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Reading Interest and Study Habits as Predictors of Road Pavement Learning Outcomes

***Radha Krisnamurti Sigamura[1], Nanda Prayoga[2]**
[1,2]Faculty of Engineering, Universitas Musi Rawas, South Sumatra, Indonesia
E-mail: *[1]radhakrisna964@gmail.com *Corresponding Author

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ABSTRACT

This study examines whether reading interest and study habits predict learning outcomes in the Road Pavement Structure course among sixth-semester Civil Engineering students at Universitas Musi Rawas. The study used a quantitative, non-experimental ex post facto correlational design involving the complete cohort of 32 students in the 2025-2026 academic year. Reading interest was measured using a 29-item Likert questionnaire, study habits using a 23-item Likert questionnaire, and learning outcomes using final-semester examination scores. Descriptive statistics, Pearson correlations, simple regression, and multiple regression were used to analyze the data. The reported results indicate a positive association between reading interest and learning outcomes (r = 0.4388; coefficient of determination = 19.75%) and between study habits and learning outcomes (r = 0.430; coefficient of determination = 18.40%). When entered simultaneously, reading interest and study habits produced a multiple correlation of R = 0.563 and explained 31.554% of the variance in Road Pavement Structure learning outcomes, with F = 9.712 exceeding the reported critical value of 3.33. These findings suggest that academic reading engagement and consistent study routines are relevant non-cognitive contributors to achievement in a technically demanding civil engineering course. The results are interpreted as predictive associations rather than causal effects because the research design was observational. The study supports the integration of structured academic reading, time-management routines, and self-regulated learning practices into engineering instruction.

Keywords: *academic achievement, civil engineering education, reading interest, road pavement, study habits*

INTRODUCTION

Academic success in engineering education depends not only on cognitive ability and classroom instruction but also on how students engage with technical information and regulate their learning. Civil engineering courses require students to interpret standards, design principles, diagrams, technical specifications, and quantitative procedures. Academic reading is therefore not a peripheral activity; it is part of the disciplinary practice through which students acquire concepts, connect theory with engineering applications, and prepare for problem solving. Research in higher education shows, however, that students often acknowledge the importance of academic reading while still engaging with assigned texts inconsistently or reluctantly (Howard et al., 2018; Gorzycki et al., 2020; Bergman, 2024; Mason & Warmington, 2024).

The expansion of digital academic resources has increased access to textbooks, standards, e-books, journal articles, and online technical documentation. At the same time, access alone does not guarantee sustained academic reading. Digital reading behavior is influenced by perceived usefulness, reading habits, facilitating conditions, and the quality of the reading environment (Chang et al., 2023). Recent evidence from university students also indicates that reading motivation is positively related to reading comprehension and can meaningfully predict performance on reading tasks (Ma & Zhao, 2025). These findings suggest that reading interest can be understood as a motivational resource that encourages students to allocate attention and effort to academically relevant texts.

Study habits constitute a second dimension of academic behavior. In higher education, effective study habits include scheduling, goal setting, managing time, distributing practice, monitoring understanding, reviewing material, and adapting strategies when learning difficulties occur. These behaviors are closely aligned with self-regulated learning. Contemporary reviews emphasize that self-regulated learning involves cyclical processes of planning, strategic performance, monitoring, reflection, and adaptation (Panadero, 2017; Wolters & Brady, 2021). Meta-analytic and systematic-review evidence indicates that self-regulation and related learning strategies are associated with stronger academic performance in university contexts (Theobald, 2021; Chung et al., 2022; Hadwin et al., 2022; Imhof et al., 2024).

The relevance of study habits is particularly clear in engineering programs, where students must coordinate lectures, calculations, laboratory or design tasks, independent reading, and assessment preparation. Adams and Blair (2019), in a study of undergraduate engineering students, found that specific time-management behaviors were associated with academic performance, although they explained only part of the variability in grades. This is important because it indicates that study habits should not be treated as a complete explanation of achievement but as one component within a broader academic-performance system.

Within the Road Pavement Structure course, students are expected to understand pavement concepts, material behavior, structural layers, design considerations, and the interpretation of technical references. These demands create a plausible pathway through which reading interest and study habits may be associated with course performance. Nevertheless, recent literature has focused more heavily on general academic reading, online learning, language learning, or broad university achievement than on the combined contribution of reading interest

and study habits within an applied civil engineering course. Evidence from a specific technical-course context remains limited.

Accordingly, this study investigates the predictive relationships between reading interest, study habits, and learning outcomes in the Road Pavement Structure course among sixth-semester Civil Engineering students at Universitas Musi Rawas. Three questions guide the analysis: whether reading interest is associated with course learning outcomes, whether study habits are associated with course learning outcomes, and whether both variables jointly predict learning outcomes. By focusing on a technical course, the study contributes context-specific evidence to the broader discussion of academic reading, self-regulated learning, and student achievement in engineering education.

METHODS

Research Design

This study used a quantitative, non-experimental ex post facto correlational design. The design was selected because the independent variables - reading interest and study habits - had already developed naturally and were not manipulated by the researchers. The purpose was therefore to examine statistical relationships and predictive contributions rather than establish causal effects. This approach is consistent with quantitative correlational research in which measured variables are analyzed to identify patterns of association and prediction (Creswell & Creswell, 2018).

Participants and Context

The participants were all 32 sixth-semester students enrolled in the Civil Engineering Study Program, Faculty of Engineering, Universitas Musi Rawas, during the 2025-2026 academic year. Because the complete cohort was included, the study effectively used total population sampling within this class context. The dependent variable was student performance in the Road Pavement Structure course.

Instruments and Data Sources

Reading interest was measured using a 29-item Likert-scale questionnaire containing positively and negatively worded items. Study habits were measured using a 23-item Likert-scale questionnaire, also containing positive and negative statements. Learning outcomes were obtained from documentation of students' final-semester examination scores in the Road Pavement Structure course. The available study record does not report psychometric coefficients for the questionnaires; therefore, reliability and construct-validity estimates are not introduced beyond the information supported by the source data.

Data Analysis

The analysis proceeded in two stages. First, descriptive statistics were used to summarize the distribution of reading-interest scores, study-habit scores, and learning outcomes. Second, Pearson correlation, simple linear regression, and multiple linear regression were used to examine the relationships among variables. The original analysis applied a 5% significance criterion. Regression and correlation statistics are reported as provided in the study record; raw participant-level data were not available for independent re-estimation. Multiple regression was interpreted as a predictive model

rather than evidence of causality, consistent with the non-experimental design (Field, 2018).

RESULTS AND DISCUSSION

Descriptive Profile of the Study Variables

Table 1 summarizes the central descriptive statistics reported for the three variables. Reading-interest scores had a mean of 100.68 (SD = 14.86), study-habit scores had a mean of 84.99 (SD = 13.55), and Road Pavement Structure learning outcomes had a mean of 59.30 (SD = 13.43). The score ranges indicate meaningful variability within the cohort, providing a basis for examining whether differences in academic reading orientation and study routines corresponded with differences in course achievement.

Variable	Mean	SD	Minimum	Maximum
Reading interest	100.68	14.86	63	127
Study habits	84.99	13.55	53	112
Road Pavement Structure learning outcomes	59.30	13.43	35	90

Table 1. Descriptive Statistics for Reading Interest, Study Habits, and Learning Outcomes

Reading Interest and Road Pavement Learning Outcomes

The reported simple-regression model for reading interest was Y = 19.47 + 0.396X1, with a correlation coefficient of r = 0.4388. The study record reports a coefficient of determination of 19.75%, indicating that reading interest accounted for a meaningful but limited proportion of variation in course outcomes. The reported t statistic (2.67) exceeded the stated critical value (1.79), supporting a statistically significant positive relationship under the original decision rule.

This result is theoretically plausible because students with stronger reading interest are more likely to engage with technical explanations, standards, and course references beyond the minimum required for assessment. Recent higher-education research consistently portrays academic reading as essential to disciplinary participation, yet also identifies reluctance, limited time, and uneven engagement as persistent barriers (Gorzycki et al., 2020; Bergman, 2024; Mason & Warmington, 2024). The positive association found in this course also aligns with evidence that reading motivation predicts reading comprehension among university students (Ma & Zhao, 2025). In an engineering context, better engagement with technical texts may support conceptual understanding before students apply formulas, design procedures, or structural reasoning.

Study Habits and Road Pavement Learning Outcomes

For study habits, the reported regression equation was Y = 23.190 + 0.425X2, with r = 0.430 and a coefficient of determination of 18.40%. The reported t statistic (2.50) exceeded the stated critical value (1.70), indicating a significant positive association under the original analysis. The magnitude is comparable to that of reading interest, suggesting that both motivational engagement with reading and the organization of study behavior matter for performance.

The result is consistent with current self-regulated-learning research. Study habits such as planning, scheduling, monitoring progress, reviewing material, and controlling distractions are not isolated routines; they are behavioral expressions of self-regulation. Wolters and Brady (2021) position time management as a central self-regulatory process in college learning, while Theobald's (2021) meta-analysis demonstrates that self-regulated-learning training can improve university students' academic performance and strategy use. Evidence from engineering education is particularly relevant: Adams and Blair (2019) found that perceived control of time and selected time-management behaviors were positively associated with undergraduate engineering performance. Thus, the present finding adds a discipline-specific example from civil engineering.

Joint Predictive Contribution of Reading Interest and Study Habits

The multiple-regression model reported in the study was Y = 36.730 + 0.340X1 + 0.356X2. The multiple correlation was R = 0.563, and the reported coefficient of determination was 31.554%. The reported F statistic of 9.712 exceeded the stated critical value of 3.33. Taken together, these results indicate that reading interest and study habits jointly explained approximately one-third of the variation in Road Pavement Structure learning outcomes within this cohort.

Predictor(s)	Regression equation	r / R	R^2 (%)	Test	Reported value	Critical value
Reading interest	Y = 19.47 + 0.396X1	0.4388	19.75	t	2.67	1.79
Study habits	Y = 23.190 + 0.425X2	0.430	18.40	t	2.50	1.70
Reading interest + study habits	Y = 36.730 + 0.340X1 + 0.356X2	0.563	31.554	F	9.712	3.33

Table 2. Summary of Reported Regression Results

The joint model is educationally meaningful because reading interest and study habits represent related but distinct aspects of learning. Reading interest concerns the willingness to engage with information, whereas study habits concern how learning activity is organized and sustained. Contemporary higher-education research similarly indicates that academic performance is shaped by combinations of motivation, self-efficacy, self-regulation, and learning-environment factors rather than by a single variable (Chung et al., 2022; Hadwin et al., 2022; Imhof et al., 2024). The approximately 31.6% explained variance in the present study also means that most variation remains attributable to other factors, potentially including prior knowledge, mathematical competence, attendance, instructional quality, assessment design, cognitive ability, and socio-environmental conditions.

Implications for Civil Engineering Education

The findings support a practical instructional approach in which reading and study routines are embedded directly into technical-course design. Lecturers can assign short, purposeful reading tasks tied to pavement cases, specifications, or design decisions; require students to identify key concepts before problem-solving sessions; and use low-

stakes questions to verify comprehension. Such activities may help convert reading from an optional preparation activity into a visible component of engineering reasoning. Digital access should also be accompanied by guidance on how to evaluate, annotate, and synthesize technical sources because digital availability alone does not ensure effective academic reading (Chang et al., 2023).

Study-habit development can be supported through structured weekly planning, distributed practice, milestone-based assignments, and reflective monitoring of progress. These strategies are consistent with the self-regulated-learning literature, which emphasizes planning, strategic execution, monitoring, and adaptation (Panadero, 2017; Wolters & Brady, 2021). For a course such as Road Pavement Structure, students may benefit from integrating reading, worked examples, calculation practice, and review rather than concentrating preparation immediately before examinations.

Limitations

The findings should be interpreted within several limitations. The sample consisted of a single cohort of 32 students from one institution, limiting generalizability. The ex post facto correlational design does not establish causal effects even though regression identifies predictive relationships. The available study record does not provide questionnaire reliability coefficients, full validity evidence, confidence intervals, standardized regression coefficients, or regression-diagnostic statistics. In addition, participant-level raw data were not available for independent verification of the reported inferential results. Future studies should use larger multi-institutional samples, report complete psychometric and regression diagnostics, and consider longitudinal or intervention designs to test whether improvements in academic reading and study routines lead to subsequent gains in engineering-course performance.

CONCLUSION

This study examined reading interest and study habits as predictors of learning outcomes in the Road Pavement Structure course among sixth-semester Civil Engineering students at Universitas Musi Rawas. The reported analysis indicates that reading interest was positively associated with learning outcomes ($r = 0.4388$; reported $R^2 = 19.75\%$), while study habits also showed a positive association ($r = 0.430$; reported $R^2 = 18.40\%$). When considered jointly, the two variables produced $R = 0.563$ and explained 31.554% of the reported variance in course outcomes, with the reported F statistic exceeding the stated critical value. These findings support the view that technical-course achievement is connected not only to content exposure but also to students' willingness to engage with academic reading and their capacity to organize learning activities consistently. For civil engineering instruction, the practical implication is to integrate purposeful technical reading, scheduled review, time-management routines, and self-monitoring into course delivery rather than treating these behaviors as entirely individual responsibilities. At the same time, the observational design requires caution: the results demonstrate predictive associations, not causal effects. Because a substantial proportion of outcome variance remained unexplained, future research should incorporate broader academic and instructional variables, stronger instrument-

validation evidence, and larger samples across institutions. Overall, the study provides context-specific evidence that reading engagement and disciplined study routines are relevant components of academic performance in an applied engineering course and offers a basis for designing learning support that connects disciplinary reading with self-regulated study practice.

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