การพัฒนาแพลตฟอร์มเพื่อการดูแลสุขภาพจิตใจ สำหรับนักเรียนมัธยมศึกษาในกรุงเทพมหานคร ประเทศไทย

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บทคัดย่อ

การวิจัยและพัฒนานี้มีวัตถุประสงค์เพื่อพัฒนาแพลตฟอร์มการดูแลสุขภาพจิตใจของนักเรียนระดับมัธยมศึกษาในกรุงเทพมหานคร โดยผ่านชุดการเรียนรู้การส่งเสริมสุขภาพด้านจิตใจผ่านระบบ Moodle Learning Management System (LMS) ซึ่งได้รับการออกแบบมาเพื่อส่งเสริมสุขภาพด้านจิตใจ ช่วยคัดกรองปัญหาทางสุขภาพจิตใจได้ในระยะเริ่มต้น และให้การดูแลการจัดการความเครียดด้วยตนเอง โดยแบ่งการวิจัยออกเป็น 3 ระยะ ได้แก่ ระยะที่ 1 การศึกษาสถานการณ์สุขภาพจิตใจของนักเรียนในกรุงเทพมหานครโดยใช้แบบประเมินความเครียดประยุกต์จาก SPST-20 ระยะที่ 2 การออกแบบและพัฒนาแพลตฟอร์มการดูแลสุขภาพจิตใจของนักเรียนในกรุงเทพมหานคร และระยะที่ 3 ผลการพัฒนาแพลตฟอร์มการดูแลสุขภาพจิตใจของนักเรียนในกรุงเทพมหานคร โดยกลุ่มตัวอย่างในการศึกษาสถานการณ์สุขภาพจิตใจคือนักเรียนระดับชั้นมัธยมศึกษาตอนปลายในโรงเรียนสังกัดสำนักงานคณะกรรมการการศึกษาขั้นพื้นฐานในกรุงเทพมหานคร

ผลการศึกษาพบว่า ในระยะที่ 1 ผลการคัดกรองสุขภาพจิตในนักเรียนมัธยมศึกษาตอนปลายจำนวน 897 คน ร้อยละ 52.50 มีระดับความเครียดปกติ และมีกลุ่มตัวอย่างจำนวนมากที่เผชิญกับความเครียดระดับปานกลางถึงสูง ในระยะที่ 2 การออกแบบและพัฒนาแพลตฟอร์มจากการสนทนากลุ่มโดยผู้เชี่ยวชาญจำนวน 5 ท่าน ได้ชุดการเรียนรู้การส่งเสริมสุขภาพด้านจิตใจในระบบ Moodle (LMS) ซึ่งประกอบด้วยแบบวัดความเครียดและเนื้อหาที่เกี่ยวข้องกับการดูแลสุขภาพจิตใจ จำนวน 4 เรื่อง ได้แก่ เรื่องที่ 1 ความหวัง เรื่องที่ 2 การมองโลกในแง่ดี เรื่องที่ 3 การรับรู้ความสามารถของตนเอง และเรื่องที่ 4 ความสามารถในการปรับตัวและฟื้นตัวภายหลังเหตุวิกฤต ในระยะที่ 3 นำแพลตฟอร์มการดูแลสุขภาพจิตใจของนักเรียนในกรุงเทพมหานคร ไปทดสอบกับนักเรียนจำนวน 30 คน ผลการศึกษา พบว่า ความเครียดของกลุ่มตัวอย่างที่เข้าสู่ชุดการเรียนรู้การส่งเสริมสุขภาพด้านจิตใจในระบบ Moodle (LMS) มีระดับลดลงอย่างมีนัยสำคัญทางสถิติ จากการศึกษานี้ชี้ให้เห็นถึงประสิทธิภาพของแพลตฟอร์มดิจิทัลในการส่งเสริมสุขภาพจิตใจและการจัดการความเครียดในนักเรียนมัธยมศึกษาตอนปลาย ดังนั้นการศึกษานี้มีส่วนช่วยสนับสนุนการพัฒนาระบบสนับสนุนสุขภาพจิตใจที่เข้าถึงได้และยั่งยืนในสถานศึกษา พร้อมทั้งส่งเสริมและคัดกรองปัญหาสุขภาพด้านจิตใจในวัยรุ่น

คำสำคัญ: สุขภาพจิตใจ, นักเรียนมัธยมศึกษาตอนปลาย, การจัดการความเครียด, แพลตฟอร์มดิจิทัล, ระบบจัดการการเรียนรู้

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Research and development of a mental healthcare platform for high school students in the Bangkok metropolis, Thailand

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Abstract

This research and development project aimed to develop a mental healthcare platform for upper secondary school students in Bangkok through a mental health promotion learning module on the Moodle Learning Management System (LMS). The platform was designed to promote mental well-being, screen for early signs of psychological problems, and support self-managed stress reduction. The study consisted of three phases: Phase 1, an assessment of students' mental health status using an adapted stress assessment tool based on the SPST-20; Phase 2, the design and development of the platform; and Phase 3, the evaluation of the platform's effectiveness.

The results revealed that, in Phase 1, the screening of mental health status in 897 students, 52.50% had normal stress levels, and 47.50% experienced moderate to high stress levels, indicating a clear need to strengthen students' mental health competencies. In Phase 2, the platform was designed and developed based on information obtained from a focus group discussion with five experts. The resulting Moodle-based learning module consisted of a stress assessment and four thematic lessons on hope, optimism, self-efficacy, and resilience after critical events. The platform also provided guidelines for mental self-care and career-inspiration content from exemplary role models. In Phase 3, the platform was tested with 30 students, with the findings indicating that post-intervention stress levels significantly decreased. The findings demonstrate that the developed digital platform is effective in promoting mental health and reducing stress among upper secondary school students. Furthermore, the developed program supports the advancement of sustainable, accessible mental healthcare systems in educational settings and enhances the effectiveness of mental health screening among adolescents.

Keywords: mental health, high school students, stress management, digital platform, Moodle LMS

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Introduction

In the wake of unprecedented global challenges—most notably the COVID-19 pandemic—the mental health of children and adolescents has become a pressing public health concern. Between January 1, 2020, and September 30, 2021, a study conducted by Thailand's Department of Mental Health reported that 183,974 individuals under the age of 20 accessed the Mental Health Check-in application. The findings reveal alarming levels of psychological distress, with 28% of adolescents reported as having high stress, 32% were identified as at risk for depression, and 22% experienced suicidal ideation. These outcomes were associated with several exacerbating factors, including excessive screen time, social isolation, family conflict, and exposure to domestic violence—conditions that intensified during the pandemic.[1]

The burden of mental health issues among youths has escalated significantly, both in Thailand and globally. A national assessment conducted in 2023 using the updated Mental Health Check-in platform found that 36.59% of Thai children and adolescents under the age of 18 were at heightened risk for developing mental disorders.[2-3] Adolescence is a developmental stage marked by rapid emotional, cognitive, and social transitions, rendering individuals particularly susceptible to stress, depression, and suicidal ideation.[4-5] Without timely support, these challenges can have long-term consequences on academic performance, physical health, interpersonal relationships, and overall life trajectories.

Although stress can serve to motivate individuals to achieve by motivating individuals to achieve academic and personal goals, unmanaged or chronic stress may result in serious mental and physical health consequences, including anxiety, depression, aggression, sleep disturbances, appetite changes, and somatic symptoms such as headaches and nausea.[6] Consequently, enhancing psychological resilience—the ability to recover from adversity—has become a strategic priority in national mental health frameworks.

Thailand's National Mental Health Development Plan (2018–2037), established by the Department of Mental Health, outlines a comprehensive, lifespan-oriented approach to promoting mental well-being and preventing psychological disorders.[7] Complementing this national strategy, UNICEF Thailand emphasized the urgent need to expand access to psychosocial support services and strengthen mental health literacy. However, there is a lack of systematic evaluation research on existing mental health support programs in Thailand, leaving the actual effectiveness of current measures—and the extent to which schools and students benefit from them—unclear. Although these efforts aim to reduce stigma, promote positive attitudes, and foster open communication among adolescents, families, and communities, the absence of robust evaluation limits our understanding of their true impact on creating a

supportive environment for early intervention and care.[8]

Despite these initiatives, access to consistent, school-based mental health resources remains limited—particularly in digital or hybrid learning contexts. Given the shift toward online and blended education in the post-pandemic era, there is a critical need to develop sustainable mental health support systems that are accessible, youth-friendly, and seamlessly integrated into educational environments.

Evidence indicates that enhancing self-esteem, strengthening psychological capital, and implementing individualized intervention programs can significantly reduce stress levels among adolescents.[9] Building on this foundation, the present study seeks to assess the mental health status of high school students in Bangkok as a preparatory step toward the development of a digital School Mental Health platform. This platform, to be delivered through the Moodle Learning Management System (LMS), is designed to promote emotional well-being, facilitate early detection and management of psychological issues, and provide sustained support within a school-based digital environment. By offering an accessible, scalable, and contextually appropriate intervention, this project addresses an urgent need in adolescent mental healthcare and supports Thailand's broader public health and educational goals in the context of the "new normal." This study aims to assess the mental health status of high school students in Bangkok, develop a school-based digital mental healthcare platform, and generate the required foundational evidence to integrate this platform into the Moodle LMS to support early detection of mental health issues, timely intervention, and sustained emotional well-being.

Methods

This study employed a Research and Development (R&D) design, consisting of three sequential phases, as illustrated in Figure 1 (Research Framework). The study was conducted from February to August 2022.

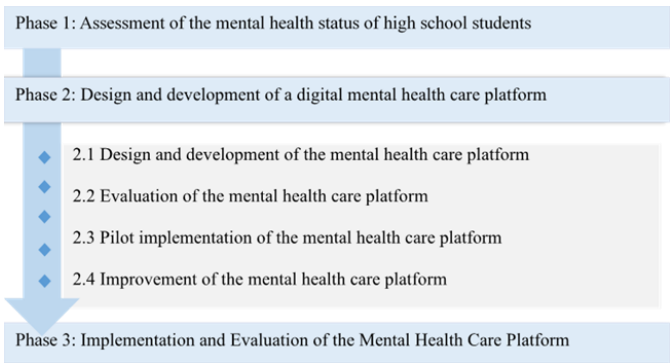


Figure 1 Research Framework

Phase 1: Assessment of the mental health status of high school students

1.1 Population and Sample

The target population comprised 1,396 upper secondary school students in Bangkok enrolled in a public high school under the authority of the Office of the Basic Education Commission (OBEC), Ministry of Education, Thailand. The sample size was calculated using the proportion estimation formula for a known population,[10] as follows:

$$n = \frac{N_p(1-p)z^2_{1-\frac{\propto}{2}}}{d^2(N-1)+p(1-p)z^2_{1-\frac{\propto}{2}}}$$

Where:

n = required sample size

N = population size (1,396)

Z = 1.96 (standard normal value at 95% confidence level)

p = 0.47[11]

d = 0.02 (acceptable margin of error)

The calculated sample size was 883. After adjusting for a potential 5% dropout rate, the final required sample was 928 students. Using cluster sampling, data were successfully collected from 897 participants, who were included in the final analysis.

1.2 Research Instrument

A stress assessment questionnaire, adapted from the SPST-20 developed by the Department of Mental Health, Ministry of Public Health[2], was tailored for high school students by modifying the original 5-point scale to a 4-point scale to simplify response options and improve clarity. This 20-item tool categorizes stress levels as follows:

0–5: Below normal

6–19: Normal

20–25: Mildly high (early physical symptoms such as irritability, insomnia)

26–29: Moderately high (increased symptoms requiring intervention)

≥30: Very high (urgent psychological attention needed)

1.3 Data Collection

The researcher coordinated with school administrators, guidance counselors, and homeroom teachers to explain the study's objectives and procedures. Participants were selected based on the following inclusion criteria: (1) currently enrolled under the Bangkok Secondary Education Service Area Office and (2) able to read, write, and communicate in Thai. Informed consent was obtained from both the students and their guardians. Students voluntarily completed the stress assessment from the adapted SPST-20 tool, and the aggregate findings were subsequently presented to the school.

1.4 Data Analysis

Data was analyzed using descriptive statistics (frequency, percentage, mean, standard deviation, maximum, and minimum). Proportions

and 95% confidence intervals (CIs) were also calculated.

Phase 2: Design and development of a digital mental healthcare platform

2.1 Key Informants

This phase involved five key informants: University lecturers specializing in public health, occupational health and safety, and family health; one adolescent psychiatrist; and one high school guidance teacher. Data was collected through focus group discussions conducted both in-person and online. The platform's content validity was evaluated by three experts, with all items achieving an Index of Item-Objective Congruence (IOC) above 0.5. The reliability of the focus group discussion (FGD) guidelines was ensured through expert review, assessment of clarity and suitability for the target group (face validity), pilot testing with a small sample to refine questions and procedures, and evaluation of consistency in administration among moderators.

2.3 Data Collection

Focus group discussions explored essential mental health content, activity types, and digital delivery formats. Feedback was used to design and refine the Moodle LMS-based digital platform. The platform underwent expert review and was improved based on recommendations.

2.4 Data Analysis

Data from focus groups was analyzed using qualitative content analysis. The Moodle-based learning module was developed and consisted of a stress assessment and four thematic lessons on hope, optimism, self-efficacy, and resilience after critical events. The platform also provided guidelines for mental self-care and career-inspiration content from exemplary role models.

Phase 3: Implementation and evaluation of the mental healthcare platform

3.1 Design, Population, and Sample

This study employed a quasi-experimental, one-group pretest-posttest design to evaluate the effectiveness of the platform, as no control group was included. The study population consisted of high school students from Bangkok, and a purposive sample of 30 students was selected based on the following inclusion criteria: (1) currently enrolled under the Bangkok Secondary Education Service Area Office; (2) able to read, write, and communicate in Thai; (3) have access to internet-enabled devices; and (4) both the student and their guardian were willing to participate with informed consent. No prior screening for stress levels was conducted before participant selection. Participants were informed that they could discontinue their participation at any time. Predefined discontinuing criteria included withdrawal of consent, inability to access the platform for more than a specified number of sessions, or any adverse events affecting their well-being. The exclusion criteria consisted of: (1) absence due to illness or personal reasons, and (2) inability to access the required digital tools.

3.2 Instruments

The intervention was delivered through the Moodle LMS and consisted of four 8-minute videos in each module: Module 1: Hope; Module 2: Optimism; Module 3: Self-efficacy; and Module 4: Resilience after crises. An additional 7-minute video covered topics such as academic pathways, career planning, and goal setting. Participants were required to watch each video at least once, although they could review the content multiple times if desired. All participants followed the same protocol to ensure consistency in exposure to the intervention. The learning program lasted approximately four weeks, with stress levels assessed both pre- and post-intervention using the adapted SPST-20 tool. For validation, content validity was assessed with an Index of Item-Objective Congruence (IOC) of 0.78, based on reviews from three experts. Reliability was tested in a pilot group (n = 30), yielding a Cronbach's alpha of 0.85.

3.3 Data Collection

The intervention began with student registration on the “Mental Health Promotion Platform for High School Students,” hosted via the Moodle LMS. Students first viewed an introductory video highlighting the importance of physical and mental health and were provided guidance on navigating the platform. The students then completed an initial stress assessment, after which learning content was tailored to their stress levels. Structured lessons focused on mental health promotion were delivered over a four-week period, followed by a post-intervention stress assessment. Students with very high stress levels were recommended for additional support, including educational resources, counseling, and strategies for coping and recovery after crises.

3.4 Data Analysis

Both descriptive statistics (frequency, percentage, mean, standard deviation, minimum, maximum) and inferential statistics (Dependent t-test) were used. Statistical significance was set at $p < 0.05$.

Ethical Consideration

The research protocol was reviewed and approved by the Human Research Ethics Committee, Faculty of Public Health, Mahidol University (COA No. MUPH 2022-005). Informed consent was obtained from all participants and their guardians before participation. Protecting personal data by storing it securely and only accessing it with authorization. Findings are reported using pseudonyms to protect identities, even if the data is detailed, upholding confidentiality.

Results

Phase 1: Mental health status of high school students

In Phase 1, the mental health status of high

school students in Bangkok was assessed by evaluating their stress levels. The results revealed that the majority of students (52.50%; 95% CI: 49.18–55.82) had stress levels within the normal range. Mildly high stress levels were observed in 23.80% of students (95% CI: 20.99–26.67), while 12.00% (95% CI: 9.98–14.35) exhibited moderately high stress levels. Additionally, 9.50% of students (95% CI: 7.64–11.58) experienced very high stress levels. A small proportion of students (2.20%; 95% CI: 1.37–3.42) demonstrated stress levels below the normal range. The overall mean stress score was 19.08 (SD = 7.93), with a median score of 18. The scores ranged from 1 to 52, as presented in Table 1.

Table 1: Number, Percentage, and 95% Confidence Interval of Stress Levels Among High School Students in Bangkok

Stress Level	Number	Percentage (%)	95% CI
Below Normal	20	2.20	1.37 – 3.42
Normal	471	52.50	49.18 – 55.82
Mildly High	213	23.80	20.99 – 26.67
Moderately High	108	12.00	9.98 – 14.35
Very high	85	9.50	7.64 – 11.58
Mean (SD) 19.08 (7.93), Median (Min, Max) 18 (1, 52)			

Table 2. Difference in Mean Stress Scores of the Experimental Group (n = 30)

Time Point	Mean (SD)	95% CI	Mean Difference (95% CI)	t (df)	*p*-value
Pre-intervention	17.30 (4.94)	15.45-19.15	4.10 (2.29-5.91)	4.62 (29)	0.0001
Post-intervention	13.20 (5.10)	11.30-15.30			

Phase 2: Design and development of a digital mental healthcare platform

In Phase 2, mental health promotion activities were designed and implemented through the Moodle Learning Management System (LMS). Focus group discussions with experts revealed that adolescents require mental health content that is age-appropriate, engaging, and grounded in everyday academic and social experiences. Experts identified four priority components—hope, optimism, self-efficacy, and resilience after crises—which were used to structure the platform's

mental health literacy modules. All instructional items achieved an IOC score above 0.5, confirming strong content validity, and minor revisions were made following pilot testing to enhance clarity and consistency. Based on these findings, a four-week Moodle-based program was developed, integrating core mental health videos, supplementary guidance materials, and individualized feedback linked to pre- and post-intervention stress assessments.

Upon registering on the platform, the participants first viewed an introductory video emphasizing the importance of both physical and mental health and providing instructions on how to navigate the platform. Students then engaged in a structured learning module beginning with an initial stress assessment. Based on the assessment results, each student received personalized content tailored to the identified mental health literacy components. The core instructional content consisted of four 8-minute videos covering hope, optimism, self-efficacy, and resilience and recovery after crisis, totaling 32 minutes. Additionally, three supplementary 7-minute videos were provided on higher education pathways, career planning, and personal goal-setting, adding 21 minutes of optional content. The entire program was designed for completion within approximately four weeks.

Upon completing the program, students underwent a post-intervention stress assessment. Those who remained in the very high stress category were given recommendations for further support, including referrals to adolescent psychological counseling services for continued monitoring, counseling, and recovery assistance.

Phase 3: Implementation and evaluation of the mental healthcare platform

In Phase 3, the implementation of the mental healthcare platform for high school students in Bangkok demonstrated a statistically significant reduction in stress levels following participation in the program. Before engaging with the platform, participants had a mean stress score of 17.30 (SD = 4.94; 95% CI: 15.45–19.15). Following the intervention, the mean stress score decreased to 13.20 (SD = 5.10; 95% CI: 11.30–15.30). A paired-sample t-test confirmed that this reduction was statistically significant ($p = 0.001$), with a mean difference of 4.10 points (95% CI: 2.29–5.91), as shown in Table 2. Although the intervention model is primarily intended for students experiencing mildly high to very high stress, these findings suggest that even students with normal stress levels can benefit from participation, since the program may provide preventive effects and reinforce mental health literacy.

Discussion

This study comprised a three-phase design aimed at assessing the mental health status of high school students in Bangkok, developing and implementing a targeted mental health promotion program via the Moodle Learning Management

System (LMS), and evaluating the effectiveness of the intervention in reducing participants' stress levels.

In Phase 1, the baseline assessment revealed that more than half of the students (52.50%) exhibited stress levels within the normal stress range. However, a significant proportion experienced elevated stress levels, with 23.80% reporting mildly high stress, 12.00% moderately high stress, and 9.50% very high stress. These findings align with previous studies, such as Pascoe,[11] which reported high stress levels among secondary school students, particularly during public health crises, and research by Rujirangseecharoen[12] and Polphichai,[13] which documented heightened stress among adolescents during the COVID-19 pandemic. The results highlight the urgent need for preventive mental health strategies in school settings and reflect broader trends among urban adolescents, where academic pressure, social expectations, and developmental transitions contribute to psychological distress, compounded by social isolation and remote learning.[14] Academic-related stress negatively affects learning, academic performance, and mental health, increasing the risk of depression, anxiety, and sleep disturbances, and if unaddressed, may lead to school dropout and reduced future employability, with broader social and economic consequences.[11] Moreover, personal factors such as family conflict, health concerns, and individual coping styles can further influence stress levels and overall mental well-being.[15,16]

The Phase 2 Moodle-based mental health promotion program demonstrated that structured, personalized interventions can effectively enhance adolescent mental health literacy and coping skills. By focusing on core components—hope, optimism, self-efficacy, and resilience after crises—the program builds psychological capital, equipping high school students with positive psychological resources to manage stress, overcome challenges, and achieve academic and personal goals. Strengthening psychological capital in adolescents is associated with reduced anxiety and depression, greater resilience, improved emotional well-being, higher motivation, better problem-solving abilities, and enhanced academic and social functioning.[17,18] Personalizing content based on initial stress assessments increased engagement, while supplementary modules on academic and career planning addressed common adolescent stressors. The flexible, self-paced design, along with early stress screening, self-awareness activities, and referral pathways, provided comprehensive support.[19] These findings suggest that integrating psychological capital into digital interventions can effectively promote resilience, reduce stress, and support overall mental health among high school students.

In Phase 3, the effectiveness of the platform was evaluated through pre- and post-intervention

assessments. The results indicate a statistically significant reduction in stress levels, with the mean stress score decreasing from 17.30 to 13.20, representing a mean difference of 4.10 points. These findings suggest that the intervention was effective in alleviating stress and enhancing mental well-being. The results support the use of digital platforms as practical tools for delivering school-based mental health interventions. This is especially relevant in light of the increasing integration of digital technologies in education, coupled with the need for scalable, cost-efficient mental health solutions for young populations. The platform's effectiveness is further supported by previous studies on digital mental health interventions, which highlight the value of digital tools in providing accessible, evidence-based, and user-friendly mental health support. Integrating such tools into school-based mental health systems not only improves access to care but also enhances early detection and response mechanisms.[20, 21] The program is designed to help decrease daily stressors, helping students gain knowledge and skills to care for their own mental health. It provides strategies for managing stress independently or guidance for students experiencing high stress, while equipping teachers and school counselors with tools to monitor and identify at-risk students through initial screenings, thereby strengthening the overall mental health support structure within educational institutions.

In conclusion, this study demonstrates that a structured, school-based digital mental health program delivered via the Moodle LMS can effectively enhance adolescent mental health literacy, strengthen psychological capital, and reduce stress among high school students in Bangkok. By targeting core components—hope, optimism, self-efficacy, and resilience—the intervention equipped students with positive psychological resources to manage daily stressors, overcome challenges, and achieve academic and personal goals.

The flexible, self-paced design, combined with personalized content and early stress screening, ensured accessibility and comprehensive support. These findings highlight the potential of integrating digital mental health interventions into school systems as a scalable strategy to support students, promote mental health, and foster resilience, emotional well-being, and long-term psychological development among high school adolescents.

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Conflict of Interest Disclosure

The authors declare that they have no conflicts of interest.

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