Design of Accounting Learning Media for Vocational Students to Enhance Data Analytics Skills Using Microsoft Power BI

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Abstract. This research is motivated by the lack of learning media that facilitates the use of data analytics tools like Microsoft Power BI in vocational accounting education, despite the fact that several professional literatures highlight that accountants need skills in working with data and communicating results to stakeholders. The purpose of this study is to design a learning media based on accounting data in the form of several financial dashboards, including sales analysis, Profit & Loss analysis, and Balance Sheet analysis, using financial transaction data processed through Microsoft Power BI. This enables both lecturers and students to interpret accounting data through the data visualization tools that have been created.This study follows a developmental research approach using the ADDIE model, which includes analysis, design, development, implementation, and evaluation. The testing of this learning media design was conducted with accounting lecturers and students. The results show that the validation from both lecturers and students indicates that the learning media received excellent ratings. Therefore, it can be concluded that the learning media utilizing Microsoft Power BI to enhance students' data analytics skills is highly feasible for implementation in accounting education.

Keywords: *Learning media, Accounting Data Anlytics, Data Visualization Accounting*

INTRODUCTION

The survey report conducted by the World Economic Forum on the Future of Jobs in 2023, which estimates structural changes in the labor market from 2023 to 2027, indicates a global decline in jobs between 2023 and 2027 for roles such as accounting, bookkeeping, payroll clerks, administration, and data entry clerks. Additionally, the survey results explain that the adoption of technology is driving the growth of jobs that currently do not employ many people, such as data analysts, data scientists, big data specialists, business intelligence analysts, database and network professionals, and data engineers.
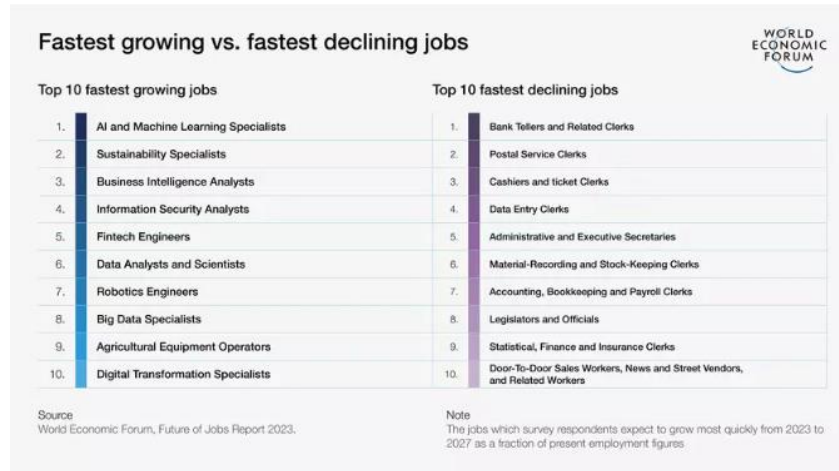
Sumber : *World Economic Forum*, Future of Jobs Survey 2023

Digital transformation in the field of accounting and finance has driven the increased demand for data analysis skills. According to a survey conducted by the Society for Human Resource Management (2016), sponsored by the American Statistical Association, organizations are projected to increase the number of jobs requiring data analytic skills, particularly in accounting and finance, by 71%. The importance of these skills has also been emphasized in several professional literatures. [1] highlights the significance of managerial accounting skills, such as curiosity, the ability to work with data, and the capability to communicate results through visualization and storytelling. [2] and [3] also stress the need for financial investigative skills, data comprehension, and the use of statistical and visualization tools to support audit, tax, risk management, and consulting.

Technological advancements in accounting, including big data analytics, artificial intelligence (AI), and business intelligence (BI), have made it easier for accountants to gather, analyze, and present financial information. This makes technology adoption crucial for accountants to enhance efficiency, transparency, and reduce risks and operational costs [4]. Additionally, according to the World Economic Forum's Future of Jobs report (2023), technology adoption will drive job growth in areas such as data analysis, data science, big data specialists, business intelligence analysts, and database professionals. This underscores the importance of digital transformation for accountants and financial professionals.

In the accounting process, data analysis plays a crucial role in classifying transactions into accounts, journaling based on the accounting equation, and posting transactions to the ledger, which then forms the basis for preparing financial statements. On the other hand, in the audit process, the volume of data being used is increasing, making data analytics technology an essential part of auditors' work to understand big data. One of the technologies used in data analytics is Microsoft Power BI, which enables users to visualize accounting data in a more informative and engaging way.

Analytical skills are closely related to critical thinking abilities that accountants must possess. Accountants should be able to read charts, diagrams, and dashboards to extract meaningful insights. Traditionally, accountants presented data in table formats and used spreadsheets. With the advancement of technology and big data, there is a growing opportunity and need for more sophisticated presentation methods, as spreadsheets are less effective in conveying complex relationships and trends. As a result, visual representations, which initially consisted of pie charts and graphs, have evolved into dynamic dashboards and interactive graphics that provide deeper insights for critical thinking and facilitate more accurate decision-making. As the volume and complexity of data increase, the demand for data visualization skills in accounting is likely to grow. Future accountants must be comfortable using advanced visualization techniques to interpret Big Data, identify trends, and communicate findings effectively. This growing demand underscores the importance of integrating data visualization training into accounting education [5].

Based on these changes, accountants need to develop digital skills and an adaptive mindset towards technology. In the context of vocational education, it is important to provide learning media that facilitate mastery of data analytics skills through the use of technology such as Microsoft Power BI. This not only prepares students to meet industry demands but also enables them to extract value from accounting data through deeper analysis, which is a key challenge for the accounting profession today [5].

The accounting learning media currently used have not yet adopted data analytics technology in the accounting education process. Vocational accounting learning media typically use accounting software to input transaction data

and spreadsheets to compile existing financial reports, such as those from the Indonesia Stock Exchange, for financial statement analysis. As a result, they do not yet represent the skills required by the accounting industry, as explained by several professional literatures like [6] and [7], which emphasize that the accounting profession must have ETL (extract, transform, load) skills and be able to use visualization tools to interpret results for stakeholders through dashboard.

Based on the above, there is a need for learning media that can introduce and train students in the use of data analytics tools to enhance data analysis skills, enabling accounting students to be better prepared to enter a competitive job market. This can be achieved by designing accounting learning media to improve data skills using data analytics software like Microsoft Power BI. By developing this learning media, educators can use it in teaching activities to enhance critical thinking, data analysis, and data visualization skills derived from financial transactions in accounting education.

METHODS

To create a media product and test the effectiveness of the produced product, this research employs the Research and Development (R&D) method, as stated by [8]. The development process follows the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE Research Development model involves stages of model development through five steps/phases, including Analysis, Design, Development or Production, Implementation or Delivery, and Evaluation. The subjects of this research are public financial accounting lecturers at the State Polytechnic of Bengkalis who have taught courses in financial statement analysis and accounting computers, aimed at assessing the feasibility of the financial data visualization learning media using Microsoft Power BI. The implementation trial is conducted with students enrolled in the financial statement analysis course.

The data analysis technique involves data acquisition, followed by analysis and description of the results. Furthermore, to determine the feasibility of the product, conclusions are drawn based on the criteria aspects of the learning media's feasibility. The learning media is considered feasible if it meets a percentage score of 61%, as presented in Table 1. To assess whether the learning media represents the required data analytics and visualization skills, the researcher uses skill indicators needed by accountants from the [6], which include the ability to extract, transform, and load relevant data, apply appropriate data analytics techniques, and interpret the results. To assess the validity, the following formula is used:

$$Percentage = \frac{Total\ Score}{Maximum\ Score}$$

After obtaining the results from the calculations based on the percentage technique above, the next step is to determine the feasibility of the learning media using the following interpretation scale criteria:

Table 1.
Feasibility Percentage

% Feasibility	Description
81 % - 100 %	Very Feasible
61 % - 80 %	Feasible
41 % - 60 %	Moderately Feasible
21 % - 40%	Not Feasible
0% - 20%	Very Not Feasible

Source: Riduwan, 2015

RESULTS AND DISCUSSION

Based on the observation results, information was obtained that accounting learning media utilizing data analytics tools is not yet available. If the use of data analytics tools is not introduced in the accounting learning process, students will face limitations in their ability to analyze complex data, resulting in a skills gap with industry demands that expect accountants to be capable of processing and analyzing big data. Additionally, graduates will struggle to adapt to new technologies, such as big data and artificial intelligence, which are increasingly being used in the field of accounting.

The initial stage of this research is to conduct a needs analysis to address the absence of accounting learning using data analytics tools to visualize financial transactions that have been carried out. Based on the observation results, financial data commonly used in accounting learning is required, including special journals such as purchase journals, sales journals, general journals, specific journals, and chart of accounts (COA) codes. Below are the details of the financial data that will serve as the dataset to represent ETL (extract, transform, load) skills for accounting students.

Table 2. Details of Financial Data

No.	Keterangan	Jumlah Transaksi
1.	Total transaction lines	407.587 lines
2.	Number of products sold	4 units of products
3.	Transactions	95.526 transactions/year
	Details of transaction journals:	
	- Purchase Journals	6.355
	- Sales Journals	65.636
	- Correction Journals	10.461
	- Adjustment Journals	230
	- General Journals	2.212
	- Cash on Hand Journals	7
	- Cash Receipt Journals	10.625

Sumber : Data diolah, 2024

After determining the financial transaction data, the next stage is to design the mapping of the Chart of Accounts (COA) for transactions, which will include a total of 4,950 account codes to be mapped. The mapping will then determine the code for mapping the cost area of the transaction data and create a calendar table for the transaction dates. The next task is to design a learning media that includes the previous financial data visualizations using Data Analytics and Data Visualization tools, specifically Microsoft Power BI. The subsequent step is to build the model view in Microsoft Power BI to manage and establish relationships between the tables in the specified dataset. Below is the model view created in Microsoft Power BI.
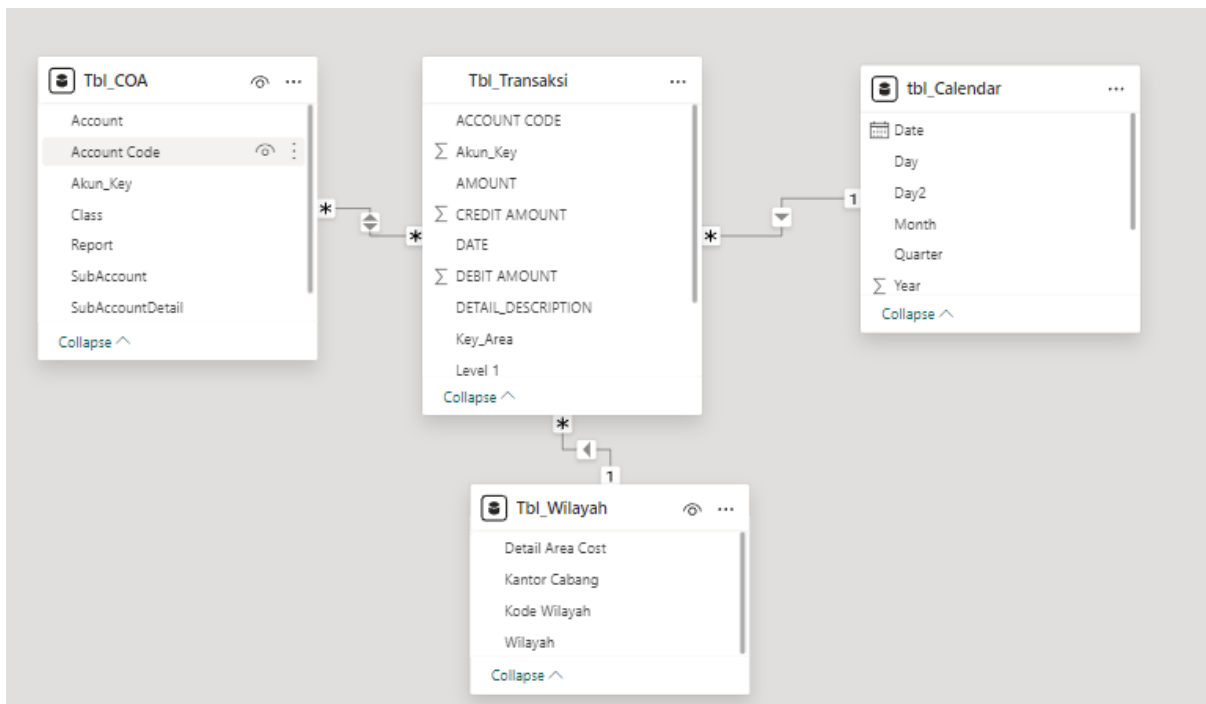

Figure 2. Model View Design of Accounting Learning Media

The next step in designing the learning media using Microsoft Power BI is to determine the metrics (Key Performance Indicators) that will be placed on the financial dashboard for use by lecturers and students to analyze and interpret the contents of financial transaction journals, including trends and business performance indicators in the

form of KPIs. Three dashboards have been created: the Sales Analysis Dashboard, Profit & Loss Analysis Dashboard, and Balance Sheet Analysis. The metrics used in the Sales Analysis Dashboard include total gross revenue (gross sales), cost of sales (cost of sales), gross profit, sales vs. cost of sales, the number of days required to receive payments on credit sales (Days Sales Outstanding), customer sales by area, and product sales trends. Below is the design display of the Sales Analysis Dashboard.
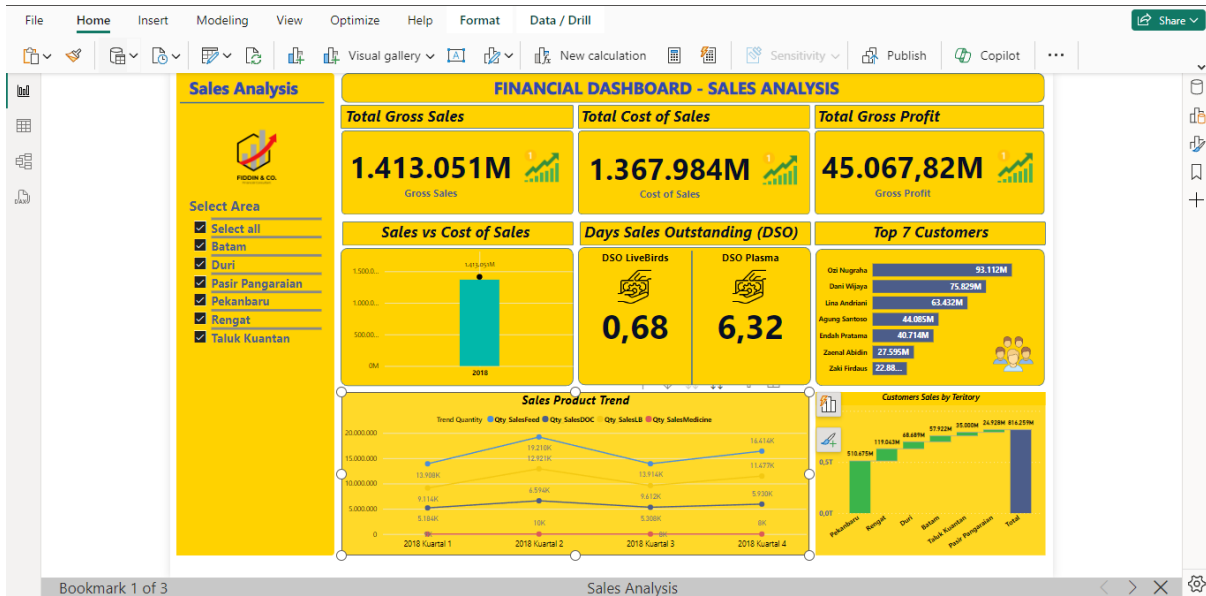

Figure 3. Sales Analysis Dashboard

The design of the Profit & Loss Dashboard includes several financial metrics, namely: Total Revenue, Total Expenses, Gross Profit, Net Profit, Gross Profit Margin, Net Profit Margin, a comparison of Total Revenue with Total Expenses, and vertical analysis for the Profit & Loss statement. Additionally, there are several filters to select for month and operational area. Below is the learning media design for the Profit & Loss Analysis dashboard.
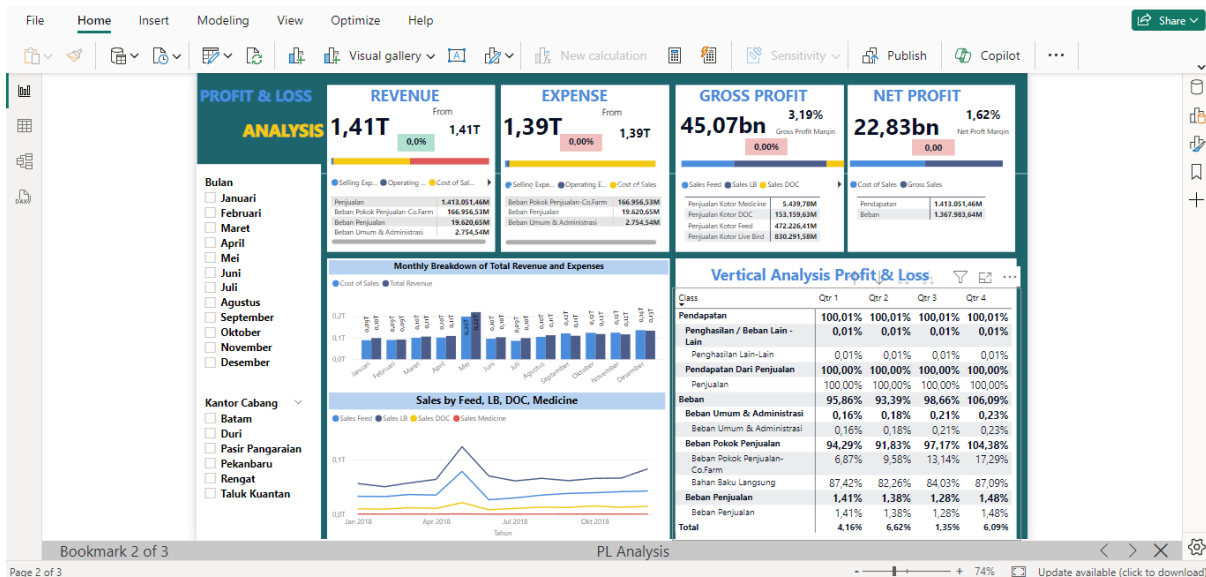

Figure 4. Profit & Loss Analysis Dashboard

Next is the Balance Sheet Analysis dashboard, which contains financial metrics to analyze the company's financial performance, such as the Current Ratio, Quick Ratio, Return on Assets, Debt to Equity Ratio, Debt to Asset Ratio, and a comparison of the balance sheet from January to December. Below is the learning media design for the Balance Sheet Analysis Dashboard

BALANCE SHEET ANALYSIS

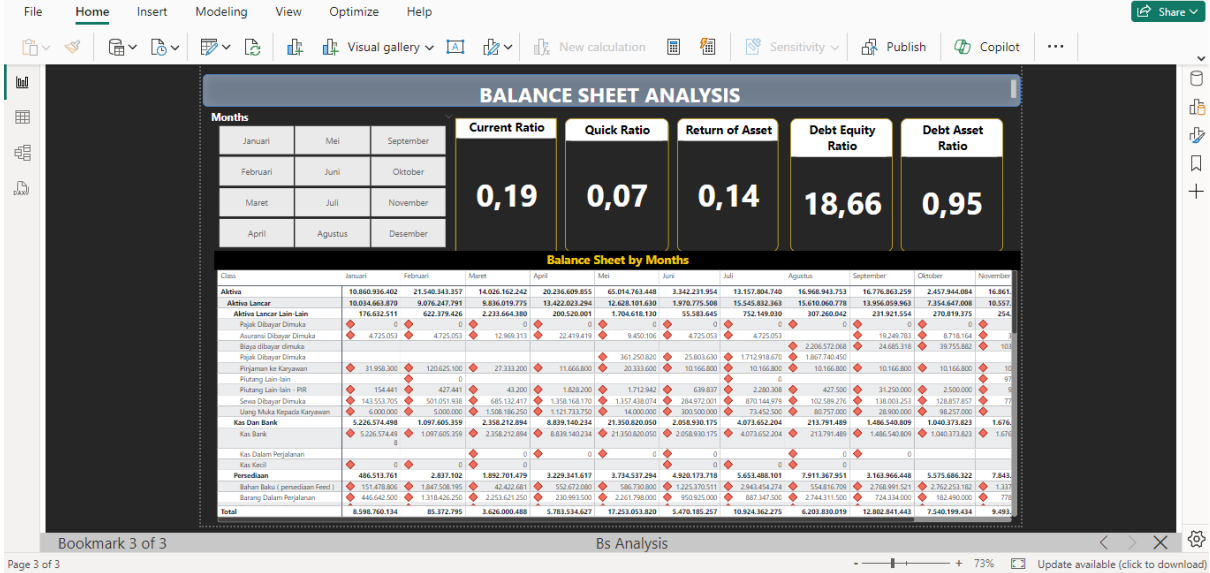| Current Ratio	Quick Ratio	Return of Asset	Debt Equity Ratio	Debt Asset Ratio
0,19	0,07	0,14	18,66	0,95

Figure 5. Balance Sheet Analysis Dashboard

The next stage of developing the learning media is the development phase. In this phase, the learning media that has been designed and developed is then validated by several accounting lecturers to assess the feasibility of the product. The criteria for learning media feasibility use the skill indicators required for accountants from the EY Foundation, which include the ability to extract data, transform, load relevant data, apply appropriate data analytics techniques, and interpret results. The validation results from the lecturers showed a score of 89%, which means the learning media can be categorized as highly feasible. Below is the data presented from the lecturer validation analysis:
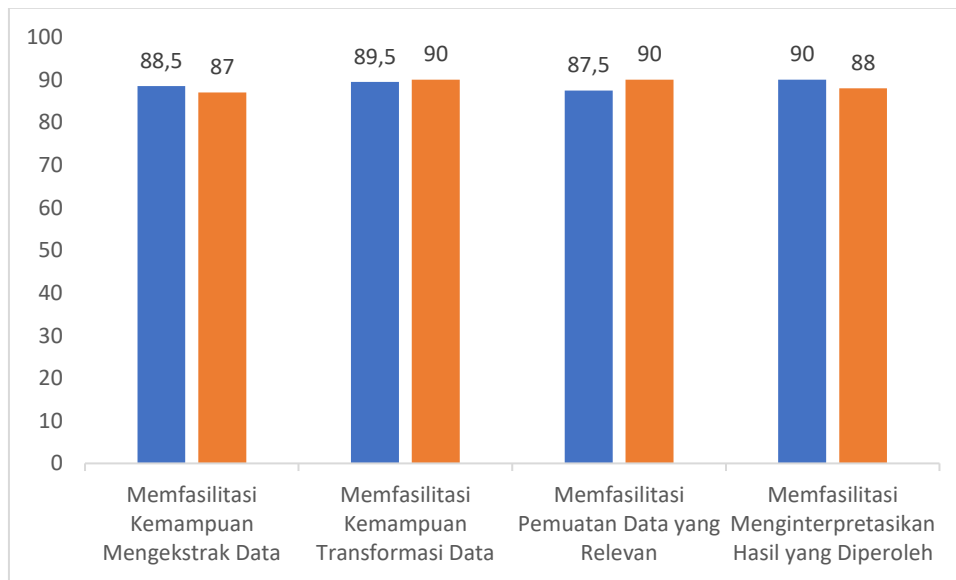
Figure 6. Lecturer Validation Results

The next stage is the implementation of students' analytical skills through the teaching media that has been developed for students enrolled in the financial statement analysis course, with a total of 30 students. The trial began by introducing the concept that the transactions journaled by students during previous accounting learning processes represent raw data containing financial information. According to [9], accountants must understand and manipulate data. Students need to use visualization tools to communicate information and create dashboards [7]. Students were asked to extract the dataset previously created using Microsoft Power BI, then perform data transformation and loading into the data visualization tool. Afterward, students used the dashboards developed to interpret financial information

and conduct financial statement analysis. At the end of the trial, students were asked to fill out a questionnaire to provide feedback on the teaching media. Below are the students' assessments of the developed learning media.
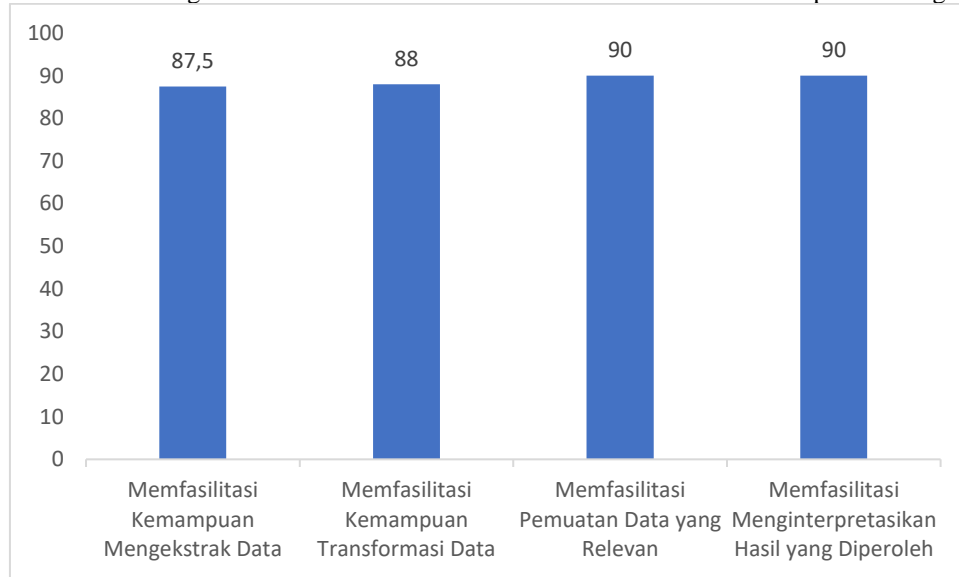

Figure 7. Results of Respondent Assessments

Based on the recapitulation of the user survey regarding the learning media, a percentage of 88.87% was obtained, which is based on aspects such as data extraction ability, data transformation ability, data loading ability, and the media's ability to facilitate the interpretation of information. Therefore, this media can be considered as a supportive tool in the learning process.

The evaluation phase is a process to assess whether the developed media aligns with the initial objectives set. According to [10], this evaluation is conducted at every stage of the ADDIE development model, not just at the end. The evaluation includes formative and summative evaluations [11]. Formative evaluation is conducted at each stage, while summative evaluation is only carried out at the final stage. In this study, formative evaluation was conducted at every stage to revise the product as needed. The evaluation was carried out by analyzing questionnaires from subject matter experts, media experts, and user feedback, allowing for the assessment of whether the developed product is suitable for use [10]. Based on the overall analysis, it can be concluded that the design of this learning media is highly suitable for use as an instructional tool.

CONCLUSIONS

The development of a learning media to enhance students' data analytics skills using Microsoft Power BI has been successfully completed. Based on evaluations from lecturers and students, the learning media is considered highly effective for accounting education. However, this research is limited to financial dashboards, including sales analysis, profit and loss analysis, and balance sheet analysis. Further development is needed for cash flow analysis, variance analysis, and predictive analysis. Additionally, creating a strategy dashboard would be beneficial to help lecturers explain financial performance using accounting data more effectively.

ACKNOWLEDGMENTS

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