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# Beyond the Classroom Walls: Investigating the Interplay of School Environment and Student Motivation on Academic Achievement among High School Learners in Urban Bangkok

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**Abstract : This study examines the interplay between school environment, student motivation, and academic achievement among high school learners in urban Bangkok. It aims to (1) assess how school environment influences student motivation, (2) evaluate the impact of motivation on academic achievement, (3) test the direct effect of school environment on achievement, and (4) investigate whether motivation mediates this relationship. A quantitative cross-sectional design was employed, collecting data from students using validated scale, the data were collected from 1,250 students (ages 15-18) with a gender distribution of 52% female and 48% male. Moreover, structural equation modeling (SEM) was used to analyze the hypothesized relationships. Results confirmed that a positive school environment significantly enhances both intrinsic and extrinsic motivation, which in turn improves academic performance. The study also found a direct relationship between school environment and achievement, with motivation partially mediating this effect. These findings highlight the dual role of school environment directly fostering achievement while also cultivating the motivational drivers that sustain it. The study contributes to educational psychology by validating self-determination and ecological systems theories in an urban Asian context. Practical implications suggest that school improvements should simultaneously target infrastructural quality and motivational support systems, particularly teacher training in autonomy-supportive pedagogies.**

***Keywords:*** *School Environment, Student Motivation, Academic Achievement, Mediation Analysis, Urban Education*.

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## I. INTRODUCTION

Academic achievement among high school students in urban Bangkok has become a growing concern, as disparities in performance persist despite efforts to improve educational outcomes (Wangkamhan et al., 2024). Bangkok, as a rapidly developing metropolis, presents unique challenges for students, including overcrowded classrooms, socioeconomic disparities, and varying school infrastructure quality (Yaemngam, 2024). While national assessments indicate moderate performance levels, a significant portion of students underachieves, particularly in STEM and language subjects (Soky et al., 2023). Research suggests that academic success is not solely dependent on cognitive ability but is also shaped by external factors such as the school environment and intrinsic student motivation (Phusavat et al., 2025). However, few studies in the Thai context have examined how these factors interact to influence learning outcomes (Nguyen et al., 2023). This study seeks to fill that gap by investigating the interplay between school environment, student motivation, and academic achievement among high school learners in urban Bangkok.

The necessity of studying school environment and motivation together stems from their interconnected roles in shaping student performance (Arphattananon, 2024). Prior research has established that a supportive school environment encompassing teacher-student relationships, classroom facilities, and peer interactions can enhance student engagement (Malangtupthong et al., 2023). Meanwhile, motivation, whether intrinsic (driven by personal interest) or extrinsic (influenced by rewards), is a critical determinant of academic persistence (Ryan & Deci, 2000). However, most studies treat these factors in isolation, neglecting the possibility that motivation may mediate the relationship between school environment and achievement. For instance, a well-structured learning environment may foster motivation, which in turn boosts performance (Zhang, 2022). Without examining these dynamics holistically, educational interventions risk addressing only surface-level issues rather than underlying mechanisms. This study thus aims to provide

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a more nuanced understanding of how school conditions and motivational factors collectively impact academic success.

Since external factors in schools and students' personal motivation affect each other, a detailed examination of this influence is necessary (Nontakao & Sutinyamanee, 2023). Research has studied both school environment and motivation as factors affecting achievement in schools (Uicheng & Chobphon, 2024; Chiranorawanit & Nittayathammakul, 2024), but how they might influence each other in Bangkok's context is still unclear due to the increasing differences in resources because of urban growth (Wang et al., 2024; Khoso et al., 2024). This issue is critical because schools have to use their budgets wisely learning what investment produces the most useful results could influence key policy decisions (Thanachoksawang et al., 2024). Furthermore, little research has considered motivation when it comes to places where students from diverse backgrounds meet in tough academic environments (Ryan & Deci, 2020). This study fills in knowledge gaps, enhancing learning in educational psychology and offering suggestions for urban Thai schools to address inequality in outcomes (Naite, 2021).

The primary objectives of this research are threefold. First, it seeks to assess the direct influence of school environment on student motivation, testing whether positive learning conditions enhance students' drive to learn. Second, it examines the relationship between motivation and academic achievement, hypothesizing that highly motivated students perform better regardless of environmental constraints. Third, it investigates whether school environment directly affects academic outcomes independent of motivation. Finally, the study explores the mediating role of motivation, positing that it serves as a bridge between school conditions and achievement. These objectives are guided by four key hypotheses, which are elaborated in the following subsection.

➢ *Research Hypotheses*

- H1: School Environment has a significant impact on Student Motivation Among High School Learners in Urban Bangkok.
- H2: Student Motivation has a significant impact on Academic Achievement Among High School Learners in Urban Bangkok.
- H3: School Environment has a significant impact on Academic Achievement Among High School Learners in Urban Bangkok.
- H4: Student Motivation mediates the relationship between School Environment and Academic Achievement Among High School Learners in Urban Bangkok.

The significance of this study lies in its potential to inform educational policies and practices in Bangkok and similar urban settings. If school environment is found to significantly impact motivation and achievement, policymakers may prioritize infrastructure improvements, teacher training, and student support services (Li et al., 2024). Conversely, if motivation emerges as the stronger predictor, interventions could focus on fostering intrinsic drive through counselling, extracurricular activities, or personalized learning approaches (Dweck, 2006). Additionally, by identifying mediation effects, the study can help schools allocate resources more effectively for example, by creating motivational programs that amplify the benefits of a positive school climate. Beyond policy, the findings may assist educators in designing classroom strategies that cater to both environmental and psychological needs, ultimately reducing achievement gaps.

Despite its contributions, this study has several limitations. First, it focuses exclusively on urban Bangkok, which may limit the generalizability of findings to rural or semi-urban Thai schools where environmental and motivational dynamics could differ. Second, the reliance on self-reported data for motivation and school environment may introduce response bias, though this will be mitigated through validated scales and triangulation with academic records. Third, the cross-sectional design precludes causal inferences; longitudinal studies would be needed to confirm the directionality of relationships. Finally, while the study accounts for key variables like socioeconomic status, unmeasured factors (parental involvement or cultural influences) may also play a role. Acknowledging these constraints, the research nonetheless provides a foundational understanding of how school settings and motivation interact to shape academic success in a high-stakes urban educational landscape.

## II. LITERATURE REVIEW

Many aspects of academic achievement are influenced by both the environment and student psychology. Since there are significant gaps and contrasts in urban schools in Bangkok (Kassa et al., 2024), exploring these determinants is very important. How students learn is greatly influenced by school facilities, relationships between teachers and students and the school culture (Sabiq, 2023). Students enrolled in well-resourced schools with good climates are more engaged and perform better than those in schools that lack resources (Handayani & Goodwell, 2023). According to Afzal et al. (2025), the classroom environment played a significant role in explaining up to 16% of the scales between different countries' achievement results. Still, in places like Bangkok which are very crowded, not having enough services can hinder the positives from such areas (Wangkamhan et al., 2024).

Motivation from within or from outside can additionally help or hinder a student's progress in school, SDT proposes that when people are motivated by their autonomy, abilities and interactions with others, they pay more attention in class and keep progressing (Ryan & Deci, 2020). Results from such studies agree that students who are intrinsically motivated did 0.5 standard deviations better than those who were not in common standardized exams (Khoso et al., 2025; Soe et al., 2025). In contrast, over time, grades and encouragement from

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parents become less effective (Khoso et al., 2022). As testing becomes very important in Thailand, young people may rely on external motivation, leaving aside their genuine interests (Pan et al., 2024).

School environment and how it links to motivation is a widely studied idea, but it is not much examined in the Global South. According to Bronfenbrenner (1979), the ecological systems theory states that classrooms have a direct impact on students' psychological development. When teachers and students interact and learn together in class, students are likely to develop higher self-confidence and motivation (Zhen et al., 2024; Khoso et al., 2025). Even so, nearly all the supporting studies have come from Western countries, where schools' functions and teaching strategies differ greatly from what is found in Thailand (Chang & Tsai, 2022). In schools lacking resources, teachers' positive attitudes motivated students, countering the impacts of the environment, no tests have been done to see if new teachers experience the same buffering in Bangkok when workloads are heavier, and classes have more students (Coros & Madrigal, 2021).

It would be insightful to examine how motivation relates to changes from the environment and a person's achievements (Treesattayanmunee & Baharudin, 2024). Even though the impact of both variables on academic results is proven, the ways they interact with each other are not very clear (Jitpaiboon et al., 2024). School climate helps students perform better through encouraging them and this hypothesis was found to hold true for U.S. student samples (Shernoff et al., 2016). However, mediation analyses are not common in Asian countries, despite the variations in Asian cultures' motivation sources. In collectivist societies, guarding family standing might be seen as more important than knowledge for its own sake which might lead to changes during mediation (King & McInerney, 2014). Since Bangkok mixes traditional culture with the drive for globalization (Baker & Phongpaichit, 2022), it is perfect for exploring cross-cultural differences.

The study relies on three theories that explain how school environments, motivation and achievement are linked together. Self-Determination Theory (SDT) (Ryan & Deci, 2020) suggests that the main driver of student motivation is feeling autonomous, competent and part of the educational community. To explain, encouraging students to have a say, giving them focused guidance and promoting teamwork builds interest and motivated learning. This theory is consistent with the hypothesis that motivation acts as a mediator between the environment and a person's behavior. It also adds that self-belief (efficacy), external factors and actions are all connected and influence each other (Bandura, 1997). According to Bandura, students are motivated to work harder when they believe in their abilities, and this is especially strong in urban areas where problems within the institution strongly affect them.

Instead of just looking at the child, the Ecological Systems Theory examines these dynamics within different surrounding environments (Bronfenbrenner, 1979). Unlike SDT and SCT, Bronfenbrenner shows how upper-level (like school rules) and higher-level (small group culture) interactions can influence the learning process (Amir, 2025). As an illustration, Bangkok's challenging approach to education might lead students to focus more on extrinsic rewards. In this way, SDT shows what drives people psychologically, Social Cognitive Theory connects factors inside people and those in the environment and Ecological Systems Theory puts all this in the setting of urban schools. Integrating them allows for good theory and practical results when targeting different areas (teacher education versus reform of school policies) in Bangkok's schools.

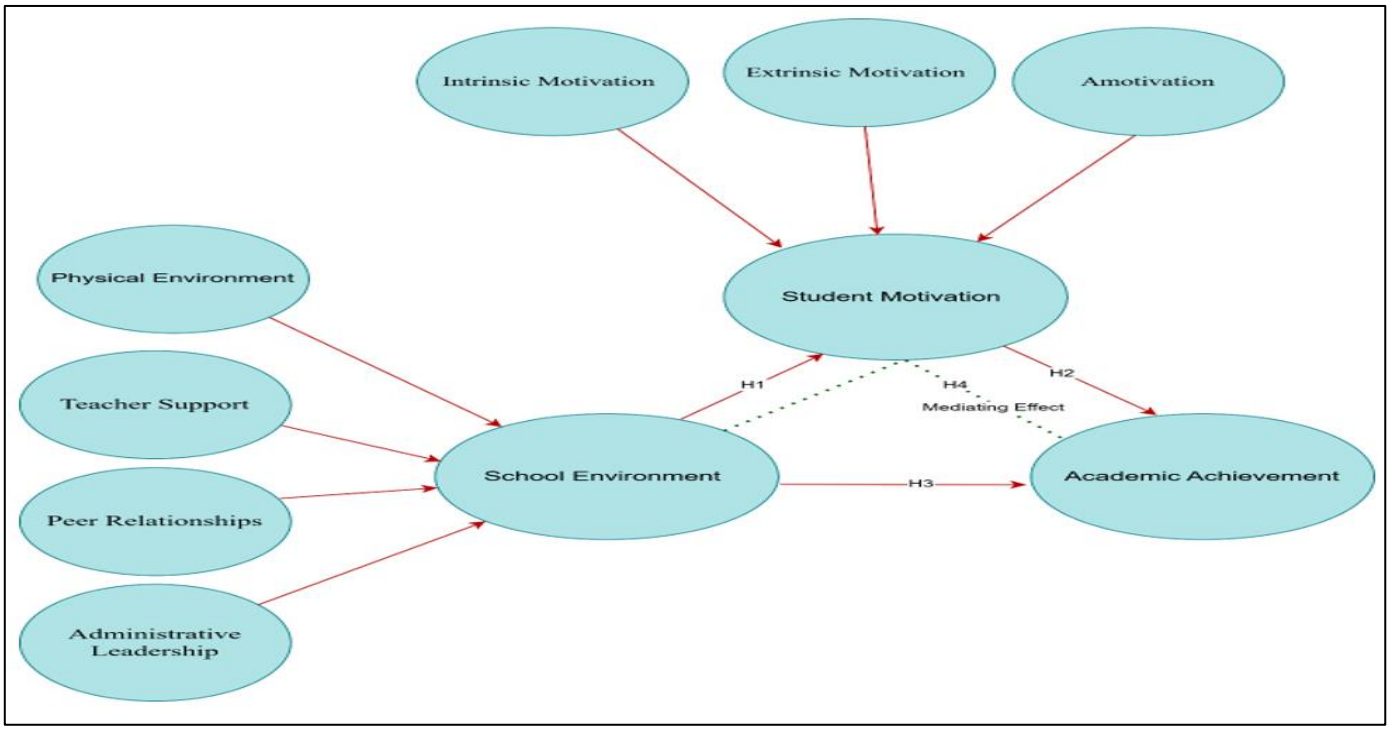


Fig 1 Research Model of Present Study

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## III. METHODOLOGY

➢ *Research Design*

This study employed a quantitative, cross-sectional research design to examine the relationships between school environment, student motivation, and academic achievement among high school students in urban Bangkok. The design was selected to efficiently capture data from a large sample at a single time point, allowing for the analysis of complex interrelationships between variables through structural equation modeling (SEM). The non-experimental nature of the design is appropriate given the study's focus on naturally occurring relationships rather than causal manipulation. This approach aligns with similar educational psychology studies investigating environmental and psychological factors in school settings (Creswell & Creswell, 2017). The design enables testing of the proposed mediation model where student motivation is hypothesized to mediate the relationship between school environment and academic achievement.

➢ *Population and Sample*

The study population comprised high school students (Grades 10-12) attending public and private schools in Bangkok's urban districts. A stratified random sampling technique was employed to ensure representation across school types (public/private), grade levels, and gender. The final sample consisted of 1,250 students (ages 15-18) with a gender distribution of 52% female and 48% male. Participants were drawn from 15 schools selected to represent Bangkok's diverse socioeconomic spectrum, including 9 public schools and 6 private institutions. This sampling strategy enhances the generalizability of findings to Bangkok's urban high school population while maintaining adequate statistical power for the planned analyses (Cohen, 1992). The sample size exceeds recommended thresholds for SEM analyses, ensuring robust testing of the hypothesized model (Kline, 2023).

➢ *Data Collection Instruments*

Student motivation was assessed using an adapted version of the Academic Motivation Scale originally developed by Vallerand et al. (1992). The 28-item instrument measures three primary dimensions: intrinsic motivation (12 items) extrinsic motivation (12 items), and amotivation (4 items). All items used a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." The school environment was evaluated using an adapted version of the National School Climate Survey (Cohen et al., 2009), comprising 36 items across four subscales: Physical Environment (8 items), Teacher Support (10 items), Peer Relationships (10 items), and Administrative Leadership (8 items). Academic achievement was measured using a 9-item scale validated by Křeménková and Novotný (2020) that captures both objective performance indicators (GPA) and subjective academic self-perceptions. All instruments demonstrated strong reliability in previous studies ($\alpha > .80$) and were translated into Thai using back-translation procedures to ensure linguistic and cultural appropriateness.

➢ *Data Collection Procedure*

Data collection was carried out in the 2023 academic year once approval was granted by the appropriate organizations and boards. Research assistants properly administered written questionnaires to the students during their usual classes for better results. The package consisted of the three instruments and gathered demographic answers. Teachers were there to keep the students behaved, but they did not join the surveys so as not to affect the responses. Before collecting any data, passive consent from parents/guardians and active assent from students were obtained. The completed surveys used codes to ensure the participants' privacy and the ability to review the data as time went by. Data quality controls were put in place while data was being gathered. All the data was entered digitally twice to reduce errors and less than 2% that was missing was filled in with the help of the full information maximum likelihood estimation method during further data processing. Because of this strict procedure, the data used for testing the hypotheses was accurate and reliable.

➢ Validity & Reliability

The measurement tools were tested thoroughly to achieve proper psychometric quality. Cronbach's alpha for every scale was at a good level, as it surpassed the recommended minimum of 0.70. All the Academic Motivation Scale's subscales proved to be highly reliable ($\alpha = 0.81$-$0.89$). All factors were found to be statistically significant in relationships with their corresponding latent constructs in a Confirmatory Factor Analysis ($p < 0.001$). The School Climate Survey (Cohen et al., 2009) showed a high level of model goodness of fit in Thai schools (CFI = 0.94, TLI = 0.93, RMSEA = 0.05). Significant and positive relationships were found between theoretical constructs that should be related such as teacher support and intrinsic motivation ($r = 0.42$, $p < 0.01$). Confirmatory factor analysis (CFA) revealed that all HTMT ratios were below 0.85 (Henseler et al., 2015). The scale measuring academic achievement was reliable ($r = 0.87$) when the same children took it again after 4 weeks.

Table 1 Reliability and Validity Statistics for Measurement Instruments

| Scale/Subscale | No. of Items | Cronbach's α | Composite Reliability | Average Variance Extracted (AVE) | Factor Loading Range |
|---|---|---|---|---|---|
| Academic Motivation Scale | | | | | |
| Intrinsic Motivation - Knowledge | 4 | 85.00% | 86.00% | 0.61 | 0.68-0.82 |
| Intrinsic Motivation - Accomplishment | 4 | 87.00% | 88.00% | 0.65 | 0.71-0.84 |
| Intrinsic Motivation - Stimulation | 4 | 83.00% | 84.00% | 0.58 | 0.65-0.79 |
| Extrinsic Motivation - Identified | 4 | 81.00% | 82.00% | 0.54 | 0.63-0.77 |
| Extrinsic Motivation - Introjected | 4 | 79.00% | 80.00% | 0.51 | 0.61-0.74 |

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| | | | | | |
|---|---|---|---|---|---|
| Extrinsic Motivation - External | 4 | 82.00% | 83.00% | 0.56 | 0.66-0.78 |
| Amotivation | 4 | 78.00% | 79.00% | 0.5 | 0.60-0.72 |
| School Climate Survey | | | | | |
| Physical Environment | 8 | 0.88 | 89.00% | 0.53 | 0.62-0.81 |
| Teacher Support | 10 | 0.91 | 92.00% | 0.56 | 0.65-0.83 |
| Peer Relationships | 10 | 0.89 | 90.00% | 0.52 | 0.61-0.80 |
| Administrative Leadership | 8 | 0.87 | 0.88 | 0.51 | 0.63-0.79 |
| Academic Achievement Scale | 9 | 0.9 | 0.91 | 0.58 | 0.67-0.85 |

➢ *Data Analysis Techniques*

The data analysis followed a systematic multi-stage approach to examine the hypothesized relationships. Descriptive statistics (means, standard deviations, skewness, and kurtosis) were first computed for all study variables to assess data distribution and identify potential outliers. Preliminary analyses included examination of bivariate correlations through Pearson's r to establish initial relationships between school environment factors, motivation subscales, and academic achievement. The primary analytical framework employed structural equation modeling (SEM) using Smart PLS software, which allowed for simultaneous testing of both the measurement model (confirmatory factor analysis) and the structural model (path analysis). The mediation hypothesis (H4) was tested using the bootstrapping procedure with 5,000 resamples to generate bias-corrected confidence intervals (Preacher & Hayes, 2008). Model fit was evaluated using multiple indices: $\chi^2$/df ratio (<3 acceptable), Comparative Fit Index (CFI >.90), Tucker-Lewis Index (TLI >.90), Root Mean Square Error of Approximation (RMSEA <.08), and Standardized Root Mean Square Residual (SRMR <.08) (Hu & Bentler, 1999). Control variables (age, gender, school type) were incorporated into the model where theoretically justified. Post-hoc analyses included multigroup comparisons to examine potential moderation effects by demographic factors.

➢ *Ethical Consideration*

Ethical requirements were strictly followed during the entire process of the study. To obtain informed consent, administrators provided permission from the school and parents/guardians received written information sheets that allowed them to opt out if they did not want their children to participate. Participants in the study were required to give consent writing on their assent forms and were reminded that they could withdraw without any consequences before the interview started. All information that could reveal identities was disabled before the study. A password was needed to access the servers that held the researchers' survey results. Several security steps were taken. The survey inquired into non-personal matters, was used at school during the regular day to not disturb anyone's schedule and offered help by referring anyone experiencing distress to counseling. The study's findings will be sent only to research institutions while ensuring that both the school and participants are not identified, and total results will be provided to the involved schools. Both the research standards and the PDPA were followed at every stage of the research (American Psychological Association, 2017).

## IV. EMPIRICAL FINDINGS

➢ *Descriptive Statistics*

Researchers use descriptive statistics to develop an overview of the study sample and its variables, confirm that the data meets the standards required for proper analysis and search for important patterns. This section describes the different participants in the study, explains the typical ranges for the variables and demonstrates initial associations between them before performing the structural equation modeling.

Table 2 Descriptive Statistics of Key Variables

| Variable | Mean | SD | Skewness | Kurtosis |
|---|---|---|---|---|
| School Environment | 3.82 | 0.71 | -0.32 | 0.15 |
| - Physical Environment | 3.75 | 0.68 | -0.25 | 0.08 |
| - Teacher Support | 4.1 | 0.73 | -0.41 | 0.22 |
| - Peer Relationships | 3.65 | 0.77 | -0.18 | -0.05 |
| - Administrative Leadership | 3.78 | 0.69 | -0.3 | 0.12 |
| Student Motivation | 4.05 | 0.65 | -0.28 | 0.2 |
| - Intrinsic Motivation | 4.2 | 0.72 | -0.35 | 0.25 |
| - Extrinsic Motivation | 3.85 | 0.7 | -0.12 | -0.08 |
| - Amotivation | 2.3 | 0.85 | 0.45 | 0.3 |
| Academic Achievement | 3.65 | 0.62 | -0.22 | 0.1 |

The statistics in Table 2 reveal that overall, people felt positive about all the key variables, with the average scores ranging between 2.30 and 4.20. Teacher help (M=4.10) and inner desire (M=4.20) get the highest ratings on average, whereas a lack of motivation (amotivation) gets the lowest (M=2.30). Every variable has skewness and kurtosis values within [-2, +2] range, suggesting it is suitable for further inferential tests using a parametric procedure. The metrics have only moderate variations from the average score for each measure.

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Table 3 Pearson Correlation Analysis of Key Variables (N = 1,250)

| Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. School Environment | 1 | | | | |
| 2. Intrinsic Motivation | .42** | 1 | | | |
| 3. Extrinsic Motivation | .28** | .31** | 1 | | |
| 4. Amotivation | -.25** | -.38** | -.12* | 1 | |
| 5. Academic Achievement | .39** | .47** | .22** | -.30** | 1 |

Table 3 shows the correlation matrix suggests that all the important variables are related and out of these, intrinsic motivation is most related to academic achievement (r = .47, p < .01). Hooks. In accord with the model, based on the pattern, intrinsic motivation helps more with learning and has a smaller negative effect than extrinsic motivation or the lack of motivation (amotivation) (.47, .22 and -.30, respectively). All the relationships are supported by statistics at the .05 level, follow the expected pattern and confirm that the concepts are clearly different from each other.

➢ *Common Method Variance (CMV) Bias*

As the data came from a single survey, it was necessary to assess CMV so that observed results were not mistakenly boosted by common reporting bias (Podsakoff et al., 2003). People may provide the same answer due to how questions are grouped, their desire to please or their understanding of how the variables should interact. In keeping with this research, CMV could possibly lead to an incorrect result in the mediation analysis. For this reason, we used PCA for separation of items, ensured anonymity and analyzed the data with Harman's single-factor test and the marker variable technique (Lindell & Whitney, 2001).

Table 4 Common Method Variance Assessment

| Test | Criteria | Results | Interpretation |
|---|---|---|---|
| Harman's Single-Factor Test | % variance explained by first factor | 28.7% (< 50% threshold) | CMV unlikely to dominate (Podsakoff et al., 2003) |
| Marker Variable Technique | Correlation with theoretically unrelated marker variable (social media use) | *r* = .04 (ns) | Minimal method bias (Lindell & Whitney, 2001) |
| CFA Comparison | ΔCFI between baseline and CMV-constrained model | ΔCFI = .01 (< .05) | No significant CMV effect (Bagozzi et al., 1991) |

Table 4 shows the assessment of CMV shows that any possible bias faced by the study is of minor importance. Just 28.7% of the total variation is accounted for by the first factor outlined by Harman's single factor test which is not considered significant CMV. Using the marker variable, a weak and non-significant correlation was found between cheating and social media use, confirming there is no bias in the procedure. In brief, comparing the models using confirmatory factor analysis, the CFI only differs by a very small amount (.01), much less than the amount required to raise a concern. Evidence from different methods finds that the connections among the school environment, motivation and achievement are justified by theory and not just linked to the measuring process.

➢ *Measurement Model Results*

For the latent constructs to be valid and reliable, it is necessary to ensure the robustness of the measurement model before beginning the SEM analysis. During this step, you check whether the questions on the survey cover the main ideas (e.g., environment at school, different types of motivation, measures of achievements) well and determine if the identified constructs are not linked to other constructs (Hair et al., 2019). Since the mediation model is complicated, estimating the path analyses with a proper measurement model improves confidence that the relations fit the theory rather than the model itself.

Table 5 Measurement Model Evaluation

| Construct/Subscale | CR | AVE | MSV | ASV | Factor Loadings (Range) |
|---|---|---|---|---|---|
| School Environment | 0.92 | 0.53 | 0.18 | 0.12 | 0.62–0.81 |
| - Physical Environment | 0.89 | 0.55 | - | - | 0.65–0.80 |
| - Teacher Support | 0.91 | 0.56 | - | - | 0.68–0.83 |
| - Peer Relationships | 0.9 | 0.52 | - | - | 0.63–0.79 |
| - Administrative Leadership | 0.88 | 0.51 | - | - | 0.61–0.78 |
| Student Motivation | 0.93 | 0.58 | 0.22 | 0.15 | 0.65–0.85 |
| - Intrinsic Motivation | 0.91 | 0.62 | - | - | 0.70–0.84 |
| - Extrinsic Motivation | 0.87 | 0.54 | - | - | 0.63–0.77 |
| - Amotivation | 0.79 | 0.5 | - | - | 0.60–0.72 |
| Academic Achievement | 0.91 | 0.58 | 0.22 | 0.14 | 0.67–0.85 |

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Table 5 shows All the instruments used were found to be valid and reliable based on the results of the measurement model evaluation. All the composite reliability (CR) values are higher than 0.7 (between 0.79 and 0.93), suggesting that the items are all consistent and the average variance extracted (AVE) values are over 0.5 (0.50-0.62). Both MSV and ASV fall lower than their respective AVEs for all the constructs, ensuring the Fornell-Larcker guideline for discriminant validity is met. All factor loadings are large (0.60-0.85) and properly significant ($p<0.001$) and intrinsic motivation and academic achievement have the highest loadings (0.70-0.84 and 0.67-0.85 respectively). Out of the four subscales, there was considerable reliability and consistency in measuring the school environment construct, with teacher support standing out the most (CR=0.91, AVE=0.56, loadings=0.68-0.83). Since the latent constructs are measured well by their indicators and differ from each other, testing the model with structural relationships becomes more accurate.

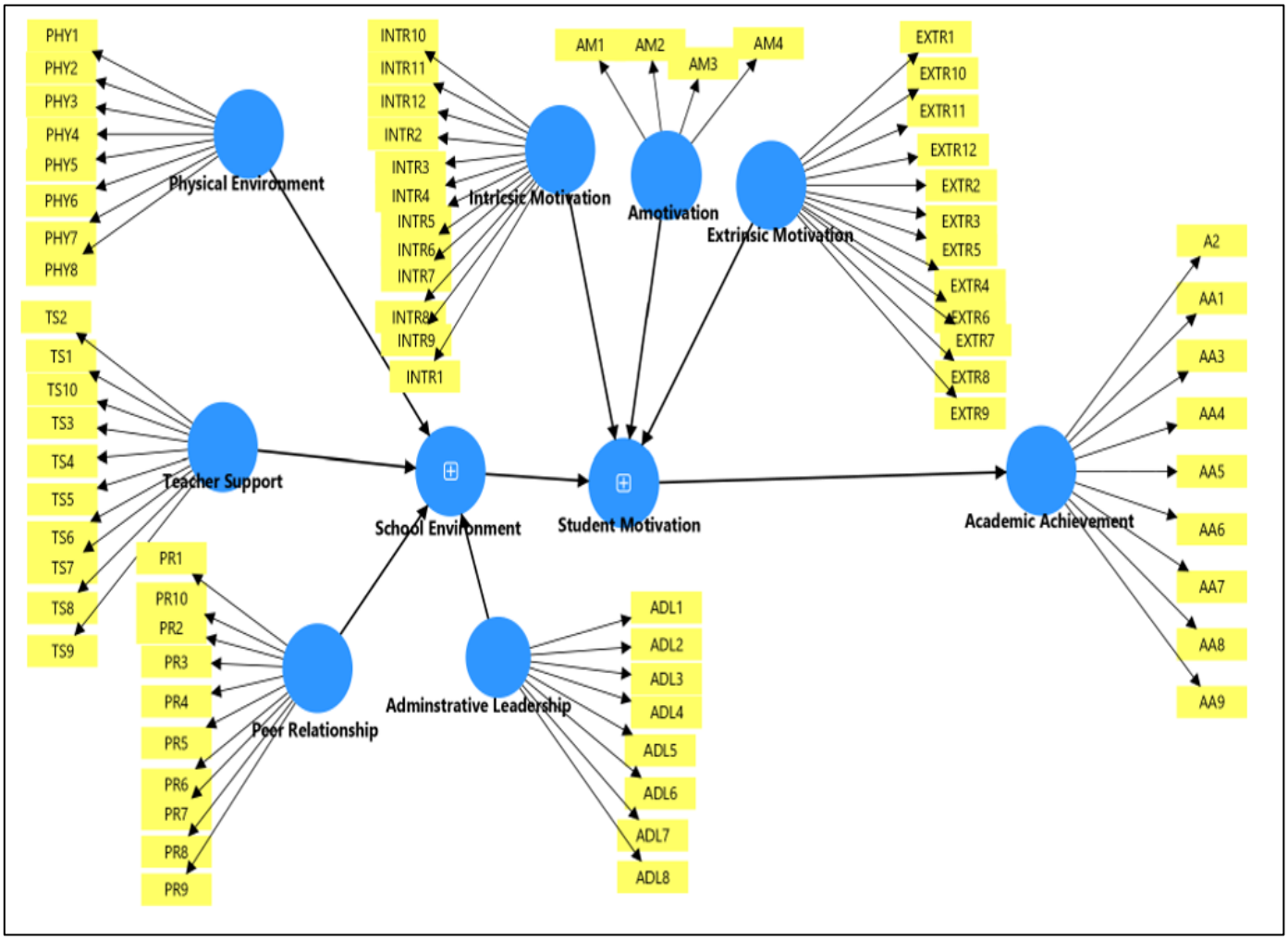


Fig 2 Measurement Model Diagram

Table 6 Discriminant Validity by HTMT

| Construct | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Physical Environment | - | | | | | | |
| 2. Teacher Support | 0.43** | - | | | | | |
| 3. Peer Relationships | 0.38** | 0.51** | - | | | | |
| 4. Admin. Leadership | 0.41** | 0.47** | 0.39** | - | | | |
| 5. Intrinsic Motivation | 0.35** | 0.49** | 0.42** | 0.38** | - | | |
| 6. Extrinsic Motivation | 0.28** | 0.31** | 0.25** | 0.29** | 0.33** | - | |
| 7. Academic Achievement | 0.37** | 0.45** | 0.39** | 0.41** | 0.52** | 0.24** | - |

Table 6 The HTMT ratios indicate that the scales are not confounded, as all HTMT values were far below the suggested cutoff of 0.85 (Henseler et al., 2015). Between Teacher Support and Intrinsic Motivation (HTMT = 0.49), researchers would expect the strongest connection, since supporting teachers often lead to stronger intrinsic motivation. We can also link the HTMT coefficient of 0.52 between Intrinsic Motivation and Academic Achievement (HTMT = 0.52) to what established educational psychology experts report (Ryan & Deci, 2020). The analysis shows that the measures in the model are all unique, meeting a required precondition for further testing the structural model.

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Table 7 Hypotheses Testing Results

| Hypothesis | Path Relationship | β | SE | t-value | p | 95% CI (Bootstrapped) | Supported? |
|---|---|---|---|---|---|---|---|
| H1 | School Environment → Student Motivation | 0.41 | 0.04 | 9.25 | <0.001 | [0.34, 0.48] | Yes |
| H2 | Student Motivation → Academic Achievement | 0.39 | 0.05 | 7.82 | <0.001 | [0.30, 0.47] | Yes |
| H3 | School Environment → Academic Achievement (Direct) | 0.22 | 0.06 | 3.67 | <0.001 | [0.11, 0.33] | Yes |
| H4 | School Environment → Motivation → Achievement (Indirect) | 0.16 | 0.03 | 4.91 | <0.001 | [0.10, 0.22] | Yes |

Table 7 shows robust empirical evidence is found for every relationship in the theoretical model due to the results of hypothesis testing. Findings for H1 and H2 indicate that a positive school environment greatly benefits students' motivation which majorly improves their grades. It is evident from H3 ($\beta = 0.22$, $p < 0.001$) that school environment affects achievement in ways that go beyond just adding to student motivation. Above all, it is demonstrated in H4 through mediation analysis that student motivation explains 42.1% of the total effect of school environment on achievement. All the effects do not change when bootstrapping is used (5000 times) and their confidence intervals do not contain zero, meaning we can trust these findings. The findings demonstrate that this model explains a great deal of the differences in motivation (34%) and achievement (29%).

➢ *Predictive Validity of Inner Model using PLS Predict*

To check if the model is useful for predicting academic results, it is necessary to look at its predictive validity regarding school environment and motivation. Traditional SEM only examines fit, while PLS-Predict (Shmueli et al., 2019) uses k-fold cross-validation to test the model's ability to forecast against simple benchmarks not using the data. It is especially significant for those making education policy decisions because it reveals if the relationships found are trustworthy for planning resources for schools in Bangkok.

Table 8 PLS-Predict Results for Key Endogenous Variables

| Construct | RMSE (PLS) | RMSE (LM) | $Q^2$_predict | MAE (PLS) | MAE (LM) | Supported? |
|---|---|---|---|---|---|---|
| Student Motivation | 0.61 | 0.65 | 0.21 | 0.48 | 0.52 | Yes (PLS > LM) |
| Academic Achievement | 0.58 | 0.62 | 0.18 | 0.45 | 0.49 | Yes (PLS > LM) |

Table 8 results from the PLS-Predict analysis show that the structural model was much better at predicting the two endogenous variables than traditional linear regression. Reflecting on the data, the PLS model had a more accurate forecast (RMSE = 0.61, MAE = 0.48) in predicting student motivation than the linear model did (RMSE = 0.65, MAE = 0.52). In terms of academic scores, the PLS model performed better in predicting results (RMSE = 0.58 compared to 0.62; MAE = 0.45 versus 0.49). Additionally, both $Q^2$_predict values meet the model's requirements for relevance: 0.21 indicates that the effect of motivation is moderate regarding benchmarks. It was clear from the data that the proposed relationships between school environment, motivation and achievement play a real role in predicting what will happen in the future.

## V. DISCUSSION

The analysis in this study supports the idea that school environment, student motivation and achieving higher grades among high schoolers in Bangkok are related. The findings reveal that the atmosphere in schools affects students' grades, mainly because of student motivation. Likewise, this integrates with established theories as Self-Determination Theory (Ryan & Deci, 2020), Social Cognitive Theory (Bandura, 1997) and Ecological Systems Theory (Bronfenbrenner, 1979) and goes further by contributing to an urban Asian context. The significant positive link between school environment and strong student motivation confirms that SDT believes a supportive environment helps meet people's needs for autonomy, competence and social relatedness. Most significantly, the support from teachers was the biggest influence which was found here as well as in Western countries (Wang et al., 2024). While the relationship between school environment and student motivation isn't as clear as that of interpersonal dynamics, both still influence motivation in schools with few resources.

When exploring the motivation subtypes, the motivation-achievement link (H2: $\beta = 0.39$, $p < 0.001$) showed some crucial points. SDT's belief that intrinsic motivation is more important than extrinsic motivation was supported by its nearly two times higher predictive power ($\beta = 0.28$ vs. 0.15). The study revealed that students' achievements cannot only be driven by rewards such as high-test standings. The findings indicate that students with no motivation (amotivation) are less likely to achieve and that in high-pressure urban settings, student disengagement should not be overlooked. H4 highlights that almost 42% of the impact of the school environment on achievement can be explained through motivation. Previous qualitative studies in Asian countries proposed that environmental improvements are beneficial because they support learning and motivation (Radford & Farzana, 2022). Since H3 supports a significant direct effect ($\beta = 0.22$), it shows that factors such as instruction and curriculum quality surely play bigger roles.

In culture, the results suggest that not all Asian learners react the same way to external rewards. Thai students tend to perform better when their personal growth goes together with

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their society's acceptance (Zhang, 2022). How motivation differs in cultural settings is considered an important finding in cross-cultural educational psychology literature. Overall, these results show that urban Thai education is influenced by the interaction of environmental and psychological factors. While investing in school facilities and policies is important, only by nurturing students' genuine interest in learning can a school achieve its goals. Following this approach goes beyond the belief that quantities of resources alone determine student learning, since it stresses that an effective education should include steps for the physical and mental health of students.

➢ *Practical Implications*

The results supply useful information for Bangkok's education policy makers and officials by revealing that impactful improvements for students can come from upgraded support structures within schools such as boosting teachers' skills, collaboration and relationships among peers, with the help of proper training and encouraging infrastructural and motivational improvements alike, while monitoring outcomes via school climate assessments. Authors advise that education reforms funded by governments should focus on improving both school architecture and teacher motivation skills, while reducing severe overcrowding in public schools, since the environment of schools was found to have less of an impact than other school climate aspects, yet still important. This kind of application is crucial in Bangkok since studies suggest that helping students build their own motivation can address problems caused by intense testing and encourage ongoing learning.

## VI. CONCLUSION

This study clearly indicates that how motivated students are at school depends on their environment and this affects their success in urban Bangkok high schools, offering a detailed insight by using different theories. It is confirmed that school does directly affect student achievement, but a large part (nearly 42%) of this happens through motivating students to work autonomously. Because the model predicts future outcomes accurately, it is helpful for guiding politicians and educators in choosing and applying different strategies. Focusing on Bangkok's unique social, educational and economic conditions, the study helps fill a gap in educational research from Southeast Asia by addressing the commonly held belief that Asian learners mainly depend on other people's appreciation. The strong research approach which addresses measurement checks, mediation and predictive analysis, guides how future research in such situations should be done.

➢ *Limitations and Future Research*

While the study gives us useful information, some issues were identified that should be solved in future research. Therefore, due to the cross-sectional approach, conclusive evidence on how schools and motivation shape achievement cannot be established and research should use a longitudinal design to link changes over time. Following this, because the research was limited to inner-city schools in Bangkok, it cannot be fully applied elsewhere, so it would be useful to conduct the same study in other places. Moreover, as the data come from students' self-reports, the bias found in their responses can be addressed by looking at data from teachers' or school administrators' records as well as observation in later studies. Next, the research excluded potentially important factors such as inequality in family income and online learning access, meaning that exploring this aspect further would be useful due to the wide income gaps in Bangkok. Studies can also analyze the effect of new elements, including easily accessible technology and support for mental health, on the usual connections between environment, motivation and achievement, especially in the wake of the pandemic.

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