6%
4	Jika frekuensi mengulang materi tinggi (FMP2),maka ketertarikan terhadap materi kuliah tinggi(KMK2)	32,2%	84,1%	27%

Based on the results of the analysis of the A priori algorithm on the intensity of playing online games with interest in learning, several important patterns were obtained as follows:

1. Correlation between the intensity of playing online games and learning interest Based on the results of the previous analysis, interest in the minimum lecture meter (KMK1) tends to have a level of concentration when studying, namely difficulty focusing (TKG1) after playing online games which affects learning interest.
2. Interest in minimal lecture meters (KMK1) influenced by the intensity of playing online games tends to correlate with the frequency of repeating infrequent subject matter (FMP1) which can affect students' interest in learning.
3. The factor that affects the level of interest in learning, especially among students, is the absence of efforts to balance play and study time (WUB3).
4. The strongest rule (Best Rule) If the interest in lecture metering is minimal (KMK1), then the frequency of repeating infrequent subject matter (FMP1) with a support value of 46.5% and also a confidance value of 88.4%, making it the strongest rule with a value of 41.10%. This can affect the low interest in learning compared to the intensity of playing online games.

5. Conclusions and Suggestions

5.1. Conclusion

From the results of the association pattern analysis carried out using the A priori method, several conclusions can be drawn regarding the attributes contained in the intensity of playing online games with learning interest as follows:

1. There is no effort to balance time playing online games and studying (WUB3), then interest in lectures will be minimal (KMK1) with a confidence value of 92.3%. This proves that the tendency to play online games without any effort to balance time playing online games and learning can affect interest in learning.
2. The age factor can also affect the level of playing games and also learning interest, this is evidenced by the results of the previous analysis which shows that the age range of >20 years (UMR3) tends to affect minimal interest in lecture materials (KMK1) so it can be concluded that the age factor is an additional indicator that affects the pattern of the relationship between playing games and learning interests.
3. A priori effectiveness in decision-making The A priori method is very effective in uncovering every pattern that exists in each related attribute. These findings can be used as a basis for better time management between playing online games and learning in order to balance the time between playing and learning which can affect students' interest in learning at STMIK Kaputama.

5.2. Suggestions

In this study, there are still many shortcomings that need to be corrected in the next research if you want to develop research by raising issues related to online games with interest in learning using a priori algorithm. Given the limitations of the author both in terms of knowledge, time and experience possessed by the author, the advice that will be given is:

1. Use a larger and more diverse dataset
2. Comparing the A priori method with other algorithms
3. Adding new variables as analysis factors This study only focused on the main variables

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