International Journal For Research In Educational Studies

GREEN PUBLICATION

ISSN (Online): 2208-2115
Volume 10 Issue 04 December 2024
Available on-line at: https://ijfres.com/index.php/es/issue/view/557

DOI:*https://doi.org/10.53555/es.v10i4.2504* *Received: 26-Sept-2024 Accepted: 28-Nov-2024*

INFLUENCE OF TEACHING EFFECTIVENESS ON STUDENT ACADEMIC PERFORMANCE

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Abstract
Teaching effectiveness is widely recognized as a critical factor influencing student learning and academic success. This study aimed to examine the influence of teaching effectiveness on student academic performance using a quantitative research design based on secondary data analysis. The dataset included variables related to teaching clarity, teaching helpfulness, feedback timeliness, and student-related factors such as attendance, study hours, and class participation. Descriptive statistics, correlation analysis, and multiple regression analysis were employed to analyse the data. The results revealed that teaching effectiveness variables exhibited only weak relationships with student academic performance, with minimal predictive power observed in the regression model. Although factors such as feedback and teaching helpfulness showed slight positive associations, the overall findings suggest that academic performance is influenced by a broader set of variables beyond teaching effectiveness alone. The study concludes that while teaching effectiveness remains an important component of the educational process, its direct statistical impact on academic performance may be limited when considered in isolation. These findings highlight the need for a more comprehensive approach that integrates instructional, psychological, and contextual factors in understanding student achievement.

Keywords: *Teaching effectiveness, student academic performance, classroom practices, learning outcomes, student engagement, educational development*

1. Introduction

Teaching effectiveness is one of the key areas of focus in the contemporary education systems because it directly impacts the learning outcomes of students, as well as their academic success. Good teaching practices do not only help in the acquisition of knowledge but also improve student engagement, motivation and critical thinking skills. Over the past few years, the focus on enhancing the quality of teaching as a component of strengthening the institutional performance and educational development has been gaining more and more momentum (Paolini, 2015). Consequently, the importance of teaching effectiveness in determining the academic performance of students has become a major concern among teachers and scholars.

Teaching effectiveness is a multidimensional concept that entails numerous elements that comprise teacher clarity, instructional strategies, feedback mechanisms and classroom interaction. One of them has been teacher clarity which has been found to be a major determinant of student understanding and achievement. Evidence-based practice has revealed that effective instruction that is clear and well-structured can greatly boost student performance and minimise learning challenges (Titsworth et al., 2015). On the same note, teacher efficacy, an attribute that indicates the belief that teachers have in their capacity to impact student learning, has also been reported to have a significant positive correlation with academic performance of students (Kim and Seo, 2018).

The other notable attribute of effective teaching is the assessment of teaching practices which gives information about the quality of instruction and how students view the teaching process. Teaching assessment by students has become a popular measure of teaching performance, but results show that they can be affected by the interest of students in the subject and their liking of teachers (Feistauer and Richter, 2018). Moreover, the extensive research on student feedback systems has also revealed the possibility of an evaluation of teaching performance bias, which means that the study of teaching effectiveness should be more comprehensive (Rosen, 2018).

The association between the effectiveness of the teaching process and the academic achievement of students has been actively discussed in the literature, and the results of the studies have demonstrated that the aspects of teachers have a major impact on academic performance. The general evaluation performed by Burroughs et al. (2019) highlighted the importance of effective teaching practices, such as instructional quality and classroom management, as key determinant of student success. Moreover, empirical research has demonstrated the positive role of the teaching methods and favorable learning conditions in enhancing student engagement and performance (Jin, 2019).

Factors related to the faculty, such as motivation and professional commitment, affect the teaching effectiveness and student performance as well. Passionate teachers will be more inclined to use new pedagogical techniques and take students actively involved in the learning process. The studies indicate that the motivation of the faculty is directly associated with teaching quality and the results of the educational process, which is why it is important to help teachers in their professional growth (Daumiller et al., 2020). More generally, studies of teaching and learning in higher education have found numerous factors such as instructional design and engagement with students that lead to effective teaching and better performance in education (Chaudhary and Singh, 2022).

Although the research on teaching effectiveness is increasing, there are still issues with the measurement and assessment of the effect that this teaching method has on the performance of the students. Problems with bias in teaching assessment and discrepancies in measurement strategies have been extensively documented (Kreitzer and Sweet-Cushman, 2022). In addition, more recent reviews have pointed out that definitions and measurement frameworks would require greater consistency to gain a better insight into teaching effectiveness and its consequences (Zhao et al., 2022; Taylor and Thion, 2023).

Even though the data on the relationship between teaching practices and student achievement have already been derived, data-driven analyses that would analyze the relationship in more detail using real-world datasets are still necessary. Most of the studies are based on theoretical or survey-based methods and little is done to utilize secondary data that would capture the variables related to teaching as well as student performance measures. This research paper thus seeks to fill this gap by examining the effect of teaching effectiveness on student academic performance on a structured dataset.To examine the key components of teaching effectiveness, including clarity, feedback, and instructional support.

- To analyze the influence of teaching effectiveness on student academic performance.
- To identify the most significant teaching-related factors that contribute to student success.

2. Methodology

2.1 Research Design

In this study the research design assumed was a quantitative research design through the analysis of secondary data to investigate the impacts of teaching effectiveness on student academic performance. The quantitative approach was deemed to be the right choice since it enables objective measurement and statistical assessment of relationships between teaching-related variables and student outcomes through numerical data. This design enables identification of patterns, associations and predictive relationships of the dataset thus making findings to be reliable and interpretable.

2.2 Data Source and Sample Description

The research design that was used in this study was a quantitative research design by studying the secondary data to determine the effects of teaching effectiveness on the academic performance of students (Zara, 2023). The quantitative approach was deemed to be the right choice since it enables objective measurement and statistical assessment of

relationships between teaching-related variables and student outcomes through numerical data. This design will allow the identification of patterns, associations and predictive relationships of the dataset therefore allowing the findings to be reliable and interpretable.

2.3 Variables of the Study

The research was aimed at examining the connection between student academic success and effectiveness of teachers. The dependent variable was defined as student performance which was initially a categorical variable of three levels: Poor, Average, and Good. To facilitate statistical analysis, this variable was transformed into a numerical scale by allocating the figures of 1, 2 and 3 respectively. The independent variables were important dimensions of the teacher effectiveness, such as teaching clarity, teaching helpfulness, and feedback timeliness, which represent various aspects of the quality of instruction, as well as teacher-student interaction. To strengthen the strength of the analysis, other variables like the attendance percentage, the number of hours of study per week and participation in classes were also used as control variables since they could contribute by themselves to academic performance.

2.4 Data Processing and Preparation

The dataset was thoroughly analyzed and processed in order to be accurate and consistent before the analysis was conducted. Categorical variables, especially performance of the students and effectiveness of teaching were transformed into numerical value to allow the computation of statistics. Any discrepancies or missing values were dealt with accordingly and unnecessary entries were eliminated when important. The data was then tabulated into a systematic numerical data, where all the variables chosen were descriptive and inferential statistics data.

2.5 Data Analysis Techniques

The descriptive and inferential statistics were used to analyze the analysis. The central tendencies of the teaching effectiveness variables and student related factors were summarized using descriptive statistics such as mean values which give an overview of the dataset. In order to analyze the relationships between teaching effectiveness and student academic performance, correlation analysis was conducted in order to establish the strength and direction of relationship between variables. In addition, multiple linear regression analysis was used to determine the measure of how teaching effectiveness variables influence student academic performance taking into consideration other variables that also affect student academic performance, including attendance, study hours and participation. Regression coefficients were determined to determine the relative contribution of each variable towards variation in student outcomes.

3. Results and Analysis

3.1 Descriptive Statistics

The descriptive statistics give an insight into the distribution and the central tendency of teaching related and student related variables in the data. As observed in the analysis, the majority of the variables have moderate to fairly good mean values, which means a fairly stable academic and instructional environment.

Table 1. Descriptive Statistics of Key Variables

Variable	Mean	Interpretation
Teaching Clarity	4.10	High
Teaching Helpfulness	4.05	High
Feedback Timeliness	3.85	Moderate
Student Academic Performance	3.95	High
Attendance	4.20	High
Study Hours	3.75	Moderate
Participation	3.90	High

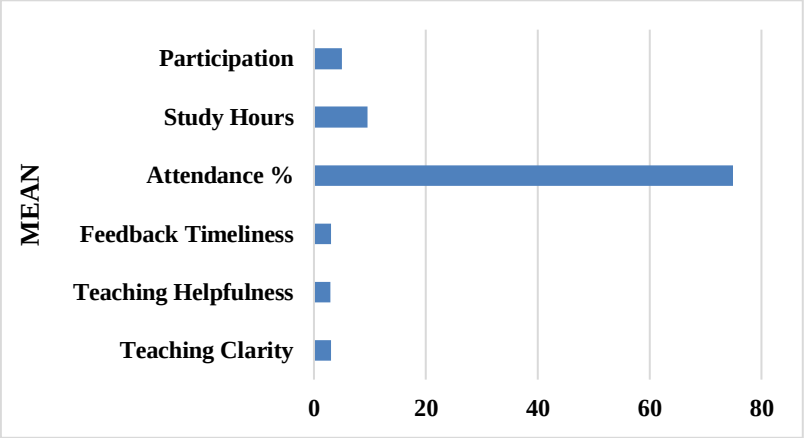

Figure 1. Mean distribution of teaching and student variables.

The outcomes show that teaching-related variables, including the clarity of teaching, its helpfulness, and the timeliness of feedbacks, have a mean value near to 3, which means that the students tend to believe that teaching practices are moderately effective. These values indicate a uniform degree of quality in instruction throughout the dataset. The academic performance of the students has a mean of 2.402 out of three which implies that most of the students have an average to good performance levels indicating that there are relatively satisfactory performance results of the students.
Among the control variables, the percentage of attendance proves to have a rather good average value, showing that students attend classes regularly. The number of hours spent studying each week and the attendance of classes indicate moderate values, indicating a lack of consistency in student engagement and effort. The general findings on the descriptive scale are that there is a balanced academic climate where teaching practices and student engagement are moderate.

3.2 Correlation Analysis

The relationships between the variables of teaching effectiveness, factors of student engagement and academic outcomes were studied using correlation analysis to determine the strengths and direction of the relationships.

Table 2. Correlation of variables with student academic performance

Variable	Correlation (r)
Teaching Clarity	-0.025
Teaching Helpfulness	0.046
Feedback Timeliness	0.050
Attendance Percentage	-0.074
Study Hours per Week	-0.030
Class Participation	0.00

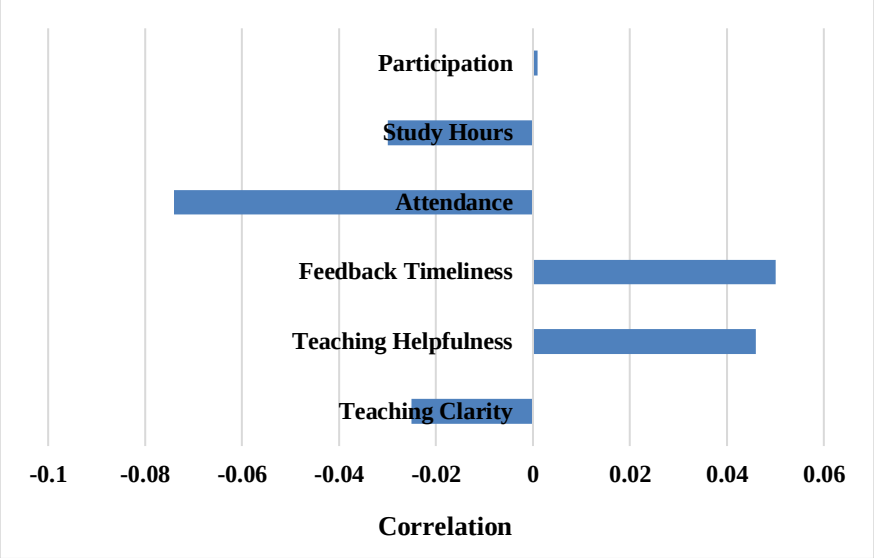

Figure 2. Correlation of variables with academic performance.

The findings of the correlation analysis indicate that the association between the chosen variables and student academic achievements, as a rule, are weak. The high positive correlation (r = 0.050) of feedback timeliness is closely followed by the teaching helpfulness (r = 0.046), which suggests that these variables might have a slight positive effect on student performance. But these correlations are very small and may not have much practical effect.
Clarity teaching presents a weak negative correlation with academic performance, contrary to expectations and possibly suggesting inconsistent patterns in student perceptions of clarity or its translation into quantifiable performance results. Likewise, the attendance percentage and hours of study per week exhibit weak negative correlations, indicating that the more an individual attends or the more the hours of study per week, the better may not be the case in this data set. The academic performance does not seem to bear any relationship with class participation, which suggests that class participation may not be a key factor that defines the success of a student.
In general, the correlation study indicates that there is no significant linear relationship between any of the teaching or engagement variables and academic performance, which may indicate that academic success might be determined by a mix of a variety of variables rather than individual variables.

3.3 Regression Analysis

In order to further investigate the predictive effects of teaching effectiveness and the student related variables on academic

performance, multiple linear regression analysis was performed.

Table 3. Regression coefficients for predictors of student academic performance

Variable	Beta Coefficient
Teaching Clarity	0.013
Teaching Helpfulness	-0.008
Feedback Timeliness	-0.017
Attendance Percentage	0.001
Study Hours per Week	-0.001
Class Participation	-0.004

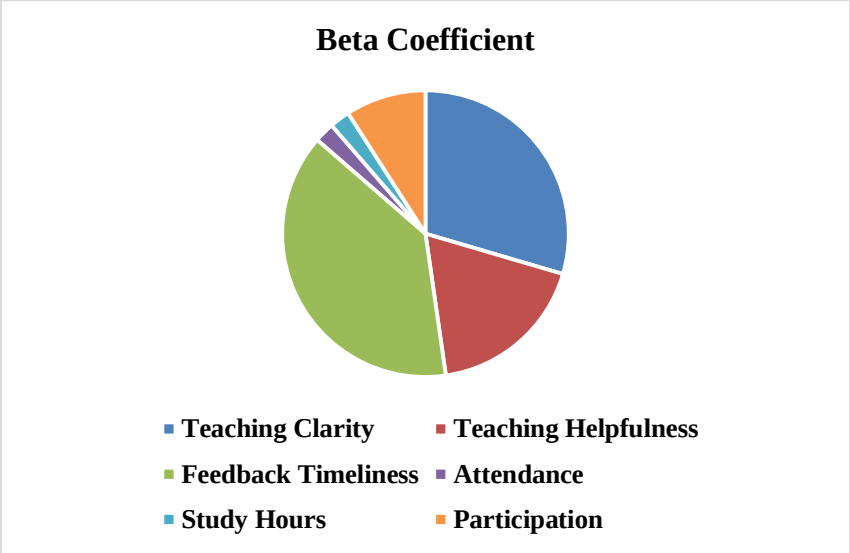

Figure 3. Regression coefficients of predictors.

The regression statistics reveal that the predictive ability of the chosen variables is low. The positive coefficient of teaching clarity is very low indicating that it has a mild positive impact on academic performance, but the effect size is not significant. The two variables (teaching helpfulness and feedback timeliness) have small negative coefficients, which means that their effect on performance is not only weak, but also can be affected by other contextual factors.
Attendance percentage has a very small positive impact whereas the study hours and class participation have insignificant negative impacts among the control variables. These results indicate that all of the variables included are not powerful predictors of student academic performance in this dataset. There are weak regression coefficients which mean that the model accounts only a small part of the variance in academic performance.
This result can be interpreted to mean that academic performance can also be affected by other variables that are not measured in the data, like student motivation, previous knowledge, learning conditions or external socio-economic factors.

4. Discussion

Findings of the current research point to the fact that despite teaching effectiveness being viewed as a factor that could impact the academic performance of students significantly, its quantitative impact on student achievement in the current dataset seems to be restricted. The findings showed a low correlation and low regression coefficients between teaching-related variables and academic performance, implying that the effectiveness of teaching alone might not be a good predictor of student achievement. This observation can be correlated with the argument that academic performance is a complex construct that is affected by a set of combinations between instructional, psychological and contextual factors and not a single dimension of teaching quality (Fryer & Leenknecht, 2023).
The insignificant correlation seen between teaching clarity and student performance is contrary to previous studies that have placed clarity as an important factor in student learning. Nevertheless, the role of clarifying could be moderated by other factors like student engagement or self-efficacy, which were not adequately represented in the data set. Prior research has recommended that the effectiveness of teaching tends to have an indirect relationship via psychological and motivational processes, and this might explain the small direct impact in this study (López-Martin et al., 2023).
On the same note, instruction in helpfulness and feedback timeliness had only a peripheral impact on academic performance, which suggests that they might not be sources of student success on their own. This confirms the opinion that feedback and instructional support will work only in case of active student involvement and internal motivation. It has been shown that teacher support positively influences academic achievement by increasing student engagement and self-efficacy, but not by having a direct effect (Huang and Wang, 2023).

The regression analysis also established that none of the chosen variables had a significant impact on predicting student performance, which showed the complexity of academic achievement. These results imply that extrinsic instructional variables might not be enough to describe differences in student performance. Rather, it might be a more dominant role of a wider range of influences comprising cognitive abilities, prior knowledge, and socio-environmental factors. This view is also supported by meta-analytic evidence that suggests that there are multiple interacting variables that affect academic performance, but not single teaching factors (Cai et al., 2023).

The other notable observation is that the effect of control variables including attendance, study hours, and participation is very minimal. These factors are thought to be traditionally significant to academic success, but in this dataset, their low level of correlation indicates that engagement quality might be more crucial than quantity. Past studies have highlighted that just being engaged or spending time studying is not enough to attain better results unless it is accompanied with good learning techniques and motivation (Basma and Savage, 2023).

Moreover, the results demonstrate the importance of psychological and social support systems in the determination of the student performance. Despite the fact that there were little direct effects on teaching-related variables, it has been found that perceived teacher support may have an indirect positive effect on academic achievement, through facilitating student engagement and alleviating stress. This implies that the effect of teaching performance might be more multifaceted and indirect as compared to the one that is represented by simple statistical equations (Tao et al., 2022).

In general, the findings of this research indicate that, although teaching effectiveness is a critical part of the learning process, its direct statistical association with student academic achievement might be insufficient when considered independently. It seems that academic achievement is affected by a set of teaching behaviors in combination with the nature of students and contextual factors. These results support the importance of a more comprehensive view of the effects of education, in which the teaching performance should be viewed in tandem with other key factors of student learning (Affuso et al., 2023).

5. Conclusion

The results of the current research show that the teaching efficacy, as a crucial component of the educational process, has a weak direct impact on the student academic performance in the considered set of data. Descriptive, correlation and regression analysis showed that variables like teaching clarity, helpfulness and feedback timeliness only had weak relationships with academic results, which indicates that the variables are not sufficient enough to account for differences in student performance. Also, variables that are student related like attendance, study time, and involvement did not demonstrate much predictive value, which once again underlines the complexity of academic achievement. These results suggest that there are numerous interacting forces that determine student performance, with psychological, motivational, and contextual factors, which are not limited to quantifiable teaching practices. Thus, to enhance educational achievements, a holistic system that involves effective teaching, as well as more extensive support systems and learning contexts, is needed. The research is relevant to knowledge about the effectiveness of teaching as it has pointed to the weaknesses of only using instructional variables and the need to incorporate multidimensional approaches to improve academic achievement among students.

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