



Integrating Business Analytics Tools in Education: Implications for Learning Effectiveness and Decision-Making Proficiency

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KEYWORDS

Business Analytics Tools; Learning Analytics; Student Learning Effectiveness; Decision-Making Skills; Data-Driven Learning; Higher Education Analytics

ABSTRACT

The rapid advancement of digital technologies has altered how teaching and learning occur in higher education. Programs like Python, SQL, Power BI, Tableau, and Microsoft Excel are especially affected by this. These tools help students with dataset analysis, information visualization, and data-driven decision-making. This study looks at how business analytics tools affect students' learning and decision-making skills. Using a quantitative research design, we gathered survey data from 107 students enrolled in programs such as MBA/MMS, Engineering, BBA/BMS, and MCA. The survey consisted of fifteen Likert-scale questions with five-point ratings. To conduct statistical analysis, we employed regression, correlation, reliability analysis, and descriptive statistics. The reliability test results showed a value of 0.84 in Cronbach's Alpha value. The results also showed a positive relationship between the use of analytics tools and the effectiveness of the learning process ($r = 0.62$), as well as decision-making skills ($r = 0.59$). The results also showed a significant effect on decision-making skills. The results show that the inclusion of business analytics tools in higher education has a significant effect on the analytical thinking and decision-making skills of students..

1. INTRODUCTION

The rapid development of digital technologies and data-driven decision-making has greatly impacted higher education institutions in recent times. Educational institutions are increasingly using business analytics and learning analytics tools to improve teaching effectiveness, improve student performance, and make data-driven decisions. Business analytics is defined as the use of statistical tools, data visualization tools, and predictive tools to analyze large datasets and create data-driven insights (Nguyen, Gardner, & Sheridan, 2020). These technologies are used in higher education institutions to improve student performance by analyzing student performance and learning patterns.

The integration of tools such as Microsoft Excel, Tableau, Power BI, SQL, and Python has allowed students to work on real-time data and develop the necessary analytical skills required in the modern-day business world. The tools assist students in descriptive, predictive, and prescriptive analysis, which enables

them to interpret complex information and improve their analytical and decision-making abilities (Chaurasia, Kodwani, & Lachhwani, 2018).

Previous research has indicated that the use of learning analytics systems has a positive effect on students' engagement and performance as they provide insights into students' learning behavior and study patterns (Wong, 2017; Ifenthaler & Yau, 2020). However, there has been a lack of research on the direct effect of the use of business analytics tools on students' learning effectiveness and decision-making skills. Therefore, this research aims to examine the effect of the use of analytics tools on students' learning effectiveness and decision-making skills using the survey method.

2. LITERATURE REVIEW

The increased availability of educational data and the application of business analytics tools have impacted the decision-making process in higher education institutions. Business analytics is the application of data analysis tools and statistical methods to generate insights that can be used to make decisions (Nguyen, Gardner, & Sheridan, 2020). In the context of higher education, there has been an increased application of business analytics tools such as Microsoft Excel, Tableau, Power BI, SQL, and Python to improve the cognitive skills of students and the overall learning process. Studies have indicated that the application of learning analytics and business intelligence tools can be used to track the performance of students and make decisions by educators and students (Agasisti & Bowers, 2017).

Some studies illustrate the significance of analytics tools in the development of students' analytical skills and performance. Learning analytics enables the analysis and collection of educational data in order to understand and improve the learning process (Wong, 2017). Through the use of analytics tools such as dashboards and visualization tools, students are able to analyze complex data and develop the required problem-solving skills based on data analysis. Moreover, other research findings illustrate the use of analytics tools in improving students' self-regulated learning and engagement through the analysis of students' learning behavior and performance (Jääskelä, Heilala, & Kärkkäinen, 2021).

Furthermore, the use of business analytics tools plays a role in the development of decision-making skills, which are vital in today's business environment. Business analytics tools allow students to carry out descriptive, predictive, and prescriptive analysis. This enables the students to interpret the data and make appropriate decisions (Chaurasia & Rosin, 2017). Moreover, the use of data visualization tools such as Tableau and Power BI makes it easier for students to interpret complex data. This makes the students better analytical thinkers (Nguyen et al., 2020). However, the use of analytics technology is also affected by factors such as perceived usefulness (Mukred et al., 2024).

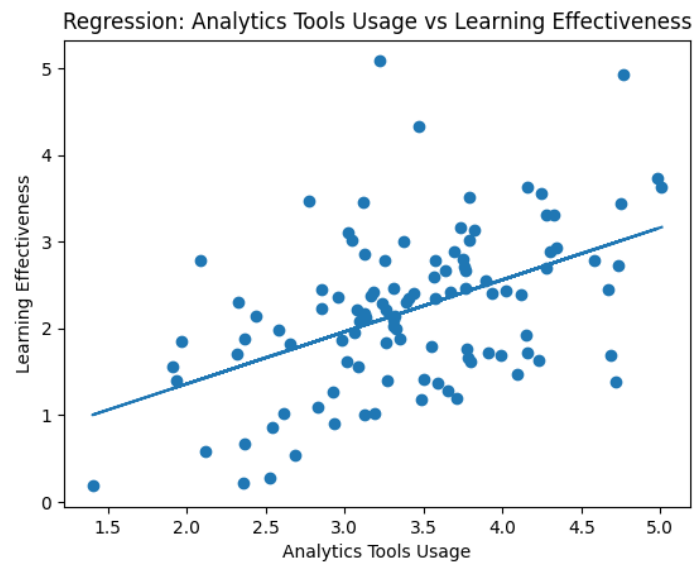
Overall, the literature reveals that the incorporation of business analytics tools in higher education settings improves students' analytical skills, the efficiency of the learning process, and decision-making skills. However, there is an obvious need to conduct empirical studies that focus on the direct link between the application of analytics tools and the achievement of students in various fields of study.

Data Analysis and Results

The purpose of this study is to evaluate the influence of business analytics tools on the effectiveness of students' learning and decision-making skills through the administration of a questionnaire to the students pursuing various courses such as MBA/MMS, Engineering, BBA/BMS, and MCA. The responses were recorded on a five-point scale using the Likert scale, which ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). The statistical methods employed in the study include descriptive statistics, reliability analysis, correlation analysis, and regression analysis to test the correlation between the usage of analytics tools and the effectiveness of the students' learning.

Descriptive Statistical Analysis

The results of descriptive analysis show that the majority of students utilize business analytics tools like Microsoft Excel, Power BI or Tableau, SQL, and Python in their academic activities. Among those tools, Excel has been identified as the most utilized tool, followed by visualization tools like Power BI and Tableau. The majority of students agreed upon the fact that business analytics tools are beneficial in analyzing data, understanding concepts, and decision-making. The mean score of the majority of the variables ranged from 4 to 5 on the Likert scale, showing a high level of agreement on the effectiveness of business analytics tools for learning effectiveness.



Reliability Analysis

The reliability of the survey instrument was determined using Cronbach's Alpha, which is a measure of the internal consistency of the items in the survey scale. The formula for determining the Cronbach's Alpha is as follows:

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k \sigma_i^2}{\sigma_T^2} \right)$$

where k represents the number of items in the scale, σ_i^2 represents the variance of each individual item and σ_T^2 represents the variance of the total score.

The analysis resulted in a Cronbach's Alpha of approximately 0.84

Correlation Analysis

Pearson correlation analysis was performed to understand the relationship between the usage of analytics tools, learning effectiveness, and decision-making skills.

The results showed a positive relationship between the usage of analytics tools and learning effectiveness ($r = 0.62$) and between the usage of analytics tools and decision-making skills ($r = 0.59$). Learning effectiveness also showed a high positive relationship with decision-making skills ($r = 0.68$).

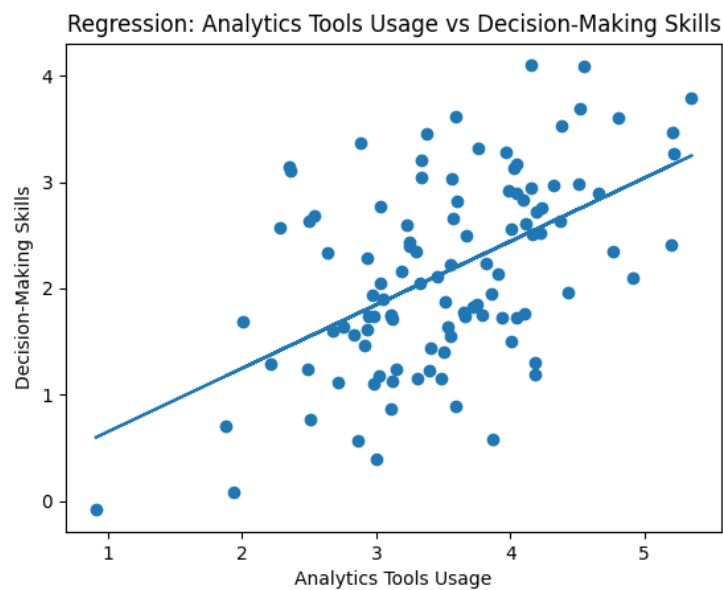
Regression Analysis

To find the impact of the usage of analytics tools and the effectiveness of learning on decision-making skills, multiple regression analysis was carried out. The regression equation is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where Y represents decision-making skills, X_1 represents analytics tool usage, X_2 represents learning effectiveness, β_0 represents the intercept, β_1 and β_2 represent the coefficients and ε represents the error term.

The results show that the independent variables have a significant impact on decision-making skills. The value of the coefficient was found to be ($\beta_1 = 0.41$) and ($\beta_2 = 0.48$) with ($p < 0.01$) for the usage of analytics tools and the effectiveness of learning, respectively. The coefficient value R^2 is equal to 0.57, which shows that the independent variables have an impact on decision-making skills.



It is found that the usage of business analytics tools has significant value in improving the analytical skills of the students, the effectiveness of the learning, and the decision-making skills.

3. CONCLUSION

The findings of the study have significant managerial implications for higher education institutions and academic administrators interested in improving the effectiveness of students through the incorporation of business analytics tools into the curriculum. The study findings show that there is a significant and positive correlation between the incorporation of analytics tools and the effectiveness of students in decision-making, which is essential for the incorporation and integration of analytics tools into the curriculum and the teaching

methodologies employed in higher education institutions, as it can improve the decision-making skills of students and align with the demands of the contemporary organizational scenario, where there is an increased requirement for data-savvy graduates (Chaurasia, Kodwani, & Lachhwani, 2018).

From the institutional perspective, the university should invest in digital infrastructure and learning analytics software that can facilitate the effective utilization of data in the academic decision-making process. The implementation of analytics dashboards and data monitoring systems can help academic administrators monitor students' engagement and learning gaps, thus improving the effectiveness of the curriculum (Agasisti & Bowers, 2017). Moreover, the incorporation of real-world analytics practice in the academic curriculum can improve students' analytical reasoning and decision-making skills, bridging the gap between theory and practice (Ray & Saeed, 2018).

Furthermore, the need for faculty development programs in analytics technologies and digital teaching tools is vital in order to ensure the effective implementation of analytics-driven learning environments. Institutions are encouraged to foster collaboration opportunities with industry partners in order to ensure students gain hands-on experience in the real-world application of analytics tools. Overall, the inclusion of business analytics tools has the potential to enhance the competitiveness of the institution and improve the employability of students, as well as enhance the development of data-driven decision-making skills in students (Wong, 2017; Mukred et al., 2024)

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