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Enhancing Efficiency and Reducing Stress in Pre-Medical Students through Hybrid Competency-Based Learning

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A B S T R A C T

Contemporary high school education presents various learning modalities, encompassing traditional in-class learning, distance learning incorporating online platforms, and e-learning. Amid the prevalent challenges posed by the COVID-19 pandemic, Hybrid Competency-Based Learning (HCBL) has emerged as a popular and effective educational approach. HCBL involves a combination of online e-learning (Ananga & Biney, 2017) and in-class instruction, augmented by hands-on activities in the medical field. This research aims to demonstrate the efficacy of HCBL in fostering successful learning outcomes and mitigating stress levels among students pursuing higher education in the medical domain. The findings reveal that HCBL not only enhances learning efficiency but also contributes significantly to stress reduction, particularly in the transition to university-level studies.

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INTRODUCTION

Pursuing university education in Thailand, especially in competitive fields such as medicine, often leads to heightened stress levels among students. This stress arises from the intense competition during university entrance exams (Thai University Central System, 2022) and continues into the first year of study. Consequently, a significant number of first-year students in medical and health science faculties experience stress-related challenges, including anxiety and depression. The researchers are motivated to explore preparatory strategies that can alleviate these issues for students entering medical and health science programs.

This three-year study focuses on collecting data from two main groups: students enrolled in preparatory courses for medical school entrance exams and the parents or guardians of these students. Data collection spans from the students' high school years (Grade 11-12) until their enrollment in university.

The research aims to identify effective readiness preparation methods (Mahlan, et.al, Wahab, 2022). that can mitigate stressors associated with the rigorous academic demands of medical and health science programs. By addressing these challenges, the study aims to contribute valuable insights to enhance the overall well-being and academic success of students pursuing higher education in these demanding fields.

LITERATURE REVIEW

1.1 In-Class Learning

The traditional mode of education where students attend physical classes in a school, college, or university setting. It involves face-to-face interaction between students and instructors within a physical classroom (Draper & Brown 2004; Banks 2003) or lecture hall. In-class learning typically includes lectures, discussions, group activities, and other forms of direct teacher-student and student-student engagement (Boud et al. 1999).

1.2 Distance Learning

Distance learning (Dangle & Sumaoang, 2020) has several advantages over in-person classroom training, which is why it is often referred to by a variety of different names. Effective online (Aggen,2012; Al Lily, Ismail, Abunasser, & Alhajhoj Alqahtani, 2020; Alhumaid, 2019; Nie,2020; Perri, 2016; Petrakou, 2010; Nickerson, 2012). instruction typically exhibits characteristics such as Distance learning allows learners to access educational materials and participate in classes from any location and at any time, accommodating individual schedules and preferences

1.3 Hybrid Competency-Based Learning (HCBL)

An educational model that integrates the flexibility and adaptability of hybrid learning with the competency-based approach (Martinez, 2020). In this context, students may engage in a mix of in-person and online learning experiences while advancing through their education based on demonstrated mastery of competencies.

Hybrid Learning: This refers to an educational approach that combines traditional face-to-face instruction with online or digital learning components (Alenezi,2020). Hybrid learning seeks to leverage the strengths of both in-person and online modalities to create a more flexible and personalized learning experience.

Competency-Based Learning (CBL): This approach focuses on students progressing through their education based on their mastery of specific skills or competencies (McGaghie, W. C., & Harris, I.B.,2018) rather than completing a fixed amount of time. It emphasizes personalized learning and allows students to advance at their own pace.

1.4 Stress Levels in University Education

Academic Stress: Explore how factors such as exams, assignments, workload, and academic expectations contribute to stress among university students (Bhujade, 2017).

Social Stress: Investigate the impact of social factors, including relationships, peer pressure, and social integration, on students' stress levels.

1.5 Learning Effectiveness

It is complex idea that may be measured in a number of ways, including students' enthusiasm for the course material, how much they learned, and how their performance and study habits changed as a result (Müller, Stahl, Alder, & Müller, 2018).

2. Materials

2.1. Research Setting: Sample Selection

High school students from Bangkok, Nonthaburi, and Samut Prakan with an interest in entering Medicine or Health Sciences from 2021 to 2023. Three groups of Sample:

2.1.1 Hybridge Competency-Based Learning Group (Group A):

Students following a hybrid competency-based learning approach, combining online learning (e-learning) with in-class instruction and practical activities such as internships in hospitals and emergency medical training.

Sample size: 115 students (46 Grade 11, 69 Grade 12).

2.1.2 In-Class Learning Group (Group B):

Students attending traditional in-class learning without practical training.

Sample size: 85 students (28 Grade 11, 57 Grade 12).

2.1.3 Distance Learning Group (Group C):

Students engaging in distance learning through online platforms such as Zoom and

e-learning, without in-person classes.

Sample size: 100 students (44 Grade 11, 56 Grade 12).

Table 1. Demographic details of participants (N = 300)

sample A		sample B		sample C	
grade 11	grade 12	grade 11	grade 12	grade 11	grade 12
46	69	28	57	44	56

METHODOLOGY

3.**Methodology**

Data collection involves pre-enrollment interviews, pre-exam academic performance data, and post-enrollment assessments, including grades after the first year of university. Quantitative and qualitative methods, including surveys and interviews, will be utilized.

The study seeks to understand how different preparatory approaches impact stress levels during exam preparation and the first year of university. The findings aim to provide insights into effective strategies to reduce stress and address mental health concerns among first-year students pursuing competitive degrees.

RESEARCH RESULT

The findings are meticulously presented and discussed, encompassing an in-depth analysis of the data derived from both the survey responses

4.1 Assessment of Intentions Before Entering Pre-Medical Preparation Programs

Objective:

To evaluate the level of academic intent on a scale of 0-10 among students before entering preparatory programs for medical studies. A score of 10 indicates the highest level of intent to pursue a medical degree.

Sample Groups:

Group A – Hybrid Competency-Based Learning

Grade 11 students: 46 samples

Average score: 7.2, Standard deviation: 2.1, Coefficient of variation: 0.292

Grade 12 students: 69 samples

Average score: 7.8, Standard deviation: 1.8, Coefficient of variation: 0.231

Group B - In-Class Learning:

Grade 11 students: 28 samples

Average score: 6.7, Standard deviation: 2.2, Coefficient of variation: 0.328

Grade 12 students: 57 samples

Average score: 7.8, Standard deviation: 1.4, Coefficient of variation: 0.179

Group C - Distance Learning:

Grade 11 students: 44 samples

Average score: 7.5, Standard deviation: 2.7, Coefficient of variation: 0.360

Grade 12 students: 56 samples

Average score: 8.0, Standard deviation: 2.3, Coefficient of variation: 0.288

Table 2. Descriptive results of the Assessment of Intentions (N = 300).

	sample A		sample B		sample C	
	grade 11	grade 12	grade 11	grade 12	grade 11	grade 12
score	7.2	7.8	6.7	7.8	7.5	8
sd.	2.1	1.8	2.2	1.4	2.7	2.3
c.v.	0.292	0.231	0.328	0.179	0.360	0.288
rank	5	3	6	2	4	1

Summary:

The results indicate that Grade 12 students interviewed for participation in preparatory programs for medical and health sciences have a higher level of academic intent compared to Grade 11 students across all learning groups. This is evidenced by their higher average scores and more reliable coefficients of variation. Among Grade 12 students, those in the online learning group exhibit the highest level of academic intent, with an average score of 8.0

4.2 Post-University Enrollment Survey

Post-Enrollment Questionnaire Results:
Achieving the Intended Faculty (Medicine or Health Sciences) on a Scale of 0-10:
Participants were asked to rate their success in entering the intended faculty, with 10 indicating successful admission to the intended faculty.
Sample Groups:

Group A – Hybrid Competency-Based Learning

Grade 11 students: 46 samples

Average score: 7.7, Standard deviation: 2.5, Coefficient of variation:0.325

Grade 12 students: 69 samples

Average score: 7.4, Standard deviation: 2.8, Coefficient of variation:0.378

Group B - In-Class Learning:

Grade 11 students: 28 samples

Average score: 7.5, Standard deviation: 2.3, Coefficient of variation:0.307

Grade 12 students: 57 samples

Average score: 6.8, Standard deviation: 2.6, Coefficient of variation:0.382

Group C - Distance Learning:

Grade 11 students: 44 samples

Average score: 6.5, Standard deviation: 2.3, Coefficient of variation:0.354

Grade 12 students: 56 samples

Average score: 6.3, Standard deviation: 2.8, Coefficient of variation:0.444

Table 3. Descriptive results of the Achieving the Intended Faculty (N = 300).

	sample A		sample B		sample C	
	grade 11	grade 12	grade 11	grade 12	grade 11	grade 12
score	7.7	7.4	7.5	6.8	6.5	6.3
sd.	2.5	2.8	2.3	2.6	2.3	2.8
c.v.	0.325	0.378	0.307	0.382	0.354	0.444
rank	1	3	2	4	5	6

Summary:

The results indicate that Grade 11 and Grade 12 students in Group A have relatively higher scores in achieving admission to their intended faculty compared to those in Groups B and C. The averages range from 6.3 to 7.7

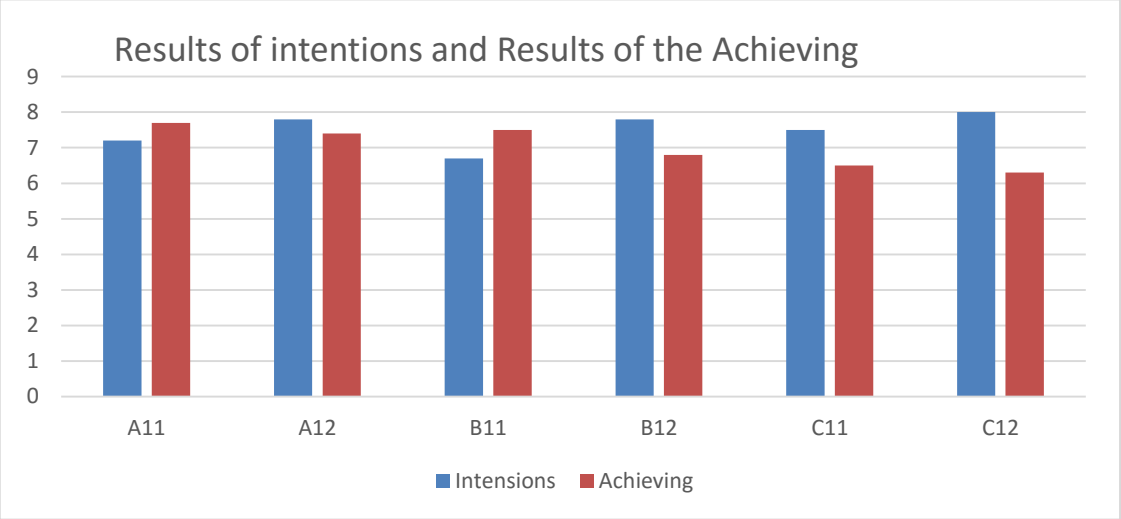
Group A (Hybrid Competency-Based Learning) exhibits relatively higher success scores for both Grade 11 and Grade 12 students compared to other groups.

Group B (In-Class Learning) shows a decline in average scores from Grade 11 to Grade 12, with a notable increase in the coefficient of variation.

Group C (Distance Learning) has the lowest average scores in both Grade 11 and Grade 12, indicating comparatively lower success in entering the intended faculty.

These findings suggest that Hybrid Competency-Based Learning may positively influence successful admission to the intended faculty, while Distance Learning shows lower success rates. The decline in scores for In-Class Learning from Grade 11 to Grade 12 warrants further investigation. Additional factors contributing to these outcomes could be explored for a comprehensive understanding of the observed patterns.

Figure1. Results of intentions and results of achieving.



4.3 Stress Levels in First-Year University Students

Post-Enrollment Stress Assessment (Scale 0-10, 10 being the Highest Stress Level):
Sample Groups:

Group A – Hybrid Competency-Based Learning

Grade 11 students: 46 samples

Average stress score: 3.2, Standard deviation: 1.8, Coefficient of variation:0.563

Grade 12 students: 69 samples

Average stress score: 3.6, Standard deviation: 2.7, Coefficient of variation:0.750

Group B - In-Class Learning:

Grade 11 students: 28 samples

Average stress score: 5.5, Standard deviation: 2.7, Coefficient of variation:0.491

Grade 12 students: 57 samples

Average stress score: 5.7, Standard deviation: 2.5, Coefficient of variation:0.439

Group C - Distance Learning:

Grade 11 students: 44 samples

Average stress score: 5.6, Standard deviation: 2.3, Coefficient of variation:0.411

Grade 12 students: 56 samples

Average stress score: 6.1, Standard deviation: 2.1, Coefficient of variation:0.344

Table 4. Descriptive results of the Stress Levels in First-Year University Students
(N = 300).

	sample A		sample B		sample C	
	grade 11	grade 12	grade 11	grade 12	grade 11	grade 12
score	3.2	3.6	5.5	5.7	5.6	6.1
sd.	1.8	2.7	2.7	2.5	2.3	2.1
c.v.	0.563	0.750	0.491	0.439	0.411	0.344
rank	1	2	3	5	4	6

Summary:

The findings reveal varying stress levels among first-year university students. In Group A, Grade 12 students exhibit slightly higher stress scores than Grade 11 counterparts. Group B and Group C, on the other hand, show higher average stress scores, indicating elevated stress levels in their first year.

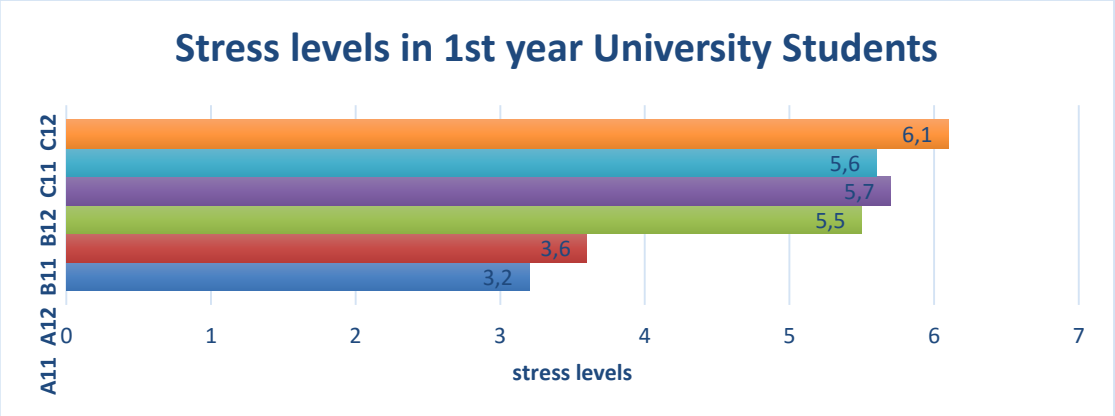
Group A (Hybrid Competency-Based Learning) displays lower stress levels for both Grade 11 and Grade 12 students compared to other groups.

Group B (In-Class Learning) and Group C (Distance Learning) show higher average stress scores, with Group C experiencing a notable increase from Grade 11 to Grade 12.

While stress levels tend to rise across groups from Grade 11 to Grade 12, the increase is comparatively lower in Group A.

These findings suggest that Hybrid Competency-Based Learning may contribute to lower stress levels during the first year of university, potentially providing insights into effective stress management strategies in higher education. Further investigation into the factors influencing stress levels and coping mechanisms in different learning environments could enhance the comprehensiveness of the study.

Figure2. Stress levels in 1st year University students



4.4 Desire for Change in College Major

Desire for Changing College Major (Scale 0-10, 10 being the Highest Desire for Change):

Group A – Hybrid Competency-Based Learning

Grade 11 students: 46 samples

Average score: 2.2, Standard deviation: 0.9, Coefficient of variation: 0.409

Grade 12 students: 69 samples

Average score: 2.6, Standard deviation: 0.9, Coefficient of variation: 0.346

Group B - In-Class Learning:

Grade 11 students: 28 samples

Average score: 3.4, Standard deviation: 1.7, Coefficient of variation: 0.500

Grade 12 students: 57 samples

Average score: 3.6, Standard deviation: 1.5, Coefficient of variation: 0.417

Group C - Distance Learning:

Grade 11 students: 44 samples

Average score: 3.6, Standard deviation: 2.1, Coefficient of variation: 0.583

Grade 12 students: 56 samples

Average score: 5.1, Standard deviation: 2.9, Coefficient of variation: 0.569

Table 5. Descriptive results of the Desire for Change in University Major (N = 300).

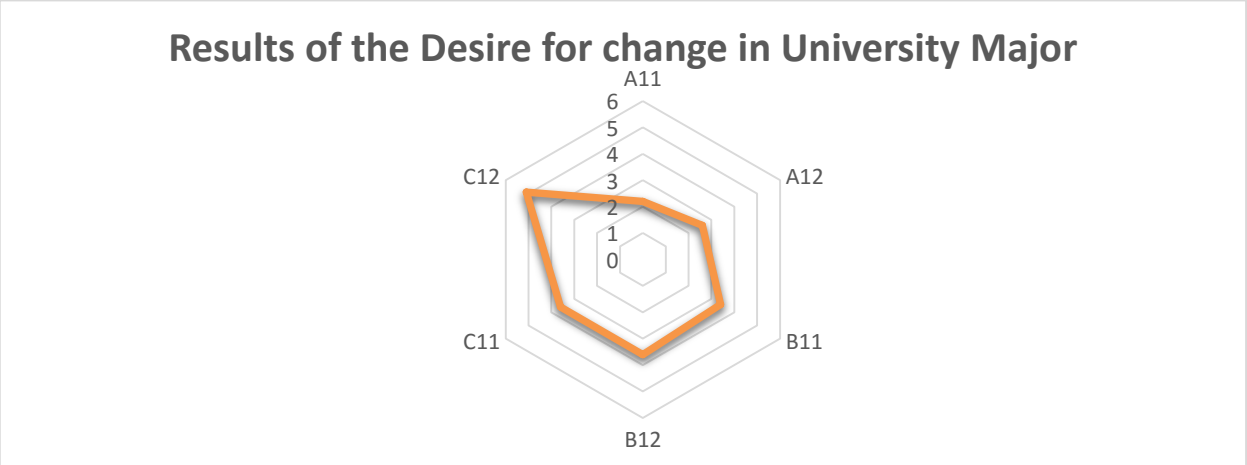
	sample A		sample B		sample C	
	grade 11	grade 12	grade 11	grade 12	grade 11	grade 12
score	2.2	2.6	3.4	3.6	3.6	5.1
sd.	0.9	0.9	1.7	1.5	2.1	2.9
c.v.	0.409	0.346	0.500	0.417	0.583	0.569
rank	1	2	3	4	5	6

Summary:

The findings from the data shed light on how different groups feel about switching university majors. Among these groups, Group C, especially Grade 12 students, stands out with the highest average score, suggesting a greater tendency to consider changing majors. The coefficients of variation point to significant differences in attitudes within each group, indicating diverse perspectives on the desire for major changes. Interestingly, Group A, who

undergoes Hybrid Competency-Based Learning, shows the least inclination to switch majors. This trend may stem from their focused learning approach, which emphasizes skill development and real-world application throughout high school.

Figure 3. Results of the Desire for change in University Major



DISCUSSION

This research, conducted over a span of two years for Grade 12 students and three years for Grade 11 students, reveals several key insights. Firstly, the intention to join the university preparation program doesn't necessarily correlate with performance in entrance exams across all sample groups. Hybrid competency-based learning, particularly in Group A, facilitated better understanding and effectiveness in preparing for medical school entrance exams.

Moreover, starting the Hybrid competency-based learning approach from Grade 11 not only aligned with students' study preferences but also significantly reduced stress levels in transitioning to university. The study indicates a trend among Hybrid competency-based learning students to have less inclination to change majors and a better understanding of professional learning pathways before entering university.

CONCLUSIONS AND RECOMMENDATIONS

Summary of Research Findings:

Prior to participating in the medical school preparation program, it was observed that Grade 12 students in all three sample groups (A, B, C) exhibited higher levels of intention to pursue medical studies compared to Grade 11 students across all three groups. Interestingly, Grade 12 students in Group C, who exclusively engaged in online learning through platforms like Zoom and E-learning (Mafruudloh, Arifatin, & Chasanah,2021), demonstrated the highest level of intention with a score of 8.0, while Grade 11 students in Group B (IN-CLASS learning) showed the lowest intention with a score of 6.7.

Following admission to university, it was found that students who joined the preparation program since Grade 11 expressed higher satisfaction levels with the intended college major compared to Grade 12 students in each sample group. Moreover, Grade 12 students in Group A, following a Hybrid competency-based learning approach, exhibited higher satisfaction compared to their counterparts in Groups B and C.

When assessing stress levels (Reilly, 2018) during the first year of university, it was observed that Grade 12 students in Group A (Hybrid competency-based learning) experienced lower stress levels compared to Grade 11 students in Group B and Group C.

Examining the desire for changing majors, students in Group A (Hybrid competency-based learning) expressed the lowest inclination to change majors. On the contrary, Group C, comprising students learning exclusively online (through Zoom and E-learning), exhibited the highest desire to change majors when compared to students in the same grade level.

The question arising from these findings is how to optimize the effectiveness of Hybrid competency-based learning, and whether initiating this approach at a particular grade level would yield the best results.

This summary provides an overview of the research, emphasizing the significant findings and opening avenues for further discussion. If you have specific aspects to highlight or elaborate on, feel free to provide additional details.

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