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Analysis of Learning Patterns of Job Training Class Users on the Masadepan.ku Platform

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Abstract : Masadepan.ku platform provides digital-based job training classes; however, the utilization of user data to enhance learning effectiveness remains suboptimal. This study aims to analyze user learning patterns based on completion rates, final scores, and participation across various fields of study. The methods used include pearson correlation analysis and data visualization through dashboards. The findings indicate no significant correlation between final scores and class completion time, with a correlation value of -0.0896. Fields of study with high participation and completion rates include social sciences, which have a participation rate of 99% and a completion rate of 97%, as well as entrepreneurship, with a participation rate of 93% and a completion rate of 95%, followed by religion, law, and administration. Fields of study with low participation and low completion rates include education and others. Additionally, fields of study that also exhibit low participation and low completion rates include technology and accounting. In terms of user satisfaction, the health category recorded the highest average rating of 4.96, indicating a very high level of satisfaction among participants. Meanwhile, the engineering and automotive category registered the lowest average rating of 4.76. Fields of study that require improvement based on low completion rates and low ratings include automation, with a completion rate of 85% and an average rating of 4.79, and tourism, with a completion rate of 83% and an average rating of 4.85, as well as the others, design, technology, and accounting categories.

Keywords :
Learning Patterns, Data Analysis, Data Visualization, Dashboard, Correlation,Tableau

1. Introduction

1.1. Background

Education is a fundamental pillar in developing high-quality and competitive human resources [1]. Through education, individuals not only gain academic knowledge but also develop the skills and abilities needed to face challenges in the workplace. In today's era, formal education still has room for improvement. This necessitates a more flexible, practical, and industry-relevant educational approach.

Technological advancements have brought significant changes to the field of education. The use of technology in education, such as computers, the internet, and digital devices, has created broader and more varied access to learning resources [2]. This technology enables online learning, reducing time, distance, and costs. One form of technology integration in education is the emergence of educational technology (edutech). Edutech serves as an innovative alternative by implementing a modern education system that utilizes technology in a flexible and measurable manner [3].

One of the products of educational technology is the Learning Management System (LMS), a tool that enables structured learning [4]. Learning management systems are not only used by formal educational institutions but also by startups and businesses offering job-related training. These platforms allow users to access learning materials, attend classes, and track their progress independently. One example of an edutech platform that utilizes a learning management system is Masadepan.ku.

Masadepan.ku is an edutech startup that provides supplementary learning services through a learning management system to support skill enhancement and career portfolio development for its users. As the number of users increases, the platform generates a significant volume of data. This data

includes information on users, available classes, completion rates, and user learning performance.

Challenges arise in managing and utilizing this data optimally for decision-making. Without proper processing, data remains just a collection of numbers that offer no added value to the company [5]. It is crucial for Masadepan.ku to have tools capable of presenting data in an easily understandable format that aligns with business needs, such as an interactive dashboard that provides real-time insights into platform performance.

Therefore, a system is needed to present essential information, such as the number of active users, the number of classes taken, class completion rates, and relevant metrics for stakeholders. Based on the previously mentioned issues, this research aims to address challenges in data utilization to enhance learning effectiveness. The research outcomes, in the form of an interactive dashboard and data analysis, are expected to assist Masadepan.ku in making more accurate and strategic data-driven decisions, ultimately benefiting both platform managers and users in improving the learning experience.

1.2. Literature Review

1.2.1 Preview Research

Previous research by Tiar Imam Muarif and Raditya Danar Dana discusses the topic of Tableau Implementation for Data Visualization Development in the Open Data Application at the Cirebon Regency Diskominfo. The challenge faced in managing Open Data at Diskominfo Cirebon Regency is the inability to transform data into informative visuals for decision-making and to support the One Data program through the Open Data website. The research method applied in the previous study was drill down, processing data in accordance with One Data regulations from West Java Province. By providing more informative data visualizations, this study aims to enhance the accessibility and utilization of data by users, particularly in the context of public services and information transparency in Cirebon Regency [6].

Research by Adi Kaswandi and Raditya Danar Dana utilized the ETL (Extract, Transform, Load) method. The results of this study led to the development of agricultural production data visualizations, including production distribution maps, production quantity charts per district, and commodity type charts. This study successfully created an interactive data visualization dashboard using the ETL method and Tableau Desktop application, which was then deployed on a website platform via Tableau Public [7].

The study conducted by Ananda Taqhsya Dwiyana et al. explores the topic of Dashboard Implementation for Patient Diagnosis Pattern Analysis at Hospital X. This study developed a dashboard to analyze patient diagnosis patterns at Hospital X to improve service quality. The methods used include collecting medical record data, performing exploratory data analysis (EDA), and visualizing data using Tableau. The results show that a dashboard featuring Sankey Diagrams, Tree Maps, and Histograms provides deeper insights into patient visit patterns, with an 88% effectiveness rate in supporting hospital management. The conclusion suggests that this dashboard enhances healthcare service efficiency, with recommendations for feature iterations and health education for the elderly [8].

Research by Basmalah Abirestu Maulisuriandhy et al. examines "Analysis and Visualization of Dengue Fever Patient Data in Situbondo Using the Tableau Platform." This study analyzes and visualizes dengue fever patient data from 2016–2022 using Tableau, utilizing geospatial data from tanahair.indonesia.go.id and patient data from Situbondo Health Centers (Puskesmas). The results show that data visualization is effective in presenting information, revealing two death cases and the spread of cases across all villages. This study is expected to assist in policy-making for dengue fever control in Situbondo [9].

Research conducted by Yuvanda Ramadhani et al. aims to implement Business Intelligence to analyze Mitsubishi car sales data from 2020–2021 through visualization using Tableau. The speed and accuracy of data processing influence the retrieval of strategic information, enabling companies to reduce potential losses and improve decision-making effectiveness. The analysis results indicate that Mitsubishi sales in 2021 experienced a significant increase compared to 2020, which was affected by the COVID-19 pandemic and a decline in consumer purchasing power. The generated data visualizations in the form of dashboards help in understanding sales quality and quantity while providing insights for developing more adaptive and competitive business strategies [10].

1.2.2 Tableau

Tableau is software that can process data into an attractive visual display in the form of a dashboard [11]. Tableau is designed to help users explore, analyze, and understand data in an intuitive and attractive way [12].

1.2.3 Analysis

Analysis is the stage where the results of data collection from interviews, field notes and other sources are found and organized in a structured manner [13]. The analysis process includes appropriate data collection methods and analysis techniques that suit the research objectives [14].

1.2.4 Learning Pattern

Learning is a structure and process designed to facilitate learning, ensuring that the transmission of knowledge takes place in a way that enriches both mind and spirit [15]. Learning pattern is a design or model that serves as a guide in the learning process in the classroom or tutorial, used to determine various learning tools, such as books, movies, computers, curriculum, and others [16].

1.2.5 Platform

Platforms are digital media that function as a means of communication for humans. Platform can also be interpreted as a system or digital environment specifically designed to execute commands according to patterns and settings that have been determined in the program system [17]. In personal computing, the platform is the basic hardware (computer) and software (operating system) on which software applications can run [18].

1.2.6 Pearson Correlation

Correlation is a method used to assess the extent of the linear relationship between two variables and the direction of the relationship. One of the most frequently used correlation measures is the Pearson correlation coefficient, which has a range of values from -1 to +1 [19]. The relationship between two variables is considered strong when the value is close to 1, while when the value is close to 0 the relationship is weak [20].

1.2.7 Data Visualization

Data visualization is the presentation of information and data in visual form, such as diagrams, graphs, maps, or infographics. Data visualization helps simplify complex information while providing deeper insight into data that is difficult to interpret [21]. Graphics commonly used for data visualization are bar charts, pie charts, line charts, heatmaps, histograms, box plots, and scatter plots [22].

1.2.8 Dashboard

Dashboard is a place where data is displayed so that users can observe real-time activities that occur on all devices in the company [23]. In general, dashboards have two main functions, namely presentation functions and forecasting functions [24].

2. Research Methods

The steps taken for problem solving are described in this framework. Here is the framework used:

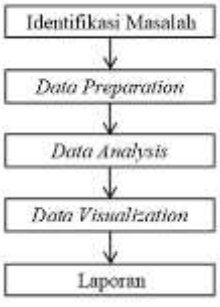


Fig. 1. Research framework

Based on the research framework described above, the discussion of each stage in the research can be described as follows:

1. Problem Identification
   The first stage carried out is problem identification. Problem identification is an important first step in the business analysis process. This stage aims to deeply understand the problems faced by the Masadepan.ku platform so that the solutions formulated can be in accordance with the needs and goals that the platform wants to achieve.
2. Data Preparation
   At this stage, data preparation is carried out to understand the data used, and that the data is of good quality and can provide accurate results in the analysis. At the data preparation stage, there are data understanding and data cleaning. Data understanding is done to understand the structure of the data, such as the number of rows and columns, the type of data in each column, as well as the purpose and context of each variable while data cleaning is done with the aim of identifying and dealing with various problems in the data. Data cleaning identified the presence of missing values in several columns, namely date_birth (66), date_completion (518), final score (518), and rating_class and review_class (521 each), without any duplication of data. In addition, there was an inconsistency in the data format in the type_gender column, where the values of “Perempuan” and “Laki-laki” were converted into “Female” and “Male”. Furthermore, an outlier check was conducted using boxplots to see the distribution of the data and visually detect anomalies. This research also included the addition of columns for further analysis and the grouping of data in the field_study column into 21 study categories to facilitate the process of data analysis and interpretation. This process is an important step to ensure that the data is ready to be used in further analysis stages and can produce relevant and reliable insights.
3. Data Analysis
   Data exploration and in-depth analysis to answer the problems to be solved using various tools, such as google colab and spreadsheets. Data exploration is carried out with the aim of understanding the structure and patterns in the available data, as well as exploring relevant insights to support data-based decision making. Focus on several business questions relevant to the Masadepan.ku platform. The data analyzed includes information on class completion time, final class grade, participation rate, and ratings given by users.
4. Data Visualization
   At this stage, visualizing the results of data analysis with the aim of presenting the findings clearly and easily understood by Masadepan.ku stakeholders. Making an interactive dashboard is done using the tableau application. This dashboard is designed to visualize important business metrics, such as the number of users, number of classes, class completion rates, and ratings from various categories of study fields.
5. Report

The final stage in this research is the preparation of a report, where all data obtained from the analysis and visualization process is combined into a comprehensive report. This report aims to present the findings of all the analysis that has been done, provide a deep understanding of the learning patterns of job training class users on the Masadepan.ku platform, and provide recommendations that can support data-based decision making by stakeholders.

3. Result and Analysis

3.1. Correlation

Based on the analysis, there is no significant relationship between the final grade and the length of time to complete the class. The correlation results show a value of -0.0896, which is very small and close to zero. A value close to zero means there is no linear relationship between the two variables. The following is a scatterplot visualization showing the relationship between the duration of class completion (in hours) and participants' final scores, as shown in Figure 2.



Fig 2. Scatterplot

3.2. Participation rate and Completion Rate

To measure user engagement in learning on the Masadepan.ku platform, we analyzed the participation rate and class completion rate based on subject categories. Through this analysis, users' learning patterns in various study categories can be observed, as shown in Table 1.

Table 1. Analysis of participation rate and completion rate

Field of study category	Participation rate	Completion rate
Administration	91%	91%
Agama	94%	92%
Accounting	80%	90%
Language	78%	92%
Business	82%	91%
Design	86%	90%
Law	94%	91%
Social Sciences	99%	97%
Occupational Health and Safety	65%	96%
Beauty	84%	94%
Health	50%	98%
Skills and Personal Development	81%	86%
Entrepreneurship	93%	95%
Culinary	77%	96%
Others	71%	67%
Media and Communication	88%	90%
Automation	82%	85%
Tourism	87%	83%
Education	76%	87%
Engineering and Automotive Technology	82%	96%
	79%	90%

In Table 1, it can be seen that categories of study such as administration, religion, business, law, social sciences, and entrepreneurship show high participation rates and completion rates. In contrast, subject categories such as accounting, technology, others, and education show lower participation rates and completion rates.

3.3. Rating

An analysis of the average rating of the study field category was conducted to evaluate the quality of the user learning experience on the Masadepan.ku platform. This rating illustrates the level of user satisfaction with the classes that users have attended and can be an indicator of the effectiveness of the materials and teaching methods used, as presented in Table 2.

Table 2. Rating

Field of study category	AVG Rating
Administration	4.913043
Agama	4.791667
Accounting	4.875000
Language	4.912181
Business	4.915110
Design	4.863980
Law	4.806452
Social Sciences	4.933333
Occupational Health and Safety	4.921053
Beauty	4.917808
Health	4.961905
Skills and Personal Development	4.921053
Entrepreneurship	4.898396
Culinary	4.917431
Others	4.846154
Media and Communication	4.928571

Field of study category	AVG Rating
Automation	4.785714
Tourism	4.850000
Education	4.909226
Engineering and Automotive	4.764706
Technology	4.874576

Table 2. displays the average rating for each category of study fields available on the Masadepan.ku platform. Based on the results of analyzing the average rating of each subject category, several important findings can be identified. The category with the highest average rating is health (4.961905), indicating that this field provides the highest level of satisfaction to its users compared to other categories. The category with the lowest average rating was engineering and automotive (4.764706), followed by automation (4.785714), religion (4.791667). Overall the average rating for all categories (>4.7), illustrates a generally good quality of learning.

3.4. Improvement of Study Field Categories

In order to identify the categories of subject areas that require improvement, the completion rate and the average rating given by users were analyzed. The results of the analysis are presented in Table 3.

Table 3. Analyze study field improvement

field of study category	Rating Category	Completion Category
Administration	High	High
Agama	Low	High
Accounting	Low	Low
Language	High	High
Business	High	High
Design	Low	Low
Law	Low	High
Social Sciences	High	High
Occupational Health and Safety	High	High
Beauty	High	High
Health	High	High
Skills and Personal Development	High	Low
Entrepreneurship	High	High
Culinary	High	High
Others	Low	Low
Media and Communication	High	Low
Automation	Low	Low
Tourism	Low	Low
Education	High	Low
Engineering and Automotive	Low	High
Technology	Low	Low

Based on the analysis shown in Table 3, there are several categories of subject areas that require improvement, both in terms of material quality, teaching methods, and user involvement. The categories with low ratings and low completion rates, requiring improvement include the automation category of the field of study, tourism, other categories of study, design, technology, as well as the accounting category of study.

3.5. Visualization

Data visualization plays an important role in communicating various insights gained during the analysis process to Masadepan.ku stakeholders. By using informative graphical representations, complex data can be presented in a more understandable and engaging way. This visualization allows those involved to get a clearer picture of user learning patterns and trends. The following is a dashboard visualization display that presents the analysis results interactively and can be seen in Figure 3.



Fig 3. User insight dashboard Masadepan.ku

Figure 3. Masadepan.ku user insight dashboard presents key information about the Masadepan.ku platform, including an overview, study categories with the highest and lowest participation and completion, user enrollment growth trends, age and gender segmentation, and ratings for each study field category.

4. Conclusion

The conclusion of this research is no significant correlation between final scores and class completion time, with a correlation value of -0.0896. Fields of study with high participation and completion rates include social sciences, which have a participation rate of 99% and a completion rate of 97%, as well as entrepreneurship, with a participation rate of 93% and a completion rate of 95%, followed by religion, law, and administration. Fields of study with low participation and low completion rates include education, with a participation rate of 76% and a completion rate of 87%, and others, with a participation rate of 71% and a completion rate of 67%. Additionally, fields of study that also exhibit low participation and low completion rates include technology and accounting. In terms of user

satisfaction, the health category recorded the highest average rating of 4.96, indicating a very high level of satisfaction among participants. Meanwhile, the engineering and automotive category registered the lowest average rating of 4.76. Fields of study that require improvement based on low completion rates and low ratings include automation, with a completion rate of 85% and an average rating of 4.79, and tourism, with a completion rate of 83% and an average rating of 4.85, as well as the others, design, technology, and accounting categories.

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