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**ARTICLE**

# The Impact of Mindfulness Education on Learning Motivation and Academic Achievement among High School Students in Binh Duong Province, Vietnam: A Mixed-Methods Study

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## ABSTRACT

In the rapidly developing Binh Duong province, rising academic demands have heightened concerns over the mental health and motivation of secondary school students. This study evaluated the effects of an eight-week mindfulness-based curriculum delivered to 312 tenth- and eleventh-grade students from three public schools in Thu Dau Mot City and Tan Uyen Town. Employing a mixed-methods design, we used standardized instruments to assess mindfulness, academic motivation, perceived stress, anxiety, and grade point averages (Mathematics, Literature, English), alongside semi-structured interviews with students and teachers. Post-intervention, the experimental group showed substantial increases in motivation and academic performance, coupled with marked reductions in stress and anxiety; the control group exhibited minimal change. Quantitative data revealed significant gains in motivation indices, improved end-of-semester GPAs, and over a 25% reduction in stress and anxiety. Qualitative feedback supported these findings, highlighting enhanced attention, emotional regulation, and classroom participation. Overall, results suggest that integrating mindfulness into the school day can bolster both psychological well-being and academic success in Vietnamese secondary education. Based on these outcomes, the study recommends broader adoption of mindfulness programs, targeted teacher training, integration into life

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skills curricula, and piloting an extended 16-week model to evaluate sustained benefits. These measures could help ensure lasting improvements in student well-being and performance amid the evolving educational landscape.
***Keywords:*** Academic Achievement; Academic Stress; Binh Duong; Learning Motivation; School-Based Mindfulness

# 1. Introduction

In the context of rapid modernization and industrialization, the mental health and academic motivation of high school students in Vietnam are facing increasingly concerning challenges. In Binh Duong province—one of the localities with the highest rates of urbanization and mechanical population growth nationwide over the past decade—academic pressure and psychological stress among high school students have emerged as pressing issues. According to data from the General Statistics Office of Vietnam (GSO)[1], the proportion of high school students nationwide, including those in Binh Duong, who frequently experience stress and anxiety related to academic pressure and performance expectations stands at 39.7%, surpassing the Southeast region's average of 34.5%. A large migrant population, intense academic competition, and a lack of systematic school-based psychological support programs are key factors contributing to this situation[1, 2].

In addition, the prolonged impact of the COVID-19 pandemic has continued to seriously affect students' mental well-being and academic outcomes. The latest report from the Department of Education and Training of Binh Duong reveals that nearly 42% of high school students reported difficulties in maintaining academic motivation, along with prolonged fatigue, stress, and anxiety following periods of online learning and social distancing[3, 4]. Alarmingly, 28.6% of students reported a decline in grades and academic performance in the first semester of the 2023–2024 academic year compared to the pre-pandemic period, particularly in subjects requiring high concentration such as Mathematics, Literature, and Foreign Languages[5]. These figures underscore the urgent need to develop mental health and academic motivation support programs within the school environment, in line with the recommendations of the World Health Organization[6, 7] and meta-analyses by Dunning et al.[8] and Mak et al.[9].

According to Dale et al.[10], Narmandakh et al.[11], and Perkins et al.[12], academic motivation plays a pivotal role in sustaining achievement, reducing dropout risk, and preventing school-based mental health issues. International research has consistently demonstrated that students with intrinsic motivation and effective emotional regulation tend to achieve higher academic outcomes, are less negatively affected by stress, and better adapt to academic pressures[13]. Conversely, students with low motivation are more prone to poor performance, higher dropout rates, and psychological problems such as anxiety, depression, or social conflict. Against this backdrop, mindfulness-based interventions have increasingly been recognized globally as an effective method for simultaneously improving mental health, motivation, and academic performance among students[14, 15]. Mindfulness is defined as a state of purposeful, non-judgmental awareness of the present moment, which helps regulate emotions and enhance behavioral control[16–20]. Over the past two decades, numerous international studies—including those by Davidson[21], Dunning et al.[8], and Kuyken et al.[15, 22]—have demonstrated that mindfulness practice reduces anxiety and stress, improves concentration, enhances emotional regulation, and fosters positive social behaviors in students.

Notably, studies by Shapiro et al.[23], Yong[24], Kabat-Zinn[25], Waters et al.[26], and Howells et al.[27] have shown that mindfulness also directly influences academic outcomes and learning motivation. In an experimental study involving 1,400 students in Germany, Waters et al.[26] found that the mindfulness practice group achieved exam scores 11% higher and reported greater satisfaction with their studies compared to the control group. Similarly, Kuyken et al.[15], through the MYRIAD Trial involving 8,376 students in the UK, confirmed that school-based mindfulness programs improved emotional regulation, increased concentration, and enhanced academic achievement, especially among students struggling with stress.

In Asia, numerous studies conducted in Thailand, Japan, and South Korea have also reported positive results when integrating mindfulness practices into life skills and homeroom activities, helping students reduce stress, improve emotional self-regulation, and boost academic performance[28, 29].

However, in Vietnam—particularly in industrial provinces like Binh Duong—the number of studies and officially implemented mindfulness education programs in high schools remains limited. Most exist only in the form of extracurricular activities, informal relaxation meditation sessions, or isolated thematic workshops, lacking consistency in materials and implementation personnel [30, 31].

Analyses by Le [32] and Dao [33, 34] indicate that despite Vietnam's long-standing Buddhist heritage and compassionate community culture, the adoption of mindfulness practices in public education still faces numerous barriers in terms of awareness, qualified personnel, and standardized resources tailored to local school culture. This situation is especially evident in Binh Duong—where academic pressure is high and misconceptions between mindfulness and religious meditation remain widespread [21, 35]. From this reality, research on the impact of mindfulness education on high school students' learning motivation and academic performance in Binh Duong becomes both a necessary and practically significant endeavor. This study not only builds upon existing international and domestic experimental evidence on the effectiveness of mindfulness in promoting school-based mental health [8, 15] but also contributes to expanding empirical data in rapidly industrializing areas like Binh Duong.

At the same time, the study aims to offer practical contributions by designing a short-term school-based mindfulness practice program suitable for adolescent psychology and the educational conditions in Binh Duong—where high schools are facing challenges such as overcrowded classrooms, heavy curricula, and a lack of psychological counseling staff. The survey data and experimental results from this study are expected to serve as an important reference for the Binh Duong Department of Education and Training as well as local high schools in building and implementing sustainable school-based mental health and life skills development programs.

Therefore, this study was conducted with the primary objective of assessing the impact of mindfulness practice on learning motivation, learning attitudes, and academic performance among high school students in Binh Duong. Through a mixed-methods design combining quantitative surveys and in-depth interviews, the study seeks to determine the extent to which mindfulness practice affects academic indicators, while identifying practical facilitators and barriers to implementation, thereby contributing to the experimental foundation for the wider application and dissemination of this model within Vietnam's general education system.

# 2. Materials and Methods

## 2.1. Research Design

This study was designed using a mixed-methods approach to comprehensively assess the impact of mindfulness practice on academic motivation and academic achievement among high school students in Binh Duong province. The mixed-methods approach allowed for the concurrent utilization of the strengths of quantitative methods—to objectively measure changes through survey data and academic results—and qualitative methods—to deeply explore the perspectives and lived experiences of students and teachers regarding mindfulness practice in school settings. This methodological approach has been recommended and effectively applied in numerous large-scale international studies on school-based mindfulness, such as those conducted by Kuyken et al. [15, 16], Dunning et al. [8], and Waters et al. [26], as well as in Asian contexts in studies by Cao [29] and Cheang et al. [35].

In this study, the quantitative component was conducted through a survey of 312 10th- and 11th-grade students at three public high schools located in Thu Dau Mot City and Tan Uyen Town, Binh Duong. The survey instruments were selected based on internationally validated scales appropriate for educational settings, including the Academic Motivation Scale (AMS-C) by Vallerand et al. [36], the Five Facet Mindfulness Questionnaire (FFMQ) [37], and the Depression Anxiety Stress Scales (DASS-21) [38]. Concurrently, the qualitative component employed semi-structured in-depth interviews with two groups: students and teachers. This method enabled the collection of detailed information regarding students' perceptions, attitudes, and experiences during mindfulness practice, as well as teachers' opinions on the feasibility, effectiveness, and challenges of implementing the program in schools. Such an approach has been considered appropriate and effective in educational mindfulness research [35, 39].

The combination of quantitative and qualitative methods not only ensured the multidimensionality of the data but also allowed for triangulation between survey data, actual academic results, and participants' feedback, thereby enhancing the reliability and practical value of the research

conclusions. This integrated approach has been successfully adopted in seminal studies by Kuyken et al.[15], Dunning et al.[8], and Waters et al.[26].

## 2.2. Study Participants and Selection Criteria

The study sample consisted of 312 10th- and 11th-grade students from three public high schools in Thu Dau Mot City and Tan Uyen Town, Binh Duong province. The selection of these two areas was based on their high population density, significant academic pressure, and the highest levels of educational competition within the province, while also ensuring feasibility and control over confounding factors during the program's implementation.

### Inclusion Criteria for Student Participants:

- Aged between 15 and 18 years;
- Voluntary participation with parental consent;
- No diagnosis of severe psychiatric disorders or serious emotional disturbances;
- Availability of academic records for both the first and second semesters of the 2023–2024 academic year for comparative analysis.

Availability of academic records for both the first and second semesters of the 2023–2024 academic year for comparative analysis.

### Expert Participants:

This group included six school counselors and life skills education teachers from participating schools. The selection criteria required at least three years of experience in teaching or organizing life skills education for high school students and prior participation in basic mindfulness training programs.

## 2.3. Research Implementation Process

### Phase 1: Literature Review

A systematic review and analysis of both domestic and international literature on the effects of mindfulness on academic motivation and academic achievement were conducted. Sources were collected from international academic databases (Scopus, PubMed, JSTOR, Google Scholar) and the national library, with key references including Kuyken et al.[15, 22], Waters et al.[26], Dunning et al.[8], Howells et al.[27], Davidson[21], and Asian studies such as Cao[29], Cheang et al.[35], and Le & Trieu[30].

### Phase 2: Development of a School-Based Mindfulness Program

Based on the theoretical framework of the MYRIAD Trial program[22] and resources from the Mindful Schools Project[40], the research team developed an eight-week school-based mindfulness program, with two 30-minute sessions per week. The program incorporated core techniques such as mindful breathing, emotion recognition, body scanning, present-moment awareness practice, loving-kindness meditation, and brief mindfulness exercises before each class. Two schools implemented the intervention program, while one school served as the control group (receiving only regular life skills education without mindfulness practice).

### Phase 3: Pre- and Post-Intervention Surveys

Surveys were administered to all participating students at two time points: prior to the intervention (March 2024) and after completing the eight-week program (May 2024). The survey content included:

- Mindfulness practice level (FFMQ-24); Baer et al.[37]
- Academic motivation (AMS-C); Vallerand et al.[36]
- Stress and anxiety levels (DASS-21)[38]
- Grade point averages for Mathematics, Literature, and English in the second semester of the 2023–2024 academic year for comparison with the first semester.

### Phase 4: In-Depth Interviews

In-depth interviews were conducted with 12 students (6 from the intervention group and 6 from the control group) and 6 teachers (4 program implementers and 2 control group teachers). The interviews focused on participants' experiences, perceptions of academic motivation, stress management abilities, and the perceived effects on academic performance. A semi-structured interview guide with open-ended questions was developed based on Cheang et al.[35] and Kuyken et al.[15].

## 2.4. Measurement Instruments

To ensure comprehensiveness and objectivity in assessing the impact of the mindfulness practice program on students' learning motivation and academic performance, this

study employed a combination of multiple quantitative measurement tools, all of which have been previously validated for reliability and validity in educational contexts. Additionally, a mindfulness practice logbook was incorporated to monitor participants' engagement and adherence levels throughout the intervention.

### Mindfulness Level:

Mindfulness was measured using the shortened Vietnamese-adapted version of the Five Facet Mindfulness Questionnaire (FFMQ – 24 items). Developed by Baer et al.[37], the FFMQ assesses five core components of mindfulness: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. The 24-item version was selected to ensure suitability for high school students, following the adaptation approaches of Kuyken et al.[15] and Cao[29] in Southeast Asian educational research. The scale was translated bilingually and refined by two school psychology experts and life skills educators in Binh Duong to ensure cultural and linguistic appropriateness.

### Learning Motivation:

Learning motivation was measured using the Academic Motivation Scale (AMS-C, 28 items) developed by Vallerand et al.[36], which has been widely applied in international school-based research[26, 27]. This scale categorizes motivation into three types: intrinsic motivation, extrinsic motivation, and amotivation, with each item rated on a 5-point Likert scale ranging from 1 (not at all true) to 5 (completely true). The AMS-C was selected for its appropriateness in evaluating learning motivation levels and detecting changes following intervention, in alignment with meta-analytic studies by Dunning et al.[8] and Perkins et al.[12].

### Academic Performance:

Academic performance was measured using students' average semester grades in three core subjects—Mathematics, Literature, and English—which are key components of the national high school curriculum. Grade data from the first and second semesters of the 2023–2024 academic year were collected from the school's digital grade management system, ensuring objectivity and standardization. The selection of these three subjects was based on recommendations by Kuyken et al.[15] for evaluating the effects of mindfulness interventions on core academic domains.

### Stress and Anxiety Levels:

Stress and anxiety were assessed using the Depression, Anxiety, and Stress Scale (DASS-21) by Lovibond & Lovibond[38], which has been translated and validated in multiple Vietnamese school mental health studies[30]. The scale includes 21 items divided into three subscales: depression, anxiety, and stress, assessing the severity of symptoms over the past two weeks. In this study, the DASS-21 served as a control variable to rule out the influence of excessive stress and anxiety on learning motivation and academic performance, consistent with approaches by Kuyken et al.[15] and the MLERN network[21].

### Mindfulness Practice Logbook:

A mindfulness practice logbook was specifically designed for this study to record the number of practice sessions attended and the types of mindfulness techniques performed (e.g., breathing meditation, emotional awareness, sound mindfulness, loving-kindness meditation, etc.). Each student in the intervention group was provided with a logbook to complete after every session under the supervision of the program instructor. This tool facilitated monitoring of adherence and active participation, while also serving as a basis for analyzing the relationship between practice frequency and changes in learning motivation and academic performance, following the protocols of Kuyken et al.[15], Cao[29], and Cheang et al.[35].

## 2.5. Data Analysis

The research data were analyzed using both quantitative and qualitative methods.

Quantitative data were processed using SPSS version 26.0. Initially, the reliability of measurement scales was assessed via Cronbach's Alpha coefficients and Exploratory Factor Analysis (EFA) to evaluate internal consistency and factor structures. Descriptive statistics were then applied to determine sample characteristics and baseline levels of learning motivation, mindfulness, stress, and academic performance before and after the intervention.

To evaluate changes over time, paired-samples t-tests were conducted for learning motivation, academic scores, and mindfulness levels within the intervention and control groups.

Independent-samples t-tests were used to compare the degree of change between the two groups. Additionally, Pearson correlation analyses were performed to examine the relationships between mindfulness practice levels (total number of sessions and FFMQ scores), learning motivation (AMS-C scores), and academic performance. This analysis process followed the procedures of Dunning et al.[8], Kuyken et al.[15], and Waters et al.[26], and aligned with contemporary experimental analyses in school-based mindfulness education research[41].

Qualitative data from in-depth interviews were analyzed using NVivo 12 software. Audio recordings were fully transcribed and coded using the thematic content analysis method by Braun & Clarke[42]. The data were categorized into three principal thematic groups: (1) experiences of mindfulness practice, (2) perceived impacts on learning motivation and academic outcomes, and (3) facilitators and barriers in implementing the program. Triangulating qualitative and quantitative results enhanced the study's validity and consistency, consistent with recommendations by Baer et al.[39] and Cheang et al.[35].

# 3. Results

After analyzing data from a quantitative survey of 312 high school students and qualitative interviews with 12 students and 6 teachers, the findings indicate that the 8-week mindfulness practice program had a significant positive impact on students' learning motivation, stress management ability, and academic performance in high schools in Binh Duong province. The data were analyzed in detail across the following key indicators:

## 3.1. Learning Motivation (AMS-C)

The analysis revealed a significant increase in learning motivation (as measured by the AMS-C scale) in the mindfulness practice group compared to the control group. Specifically, prior to the intervention, the mean AMS-C score for the mindfulness group was 3.18 (SD = 0.41) and 3.15 (SD = 0.43) for the control group, with no statistically significant difference ($p > 0.05$). However, after 8 weeks of practice, the mean AMS-C score of the mindfulness group rose to 3.84 (SD = 0.38), while the control group's score only slightly increased to 3.21 (SD = 0.40).

A paired t-test showed that the increase in the AMS-C score within the mindfulness group was statistically significant ($t = 9.71$; $p < 0.001$), whereas no significant change was observed in the control group ($t = 1.22$; $p = 0.232$). This 0.66-point increase was not only markedly higher than the control group's change but also exceeded the 0.52-point average improvement reported by Waters et al.[26] in an experimental study involving 1,400 students in Germany.

These findings are consistent with those of Kuyken et al.[15] in the MYRIAD Trial, which recorded notable improvements in intrinsic motivation and school satisfaction among students practicing mindfulness, and with Cao's[29] study in Thailand showing enhanced intrinsic learning motivation and reduced exam-related stress. The detailed comparison of learning motivation scores before and after the intervention is presented in **Table 1**:

**Table 1.** Comparison of Learning Motivation Scores (AMS-C) Before and After the Intervention.

| Group | Pre-Intervention | Post-Intervention | t | p |
|---|---|---|---|---|
| **Mindfulness** | 3.18 ± 0.41 | 3.84 ± 0.38 | 9.71 | <0.001 |
| **Control** | 3.15 ± 0.43 | 3.21 ± 0.40 | 1.22 | 0.232 |

Note: This table presents the changes in mean learning motivation scores (AMS-C scale) of high school students in both groups before and after the mindfulness practice program. Mean values, standard deviations (SD), paired t-tests, and p-values are reported to determine statistical significance.

Further analysis indicated that improvements in learning motivation were most pronounced among students who initially had low or moderate motivation levels. Approximately 71.5% of students in the mindfulness group had AMS-C scores below 3.3 before the intervention; after the program, 82.6% of them achieved scores above 3.5. This suggests that mindfulness practice is particularly effective for students vulnerable to negative academic pressure — a pattern similarly noted by Howells et al.[27].

## 3.2. Academic Performance

In terms of academic performance, the mean scores of three core subjects (Mathematics, Literature, and English) in the mindfulness group showed a marked improvement.

Before the intervention, the mindfulness group had a mean score of 6.82 (SD = 0.62), while the control group's mean was 6.85 (SD = 0.60), with no significant difference ($p > 0.05$). After 8 weeks of mindfulness practice, the mean second-semester score of the mindfulness group increased to 7.42 (SD = 0.58), whereas the control group's score only slightly rose to 6.89 (SD = 0.59). A paired t-test further confirmed that this improvement in the mindfulness group was statistically significant ($t = 8.37$; $p < 0.001$), while no significant change was observed in the control group ($t = 1.54$; $p = 0.127$). These results demonstrate that mindfulness practice not only enhances learning motivation but also contributes directly to better academic outcomes.

Overall, these results indicate that mindfulness practice not only boosts learning motivation but also yields significant improvements in students' academic performance. The detailed comparison of mean semester scores before and after the intervention is presented in **Table 2**:

**Table 2.** Comparison of mean semester scores before and after the intervention.

| Group | Semester 1 | Semester 2 | t | p |
|---|---|---|---|---|
| **Mindfulness** | 6.82 ± 0.62 | 7.42 ± 0.58 | 8.37 | <0.001 |
| **Control** | 6.85 ± 0.60 | 6.89 ± 0.59 | 1.54 | 0.127 |

Note: This table illustrates the changes in the mean semester scores of three core subjects (Mathematics, Literature, and English) between the mindfulness practice group and the control group, aiming to assess the intervention's impact on students' academic performance.

The 0.6-point increase recorded in this study aligns closely with the 0.5-point improvement reported by Kuyken et al.[15] in the MYRIAD Trial. Additionally, Perkins et al.[12] observed an average increase of 0.47 points after a 12-week mindfulness intervention among a sample of 2,100 students in Australia. Notably, subject-wise analysis indicated that the most significant improvements occurred in Mathematics and English — subjects often associated with high academic pressure among Vietnamese high school students, especially in rapidly industrializing provinces. These were also the subjects in which interviewed students most frequently reported reductions in stress and improved concentration following mindfulness sessions.

## 3.3. Stress and Anxiety Scores (DASS-21)

The stress and anxiety scores of the mindfulness practice group showed a significant reduction after 8 weeks. Specifically, the mean stress score decreased from 17.62 (SD = 5.08) to 12.84 (SD = 4.36), while the anxiety score decreased from 15.38 (SD = 4.72) to 11.21 (SD = 4.15). Both reductions were statistically significant with $p < 0.001$. In contrast, the control group experienced only negligible changes. The substantial reductions in stress and anxiety scores after eight weeks of mindfulness practice are summarized in **Table 3**:

**Table 3.** Comparison of stress and anxiety scores (DASS-21).

| Group | Stress (Pre) | Stress (Post) | Anxiety (Pre) | Anxiety (Post) |
|---|---|---|---|---|
| **Mindfulness Practice** | 17.62 ± 5.08 | 12.84 ± 4.36 | 15.38 ± 4.72 | 11.21 ± 4.15 |
| **Control** | 17.75 ± 5.14 | 17.12 ± 4.98 | 15.42 ± 4.61 | 14.97 ± 4.58 |

Note: This table presents the changes in mean scores for stress and anxiety based on the DASS-21 scale in both the mindfulness practice and control groups, aiming to assess the effectiveness of the mindfulness practice program on students' mental health.

These results further reaffirm the stress- and anxiety-reducing effects of mindfulness practices, consistent with the findings of Dunning et al.[8], Howells et al.[27], and Perkins et al.[12]. The reduction rate of over 27% in the mindfulness practice group exceeds the average reduction of 16–22% previously synthesized by Dunning et al.[8] from 23 meta-analyses.

## 3.4. Qualitative Data

In-depth interviews with 12 students and 6 teachers revealed predominantly positive feedback regarding the mindfulness practice program. Among the 12 students interviewed, 10 reported a noticeable decrease in anxiety and stress levels, along with improved concentration in their

studies following the practice sessions. Many students emphasized that practicing breathing meditation, body scanning, and emotion awareness exercises helped them better manage stress before tests, particularly in subjects requiring logical thinking and carrying high academic pressure such as Mathematics and Foreign Languages. Several students shared that they felt more confident and composed when entering class after participating in mindfulness sessions in the early morning or during breaks between lessons.

From the teachers' perspective, 5 out of 6 interviewees noted positive changes in students' attitudes and behaviors following participation in the program. One Literature teacher shared: *"After each meditation session, students would come into class with a more stable attitude, complain less about fatigue, show improved focus, and participate more actively in discussions and assignments."* A Mathematics teacher observed a significant decrease in the number of disruptive students during class, particularly during midterm and final exam weeks. A Life Skills teacher reported that loving-kindness meditation sessions held at the end of the week helped students become more sociable with their peers, reduced interpersonal conflicts, and fostered better teamwork spirit in academic activities.

Overall, the qualitative data suggest that the program not only positively influenced students' mental health and emotional regulation but also enhanced the quality of interactions between students, teachers, and peers. These findings align with the conclusions of Davidson [21], Baer et al. [39], Cheang et al. [35], and Cao [29], who highlighted the benefits of mindfulness in promoting positive behavioral adjustments in school settings, particularly in rapidly urbanizing areas with high mechanical population density such as Binh Duong. Additionally, the interview data reflect the program's feasibility and social acceptability within public secondary school environments, indicating the potential for broader implementation and institutionalization in the near future.

# 4. Discussion

The findings of this study clearly demonstrate the positive impacts of the school-based mindfulness intervention program on learning motivation, concentration, stress management, and academic performance among high school students in Binh Duong province. The implementation of a short-term mindfulness practice model involving 312 students, through a mixed-method research design, not only reinforces existing international evidence but also expands the body of experimental data in the Vietnamese context—especially amid urbanized, high-pressure academic environments. The following discussion will further analyze the implications of these findings, compare them with previous studies, identify enabling and challenging factors, and propose practical applications for this model within the general education system.

## 4.1. Comparison with International Studies

First, the significant increase in learning motivation among the mindfulness practice group in this study is fully consistent with the conclusions of Waters et al. [26]. In their experimental study of 1,400 students in Germany, Waters and colleagues observed that students participating in mindfulness programs tended to exhibit higher levels of intrinsic motivation and were less affected by adverse external factors. In our study, the AMS-C score increased from 3.18 to 3.84 (a rise of 0.66 points), surpassing the average 0.52-point increase previously reported by Waters et al. [26]. To contextualize these results within the broader literature, the comparative increases in AMS-C learning motivation scores between the present study and Waters et al. [26] are shown in **Table 4**:

**Table 4.** Comparison of learning motivation increases between the present study and Waters et al. [26].

| Study | AMS-C Score Increase (Post–Pre) |
|---|---|
| **Binh Duong (2024)** | + 0.66 |
| **Waters et al. [26]** | + 0.52 |

Note: This table summarizes the differences in mean AMS-C learning motivation scores before and after the mindfulness intervention in the Binh Duong study compared to Waters et al. [26], in order to assess the intervention's relative impact across different educational contexts.

Similarly, Kuyken et al. [15], in the MYRIAD Trial—one of the world's largest school-based mindfulness studies involving 8,376 students in the UK—also recorded significant improvements in emotional regulation, school satisfac-

tion, and especially intrinsic motivation in the mindfulness group. The average academic performance increase of 0.5 points in the MYRIAD Trial was comparable to the 0.6-point increase in the current study. This suggests that mindfulness not only helps students regulate emotions but also enhances their ability to focus and maintain learning motivation in high-pressure, achievement-oriented educational settings such as Binh Duong. The parallel improvements in academic performance observed in this study and the MYRIAD Trial are detailed in **Table 5**:

**Table 5.** Comparison of mean academic performance increases between the present study and the MYRIAD trial.

| Study | Academic Performance Increase (Post–Pre) |
|---|---|
| **Binh Duong (2024)** | + 0.60 |
| **MYRIAD Trial (2022)** | + 0.50 |

Note: This table compares changes in students' average academic performance between the Binh Duong study and the MYRIAD Trial by Kuyken et al. [15], to identify similarities and differences in the mindfulness program's effectiveness.

Moreover, improvements in stress and anxiety management also exceeded those reported in international studies. In a meta-analysis of 23 school-based mindfulness studies, Dunning et al. [8] found that mindfulness practice reduced students' stress and anxiety levels by an average of 15–25%. In contrast, the current study recorded a 27.1% reduction in both stress and anxiety—significantly higher than the average compiled by Dunning et al. [8]. The comparative rates of stress and anxiety reduction observed in this study versus those reported by Dunning et al. [8] are presented in **Table 6**:

**Table 6.** Comparison of stress and anxiety reduction rates between the present study and Dunning et al. [8].

| Study | Stress Reduction (%) | Anxiety Reduction (%) |
|---|---|---|
| **Binh Duong (2024)** | 27.1 | 27.1 |
| **Dunning et al.** [8] | 20.4 | 19.7 |

Note: This table summarizes the percentage reductions in stress and anxiety levels in the mindfulness practice group in the Binh Duong study compared with average reductions synthesized from 23 studies in Dunning et al.'s meta-analysis [8].

These findings gain added significance within the context of Binh Duong's school system—characterized by high academic pressure, dense population, and one of the highest rates of mechanical migration in the country—which makes students especially vulnerable to stress and motivational decline. Previous studies by Davidson [21], Baer et al. [39], and Howells et al. [27] have similarly emphasized the capacity of mindfulness to enhance emotional self-regulation and stress control among secondary students, aligning with the qualitative data gathered from both students and teachers in Binh Duong in this study.

## 4.2. Identifying Facilitators and Challenges in Binh Duong

During the implementation of the mindfulness practice program at public high schools in Binh Duong province, this study identified several notable facilitating factors while also highlighting specific challenges that should be considered when scaling up the model in the future.

A key facilitating factor lies in the program's suitability and high accessibility for high school students. Findings from in-depth interviews revealed that most students responded positively to the program's relaxing effects, its stress-reducing capacity, and its ability to enhance concentration. Students reported that simple exercises such as mindful breathing, body scanning, and emotion recognition were easy to access, required no complicated equipment or specialized spaces, and were entirely compatible with current classroom conditions. These findings are consistent with the conclusions of Cheang et al. [35] in their study of school-based mindfulness programs in Singapore and Cao [29] in Thailand — two Asian countries with educational conditions and cultural characteristics comparable to those of Vietnam.

In addition, the program's flexibility represents another significant advantage. Mindfulness practice sessions could be organized at various times, such as at the start of the school day, during homeroom periods, or before exams, effectively reducing psychological pressure and enhancing

students' focus before academic activities. Teachers interviewed agreed that given the current dense school schedules, brief mindfulness sessions of 5–10 minutes could be conveniently integrated into lessons without disrupting the official curriculum. The ability to adapt content flexibly according to grade levels and the specific context of each school has also enabled the program to suit a diverse range of student groups.

However, the study also identified several contextual challenges in implementing the program in Binh Duong. First, the widespread confusion between mindfulness practice and religious meditation remains an issue among teachers, parents, and students. Some parents expressed concerns that mindfulness might be associated with Buddhism or other religious practices, potentially conflicting with their personal beliefs. This challenge has also been noted in studies by Le [32] and Dao [33] in Vietnam, as well as by Cheang et al. [35] in Singapore and Cao [29] in Thailand. To address this, the program clearly emphasized the secular and scientific nature of mindfulness, focusing on its benefits for mental health and academic performance rather than any religious connotations.

However, the study also identified several contextual challenges in implementing the program in Binh Duong. First, the widespread confusion between mindfulness practice and religious meditation remains an issue among teachers, students, and parents. Some older teachers and parents expressed concerns that the program might involve superstitious elements or be associated with religious activities, potentially compromising the neutrality of public school education. This issue was similarly noted by Le [32] and Dao [33], who analyzed cognitive barriers to the adoption of mindfulness practice in Vietnamese schools. Such misconceptions have limited community acceptance and support for the program, especially in suburban and rapidly urbanizing areas.

Second, the large class sizes (averaging 45–50 students per class) and the intensive academic schedule in accordance with the current national education standards have posed considerable obstacles to organizing regular mindfulness sessions twice a week. Life skills teachers and homeroom teachers have encountered difficulties in arranging appropriate times and spaces for student practice, particularly during high-pressure periods such as midterm, final exams, or academic competitions. This situation mirrors challenges previously documented by Norton & Griffith [43] and Kuyken et al. [22] when implementing school-based mindfulness programs in densely populated areas and high-pressure education systems in Europe.

Third, a shortage of specialized teachers and standardized instructional materials also presents a major constraint. Most high schools in Binh Duong currently lack dedicated school psychologists, often assigning responsibilities to life skills teachers or staff with other concurrent duties for psychological support activities. Meanwhile, organizing mindfulness sessions requires facilitators to be formally trained in basic meditation techniques, classroom management strategies, and psychological first-aid skills. This challenge has also been highlighted by Cheang et al. [35] and Le & Trieu [30] when evaluating the feasibility of mindfulness intervention programs in Vietnam.

Fourth, local cultural characteristics and prevailing educational ideologies have influenced the program's implementation. While several European and Asian countries have normalized integrating mental health support activities into official curricula, in Vietnam, mindfulness and meditation-related activities primarily remain extracurricular or experimental initiatives, yet to be institutionalized within official educational programs. Dao's analysis [34] also noted that traditional family cultural values and an achievement-oriented mindset continue to make some parents and schools hesitant about incorporating mental health care into school settings.

Lastly, limitations in physical infrastructure at several public schools — particularly in rapidly urbanizing areas such as Tan Uyen and Thuan An — present further challenges. These schools often lack dedicated practice rooms or quiet spaces suitable for conducting proper mindfulness activities. Many teachers reported having to utilize subject-specific classrooms or schoolyards during free periods for practice sessions, which compromised intervention effectiveness due to noisy and non-private environments.

In conclusion, while the mindfulness practice program has initially demonstrated positive outcomes and certain feasibility, its broad and sustainable implementation in Binh Duong will require adjustments tailored to local infrastructure conditions, human resource capacity, and educational cultural characteristics.

### 4.3. Recommendations for Application and Expansion

Based on the positive outcomes and the identified facilitating and challenging factors, the research team proposes several specific solutions to expand and enhance the effectiveness of school-based mindfulness programs in Binh Duong, as well as in other rapidly industrializing provinces across the country.

Firstly, it is recommended to extend the intervention duration to a minimum of 16 weeks, following the guidelines of the MYRIAD Trial project[15], to ensure that students have sufficient time to practice, develop habits, and sustain long-term effects. Although the 8-week program in this study demonstrated significant short-term impacts, it remains limited in terms of long-term sustainability. Extending the program and dividing it into stages—adaptation, consolidation, and maintenance—would contribute to more durable improvements in stress management, learning motivation, and academic performance.

Secondly, it is suggested to develop a standardized mindfulness curriculum tailored to the cultural context of Vietnamese schools, drawing on reference materials from the MYRIAD Trial[15] and the Mindful Schools Project[40]. This curriculum should ensure scientific validity, religious neutrality, accessibility, and flexibility for adjustment according to grade levels and school conditions. In addition, the materials should be designed in a variety of formats—including printed books, instructional videos, and digital toolkits—to optimize implementation in classrooms with large student numbers and limited space.

Thirdly, it is necessary to organize specialized mindfulness training courses for life skills teachers, homeroom teachers, and school counselors. This recommendation aligns with what Dunning et al.[8] and Davidson[21] previously emphasized, ensuring program standardization and long-term effectiveness. Moreover, short-term training sessions for parents should also be provided to raise awareness and build community consensus, thereby minimizing misconceptions and increasing parental support.

Fourthly, the program should be integrated into homeroom sessions, life skills classes, and extracurricular activities. Diversifying implementation formats not only alleviates scheduling pressures within the formal curriculum but also improves equitable access for all students. This approach has also been recommended by Kuyken et al.[15] and Perkins et al.[12] in large-scale mindfulness education models.

Fifthly, it is proposed to establish mindfulness practice clubs in schools or organize thematic extracurricular sessions during peak exam periods. This model, previously recognized by Cao[29] and Cheang et al.[35], has proven to be a cost-effective yet highly impactful solution, especially in provinces with large class sizes and high population densities.

Finally, it is recommended to expand the pilot model to other rapidly industrializing provinces such as Dong Nai, Long An, Bac Ninh, and Hai Duong, where high school students face similar pressures from academic demands and rapid in-migration, as in Binh Duong. This not only contributes to broadening the empirical database on mindfulness interventions in Vietnam but also enriches the body of evidence for international meta-analyses on school-based mindfulness programs in Southeast Asia[9, 12].

### 4.4. Research Limitations

This study found positive effects of the mindfulness program on motivation and academic performance among high school students in Binh Duong, but several limitations should be kept in mind. First, the sample size and representativeness were restricted: we surveyed only 312 students from three public schools in Thu Dau Mot and Tan Uyen, which may not reflect the full range of regional or sociodemographic diversity. Second, although the eight-week intervention fitted the academic calendar, it offered no insight into the long-term sustainability of the results. Third, we relied on self-report instruments (FFMQ, AMS C, DASS 21), which can be influenced by social desirability bias. Fourth, we did not conduct follow-up assessments at three to six months after the intervention to confirm whether the benefits persisted; moreover, the study compared the mindfulness group to a single control group that received no mindfulness training and not to other psychological interventions. Finally, practical issues such as crowded classrooms and background noise may have limited the fidelity of the mindfulness sessions. These limitations suggest several avenues for future research: larger and more diverse samples, longer intervention durations, a wider range of comparison groups, and systematic follow-ups to strengthen the generalizability and robustness of the findings.

# 5. Conclusions

This study has provided clear and convincing empirical evidence on the effectiveness of a mindfulness-based intervention program in enhancing academic motivation, stress management, and academic performance among high school students in Binh Duong Province — one of Vietnam's fastest-industrializing, rapidly urbanizing regions with some of the highest levels of academic pressure nationwide. Employing a mixed-methods research design, which combined a quantitative survey of 312 students and in-depth interviews with 12 students and 6 teachers, the findings confirmed both the feasibility and practical effectiveness of a short-term, school-based mindfulness model within public high school settings.

Specifically, the academic motivation of the mindfulness intervention group increased significantly, with an average gain of 0.66 points on the AMS-C scale after eight weeks of practice — a result substantially higher than that of the control group and notably exceeding the average reported by Waters et al.[26] in a German study involving 1,400 students. This suggests that even with a relatively brief program of eight weeks, practiced twice weekly, meaningful positive changes in students' psychological wellbeing, learning engagement, and emotional self-regulation can be achieved.

Notably, the average academic scores in three core subjects (Mathematics, Literature, and English) for the intervention group also improved markedly, with an average increase of 0.6 points — comparable to, and in some cases exceeding, the results published by Kuyken et al.[15] in the MYRIAD Trial in the UK, which involved a sample of 8,376 students. These outcomes highlight the high applicability and adaptability of school-based mindfulness programs in educational environments characterized by large class sizes, intense exam-oriented pressure, and substantial numbers of migrant students, such as Binh Duong.

Regarding stress and anxiety management, the study further affirmed the role of mindfulness as an effective psychological intervention in educational settings. The intervention group experienced a reduction in stress and anxiety levels by more than 27% — surpassing the 20% average reduction reported by Dunning et al.[8] in a meta-review of 23 international studies. This decline holds not only statistical significance but also considerable practical value in mitigating rising academic stress symptoms in Binh Duong and other rapidly industrializing provinces[1].

Importantly, the qualitative interview results reflected a high degree of consensus between students and teachers regarding the program's feasibility, cultural appropriateness, and practical effectiveness. Most students reported that mindfulness practice helped them remain calm before exams, enhanced concentration, and alleviated academic pressure. Participating teachers also observed improved emotional regulation among students, reduced classroom conflicts, decreased disruptive behaviors, and increased proactive engagement in lessons — aligning with the findings of Davidson[21], Baer et al.[39], and Howells et al.[27] on the behavioral regulatory effects of mindfulness in schools.

In summary, this research not only contributes valuable empirical evidence within the Vietnamese context but also provides essential data for international meta-analyses, such as those conducted by Kuyken et al.[15], Dunning et al.[8], and Waters et al.[26]. It further expands the Southeast Asian evidence base, an area that remains relatively underrepresented in mindfulness education research in terms of both study volume and scale.

# Recommendations

Based on the study's findings and an analysis of the facilitators and challenges encountered during program implementation in Binh Duong, several key recommendations are proposed to scale up and institutionalize school-based mindfulness programs in Vietnam in the coming years:

First, it is recommended that pilot implementations of mindfulness practice programs be expanded to all public high schools in Binh Duong Province. Priority should be given to integrating these sessions into life skills or homeroom activity periods, with a duration of 20–30 minutes per session, conducted 1–2 times per week, in accordance with the guidelines of Kuyken et al.[15] and the Mindful Schools Project[40]. This format is compatible with the current teaching timetable and aligns with efforts to reduce academic pressure on high school students.

Second, specialized training workshops on "Mindfulness in Schools" should be organized for life skills teachers, homeroom teachers, and school counselors. Dunning et al.[8] and Davidson[21] have emphasized this recommendation when evaluating the long-term effectiveness of school-

based mindfulness programs. Teachers must not only be trained in mindfulness techniques but also proficient in adjusting exercises and handling emergent psychological issues during practice sessions.

Third, it is proposed that the Binh Duong Department of Education and Training develop a standardized set of school-based mindfulness practice materials, to be officially integrated into the life skills curriculum for high school students. Standardizing instructional materials and teaching methods is essential to ensure sustainability, consistency, and effectiveness when scaling up, while also preventing misunderstandings or confusion with religious practices — a risk previously noted in this study and in the analyses of Le[32] and Dao[33].

Fourth, it is recommended that the Ministry of Education and Training approve research and implementation of an extended version of the school-based mindfulness program, lasting 16 weeks or running throughout the academic year, following the model of Kuyken et al.[15] and Waters et al.[26]. This would allow for the evaluation of long-term effects on academic outcomes, exam motivation, dropout rates, and school mental health indicators — issues currently prioritized by UNICEF Vietnam[44], MLERN[21], Dunning et al.[45], and the WHO[6, 7] in their global school mental health care strategies.

Fifth, high schools in rapidly industrializing provinces such as Binh Duong are encouraged to proactively collaborate with school psychology experts, applied Buddhist organizations, and mental health NGOs to establish mindfulness clubs, extracurricular workshops, and brief meditation sessions before exams or during high-pressure study periods. Kuyken et al.[15], Cao[29], and Cheang et al.[35] have all identified such initiatives as flexible, low-cost, yet highly effective solutions for urbanized school environments.

Finally, it is essential to continue conducting large-scale, multi-site experimental studies to build a national evidence base on the effectiveness of school-based mindfulness programs, laying the groundwork for future meta-analyses and policy proposals at the ministerial level. Implementing studies in rapidly industrializing provinces such as Binh Duong, Dong Nai, Long An, and Bac Ninh would help assess intervention feasibility and impact under conditions of intense academic pressure and large transient populations—factors that the WHO[7] has identified as characteristic of Southeast Asia.

# Future Research Directions

To solidify and broaden the initial insights from this study, subsequent investigations should pursue the following strategies. First, enlarge the participant cohort and widen the contextual scope by incorporating various geographic areas and institutional models—namely, public, private, and boarding schools—thereby bolstering the applicability of the findings. Second, adopt a longitudinal framework, conducting follow-up evaluations at intervals of 3, 6, and 12 months, to track the durability of mindfulness-related changes in motivation, academic outcomes, and mental well-being. Third, juxtapose the mindfulness curriculum with other psychosocial and educational strategies—such as structured relaxation, short physical activity, and peer-support group counseling—to assess the comparative benefits and configuration flexibility of each approach. Fourth, amalgamate diverse measurement modalities, including physiological sensors, classroom behavior analytics, and digital practice records, with rich qualitative sources such as semi-structured interviews and observational field notes, in order to map mediating processes and capture the nuances of participants' subjective realities. Lastly, broaden the research to encompass younger adolescents in lower secondary years, university students, and teaching personnel, fostering a rounded perspective of mindfulness curricula throughout the Vietnamese educational framework. Advancing in these ways will guide the formulation of large-scale, enduring mindfulness programs that can be tailored to varied educational settings.

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# Institutional Review Board Statement

The study fully adhered to ethical principles concerning research involving minors.

# Informed Consent Statement

All participating students were clearly informed about the research objectives, their rights, and their ability to withdraw at any time. Participation was entirely voluntary and

conducted with parental consent.

## Data Availability Statement

The data used in this study are available for non-commercial academic purposes upon reasonable request from other researchers, via the corresponding author's email: ductm@tdmu.edu.vn.

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## Conflicts of Interest

The author declares no conflict of interest in relation to the publication of this article.

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