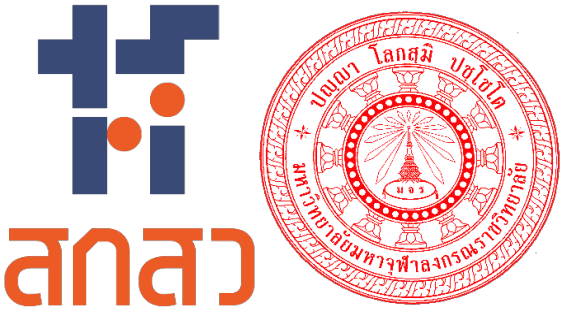

Research Report

Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People

BY

Dr. Nadnapang Phophichit

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Phramaha Weerasak Abhinandavedi, Dr.

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B.E. 2567

Research Project Funded

By Thailand Science Research and Innovation Fund

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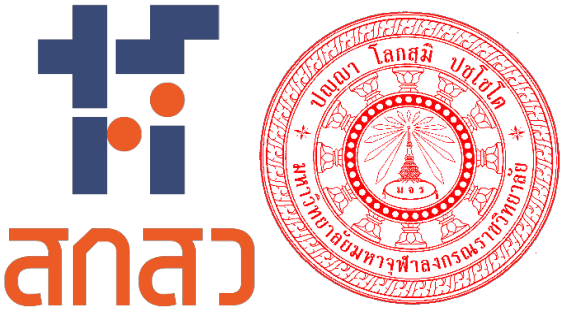

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Research Title:	Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People
Researchers:	Dr. Nadnapang Phophichit, Phramaha Phuen Kittisobhano, Asst. Prof. Dr., Phramaha Weerasak Abhinandavedi, Dr., Phramaha Nuntawit Dhirabhaddo, Dr., Mr. Nopadol Penprachoom
Department:	International Buddhist Studies College, Mahachulalongkornrajavidyalaya University
Fiscal Year:	2567/2024
Research Scholarship Sponsor:	Mahachulalongkornrajavidyalaya University

Abstract

This research, titled "Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People," aimed to: 1) develop and 2) evaluate the effectiveness of an innovative chatbot system, SabaiJai, designed to enhance stress resilience in working-aged individuals; 3) examine the impact of the stress resilience-enhancing intervention delivered via SabaiJai by comparing stress resilience levels between an experimental group using the chatbot and a control group without access to the intervention, both at pretest and posttest stages.

Employing a mixed-methods approach, the study included a literature review, expert interviews with mental health professionals (n=4) and Buddhist scholars (n=8), and a user needs assessment (n=100). SabaiJai, delivered via the LINE messaging platform, integrates psychoeducation, a 10-day structured intervention, and an AI-driven chat feature powered by GPT-4o. The chatbot uniquely blends Edith Grotberg's resilience model ("I Have," "I Am," "I Can") with the Five Spiritual Powers (*pañcabala*) from Buddhist teachings—faith (*saddhā*), effort (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*).

In a pilot test, 32 experimental participants showed a slight decrease in stress levels (mean reduction of 0.27 points on ST-5, $p=0.07$) and a slight increase in resilience (mean increase of 2.2 points on RQ, $p=0.06$) post-intervention, though these changes were not statistically significant ($p<0.05$). The control group ($n=32$) exhibited no meaningful changes ($p=0.18$ for stress, $p=0.88$ for resilience). User feedback ($n=32$) was overwhelmingly positive, with average ratings of 4.2 for efficiency, 4.0 for accuracy, and 4.1 for user-friendliness on a 5-point scale, reflecting strong engagement with the culturally adapted approach.

While the intervention demonstrates potential, the lack of statistical significance suggests the need for larger sample sizes and further refinement. This study underscores the promise of AI-assisted, culturally sensitive digital interventions for mental health and provides a foundation for future research into scalable, context-specific resilience tool.

Acknowledgement

The research work on “Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People” has been successfully completed through diligent efforts and the generous support of many individuals. Without their support, this research would not have been possible, and I extend my sincere appreciation and gratitude to them.

First and foremost, I am deeply thankful for the enduring wisdom of the Buddha, whose teachings on mindfulness, resilience, and mental well-being served as the cornerstone of this study. This integration of Buddhist psychology with modern technology owes much to this profound inspiration.

Moreover, I would like to express my deepest gratitude to the Thailand Science Research and Innovation (TSRI) for providing the essential research funds that enabled this project. Their financial support was fundamental to the development and execution of this innovative study.

I extend heartfelt thanks to the executives and staff of the Buddhist Research Institute at MCU for their kindness and invaluable assistance. Deep gratitude is also expressed to the senior experts and committee members of the institute for their insightful suggestions, which proved instrumental in achieving the research objectives.

I would also like to acknowledge the significant contributions of my research team and the software engineer, whose expertise, dedication, and collaborative efforts greatly enriched this project. Their commitment was vital to enhancing the quality and impact of the research.

In closing, I wish to dedicate any merit arising from this research to those who offered kind support throughout the process.

Dr. Nadnapang Phophichit
Head of the Research Project
September 2024

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List of Symbols and Abbreviations

The Abbreviations are used in this Research Report for reference:

A. Abbreviations for the Original Texts

A	Aṅguttaranikāya
Abhidh-s	Abhidhammattha-saṅgaha
D	Dīgha-nikāya
Dhs	Dhammasaṅgaṇī
S	Saṃyutta-nikāya

B. Scholarly Abbreviations

AI	Artificial Intelligence
B.E	Buddhist Era (appears “before” the date)
C.E	Common Era (appears “after the date)
Ed./(Eds)	Edited by/ Editor(s)
e.g.	exempli gratia/ for example
et al.	et alii or et alia, and others
ibid.	Ibiden/ in the same book or place which has been “cited just before”
loc. cit.	loco citato, in the same cited
p./pp.	Page/pages
SREI	Stress Resilience-Enhancing Intervention
SRT	Stress Resilience Test Questionnaire
ST-5	Stress Test Questionnaire
Tr./trs.	Translated by/ Translator(s)
Vol.	Volume

Chapter 1

Introduction

1.1 Background and Significance of the Problems

In recent years, the global workforce has experienced heightened levels of stress, impacting the mental well-being of working-aged individuals. Addressing this concern is crucial, and innovative approaches are warranted. According to the World Health Organization (WHO), poor working conditions, encompassing factors such as discrimination, inequality, excessive workloads, low job control, and job insecurity, can significantly impact mental health. In 2019, the WHO reported that an estimated 15% of working-age adults worldwide had a mental disorder. Work-related stress and mental health issues contribute substantially to global productivity losses, with an astounding estimated 12 billion working days lost each year due to depression and anxiety. This loss amounts to a staggering US$ 1 trillion annually.[1] The significance of mental health at the workplace is underscored by the fact that psychological illnesses constitute the leading global cause of disability.

In the specific context of Thailand, the National Statistical Office, Ministry of Information and Communication Technology[2], highlights that in 2022, working-aged people between 25-60 years constitute the largest segment of the population in the country. This demographic is vital to the nation's productivity and economic stability, making the mental health of this group a matter of paramount importance.

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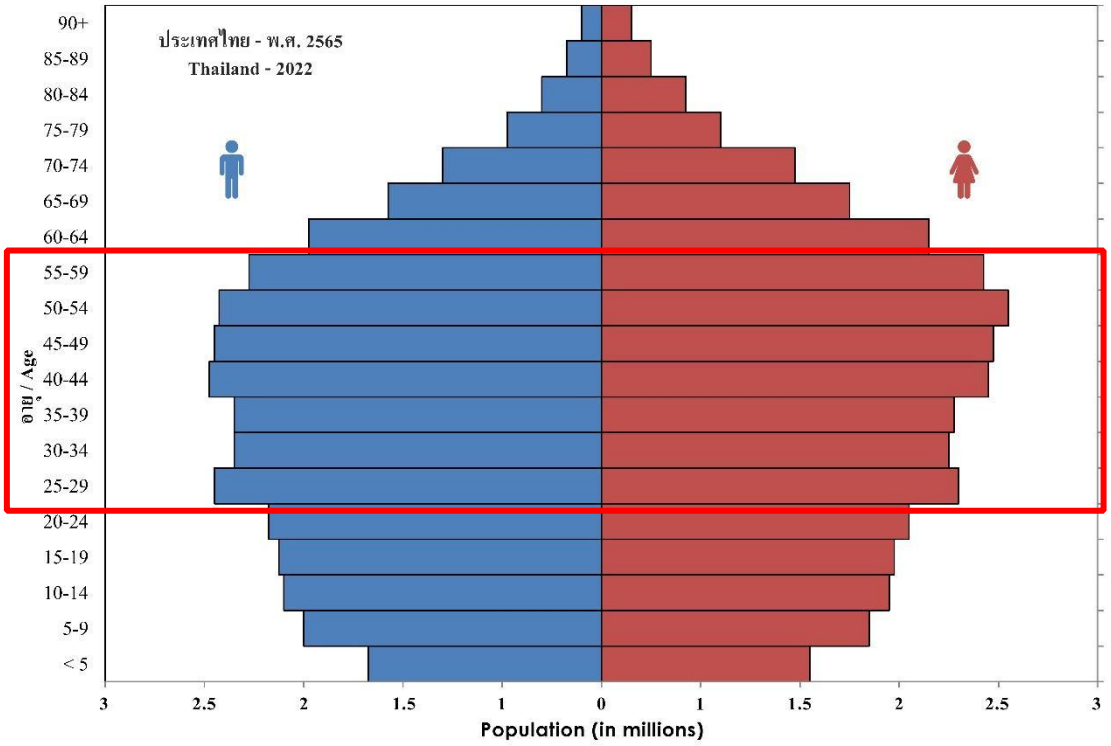
[1] World Health Organization, "Mental Health at Work", https://www.who.int/news-room/fact-sheets/detail/mental-health-at-work (accessed May 15, 2023).

[2] National Statistical Office Thailand, Ministry of Information and Communication Technology, "Thai Population 2022", https://www.boi.go.th/index.php?page = demographic (accessed May 15, 2023).

Figure 1.1 Pyramid of Thailand's Population 2022



Workplace stress can affect our personal lives, and vice versa. Heavy workloads, tight deadlines, financial demands, a lack of empathy in the office, and overbearing employers are frequently the main sources of stress in people's life. Problems including headaches, high blood pressure, heart issues, diabetes, skin disorders, asthma, arthritis, depression, and anxiety can all be attributed to stress. Both physical and mental health can be negatively affected by stress.

Resilience is commonly defined as an ability to recover from setbacks, the quality of bouncing back. Resilience is uneven. A person might be highly resilient in one aspect of life and need much higher levels of support in another.[3] It is important to give priority to physical and mental health problems, and to solve other problems that may occur.

[3] Ginsburg and Jablow, *Building Resilience in Children and Teens*, 3rd Edition, (Illinois: American Academy of Pediatricts, 2015), p. 4.

A previous studies of hospital patients and people who experience trauma states that the core teachings of Buddhism offer each practitioner a path to resilience.[4] Peres et al.[5] reviewed research on religiousness and resilience. The result showed that one of the factors which has been investigated relative to resilience is religious or spiritual aspect. D.A. Pardini et al[6] examined the potential value of religious faith and spirituality in the lives of individuals suffering from a variety of acute and chronic illnesses. The results indicated that among recovering individuals, higher levels of religious faith and spirituality were associated with a more optimistic life orientation, greater perceived social support, higher resilience to stress, and lower levels of anxiety.

Stress is an unavoidable part of life, ranging from everyday stressors such as work deadlines and family responsibilities to more severe stressors including physical or mental health issues. Resilience can be defined broadly as the capacity to bounce back from difficulties that are an unavoidable part of life. Each person has a unique way of handling stress. The ability to recognize when a situation has become difficult or painful and to decide on a response that leads to growth is known as stress resilience. According to the American Psychological Association, stress resilience is "the process of adapting well in the face of adversity, trauma, tragedy, or threats or significant sources of stress such as family and relationship problems, serious health problems, or workplace and financial stressors." Stress resilience can help individuals to bounce back more quickly from stressful situations that are an inevitable part of life.

However, the fear of the stigma associated with mental health prevents many people who are suffering from the condition from seeking treatment in a clinic or hospital, especially in Thailand. Global tech companies are fusing artificial

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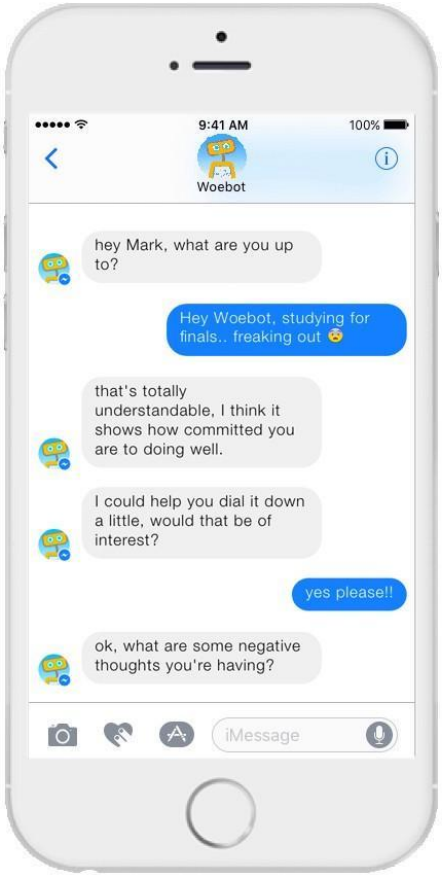
[4] Julia Aegerter, *Resilience: What's Buddhism Got to Do with It?,* (USA: Upaya Zen Center, 2012), p. 21.

[5] F. P. Julio Peres et al., "Spirituality and Resilience in Trauma Victims," *Journal of Religion and Health*, Vol. 46 No. 3 (September 2007): 343-350.

[6] D.A. Pardini et al, "Religious Faith and Spirituality in Substance Abuse Recovery: Determining the Mental Health Benefits," *Journal of Substance Abuse Treatment*, Vol. 19 No. 4 (December 2000): 347-354.

intelligence's strength with the portability of smartphones to develop chatbots designed to assist individuals with mental health issues. Mental health chatbots are a type of Artificial Intelligence (AI) that are designed to help individuals with mental health. Digital wellness tools like mental health chatbots have been widely used in mental health care provision.

Figure 1.2 Mental Health Chatbot System on a Mobile Device



Nowadays, the healthcare industry makes extensive use of artificial intelligence (AI). It is widely used to raise people's quality of life around the world. AI is utilized in hospitals, for instance, to track patients' vital signs, predict the likelihood that they will contract diseases, and even to support surgeons during operations.

Millions of people have chosen Buddhism as a therapeutic approach over the past 2,500 years, yet psychological research on the Buddhist Psychology for building stress resilience is lacking. Therefore, this research aims to develop, implement, and propose the chatbot system that serves as a virtual assistant and provides working-aged

people with stress issues individualized support to enhance stress resilience based on Buddhist Psychology.

To date, there has been little research into resilience concerning influential factors in religious faith and spirituality that enables resilience. Resilience is important because as positive psychology explains it is the human capacity to face, overcome, and be strengthened by (or even transformed by) the challenges of life. For this reason, this research attempts to investigate the concepts of resilience and practical ways to develop an innovative chatbot system for enhancing stress resilience based on Buddhist Psychology.

1.2 Research Questions

1.2.1 What are the key features and components of the innovative chatbot system designed to enhance stress resilience in working-aged individuals based on Buddhist Psychology?

1.2.2 How effective is the innovative chatbot system in enhancing stress resilience among working-aged individuals, and what are the perceived strengths and limitations of the system?

1.2.3 In what ways does the stress resilience-enhancing intervention, delivered via the innovative chatbot system, impact stress resilience levels when compared to a control group without access to the intervention?

1.2.4 What are the unique contributions of the chatbot system in building stress resilience, and how do these interventions differ in their effectiveness?

1.2.5 How do stress resilience levels vary across the pretest, posttest stages for the experimental group using the chatbot system and the control group without access to the system?

1.3 Objectives of the Research

1.3.1 To develop an innovative chatbot system for enhancing stress resilience based on Buddhist Psychology in working-aged people and evaluate the effectiveness of the chatbot system.

1.3.2 To examine the impact of the stress resilience-enhancing intervention delivered via the innovative chatbot system by comparing stress resilience levels between the experimental group using the chatbot system and the control group without access to the intervention.

1.3.3 To compare stress resilience levels at the pretest and posttest stages between the experimental and control groups.

1.4 Scope of Research

1.4.1 Scope of Content

Qualitative data

In the early stage of the study, the research covers primary and secondary sources of data from both literature review and in-depth interviews. The concept of stress resilience regarding the western psychological paradigm will be investigated through the literature review and in-depth interviews. The influential factors in Buddhism and Psychology for enhancing stress resilience of working-aged people obtained from the in-depth interviews will be further investigated through the primary sources of English translations of Tipiṭaka, the secondary sources of commentaries, textbooks, research works, and Buddhist journals. This is to survey the viewpoint from the related literatures in detailed explanation for clearer comprehension.

Quantitative data

In the second stage of the study, data obtained from the qualitative approach were utilized to develop content for the Stress Resilience-Enhancing Intervention delivered via Chatbot Innovation (@sabaijaibot) hosted on the Line as the research instrument used in the quantitative approach in the second stage. Statistics employed in this research included percentage, mean ($\bar{x}$), standard deviation (S.D.), independent t-test, and paired t-test.

1.4.2 Scope of Variables

The current study involves the following independent and dependent variables:

Independent Variables

Resilience-Enhancing Intervention delivered via SabaiJai – a Buddhist AI Chatbot Innovation for Enhancing Stress Resilience in Thailand's Working-Aged Population, based on:

1. Grotberg's Resilience Model (Psychological Resilience Theory), emphasizing:
   - "I Have" – External resources such as social support and relationships
   - "I Am" – Inner qualities such as self-esteem and personal resilience
   - "I Can" – A person's internal abilities to cope with challenges
2. The Five Spiritual Powers (*Pañcabalā*) in Buddhist Psychology, which include:
   - Faith (*Saddhā*) – Confidence in one's ability to cope
   - Energy (*Viriya*) – Effort and perseverance in overcoming stress
   - Mindfulness (*Sati*) – Awareness and present-moment focus
   - Concentration (*Samādhi*) – Stability and mental clarity
   - Wisdom (*Paññā*) – Insight into reality and stress resilience

The intervention is delivered via the SabaiJai chatbot (@sabaijaibot), accessible on the Line application.

Dependent Variable

The dependent variable in this study is the stress and resilience levels of Thai working-aged individuals, assessed through a comprehensive measurement tool. Stress resilience is evaluated using two key measurements:

1. The Stress Test Questionnaire (ST-5), developed by the Department of Mental Health, Ministry of Public Health, Thailand, assesses stress levels, where a lower score indicates a reduction in stress.

2. The Resilience Assessment, also developed by the Department of Mental Health, Ministry of Public Health, Thailand, measures resilience levels, with a higher score indicating increase in resilience and enhanced capacity to adapt and thrive under stress.

Together, these assessments provide a comprehensive evaluation of an individual's stress resilience levels at both the pretest and posttest stages of the study.

1.4.3 Scope of Population and Key Informants

Qualitative Research

In the first stage of the research, 14 key-informants were selected by using purposive sampling.[7] The key-informants are experts who are highly knowledgeable about or involved with Buddhism, psychology, stress management, resilience, and mental health chatbot creator/developer. In-dept interviews are conducted with 2 groups of key-informants as stated in table 1.1.

Table 1.1 Key Informants

Group	Key informants	Total Number (Persons)
1	Buddhist Scholars	10
2	Modern Psychologists and Stress Resilience Experts	4
Total		14

Quantitative Research

In the second stage of the research, the sampled group comprises 64 working-aged individuals aged between 25 and 60 years in Thailand who meet the inclusion criteria. They were randomly divided into two groups: the first experimental group using the chatbot system (n=32), and the control group without access to the intervention (n=32).

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[7] W. Lawrence Neuman, *Social Research Methods: Qualitative and Quantitative Approaches*, 6th Edition, (USA: Pearson Education, 2006), p. 222.

1.4.4 Scope of Area Studies

The area for researching in this research is in Thailand.

1.4.5 Scope of Time

This research will be conducted during December 2023 – August 2024.

1.5 Research Hypotheses

1.5.1 Hypothesis 1: The stress resilience levels of the experimental group using the chatbot system will show a significant positive change compared to the stress resilience levels of the control group without access to the intervention.

1.5.2 Hypothesis 2: The stress resilience levels of the experimental group using the chatbot system will be significantly higher at the posttest stage.

1.6 Definitions of the Terms

1.6.1 **Chatbot Innovation (@sabaijaibot)** means a chatbot system hosted on the Line application under the ID name "@sabaijaibot." This innovative system comprises four main menus, namely the Screening Test (ST-5), Psychoeducation, the Stress Resilience-Enhancing Intervention, and the Stress Resilience Levels Test. Through natural language processing and artificial intelligence, this chatbot aims to engage users in conversation, provide psychoeducation on stress resilience, deliver targeted interventions, and assess stress resilience levels. This Line-based chatbot is a central component of the research designed to enhance stress resilience based on Buddhist Psychology in Thailand's working-aged population.

1.6.2 **Stress Resilience** means the ability to withstand, recover, and grow in the face of stressors and changing demands.

1.6.3 **Buddhist Psychology** refers to the psychological principles and practices derived from Buddhist teachings, which aim to enhance stress resilience levels. Specifically, the Five Spiritual Powers (*pañcabala*)—faith (*saddhā*), energy (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*)—are the core principles of Buddhist psychology utilized to develop the intervention in this study. These powers are essential for cultivating a tranquil mind and gaining insight into the nature of reality, thereby enhancing stress resilience. Within the framework of Buddhist

psychology, these powers are understood as mental factors (*cetasika*) that play a crucial role in mental strength and stress resilience.

1.6.4 **Enhancing Stress Resilience** means the process of improving an individual's ability to withstand and recover from stressors, fostering adaptive coping mechanisms and emotional well-being.

1.6.5 **Working-Aged People** means Thai individuals within the age range typically associated with the workforce, aged between 25 and 60 years old.

1.6.6 **ST-5** stands for Stress Test Questionnaire developed by Department of Mental Health, Ministry of Public Health, the ST-5 is a 5-item stress measurement questionnaire designed to assess symptoms or feelings experienced over the past 4-2 weeks. This questionnaire serves as a screening test for evaluating stress levels of participants.

1.6.7 **Stress Resilience Levels** refer to an individual's ability to withstand, recover, and grow in response to stressors and changing demands. In this study, stress resilience is assessed using two key measurements. The Stress Test Questionnaire (ST-5), developed by the Department of Mental Health, Ministry of Public Health, Thailand, evaluates stress levels, where a lower score indicates a reduction in stress. The Resilience Assessment, also developed by the Department of Mental Health, Ministry of Public Health, Thailand, measures psychological resilience, with a higher score reflecting an enhanced capacity to adapt and thrive under stress. Together, these measures provide a comprehensive assessment of an individual's stress resilience levels in this study.

1.6.8 **SREI** (Stress Resilience-Enhancing Intervention) refers to a 10-day intervention program designed to enhance stress resilience. It is delivered via the LINE messaging platform, utilizing the SabaiJai AI avatar. The program incorporates psychoeducation, structured activities, and an AI-driven free chat feature powered by GPT-4o, aimed at improving users' ability to withstand, recover, and grow in response to stressors.

1.6.9 **SabaiJai** refers to refers to an AI avatar within the SabaiJaibot LINE application, designed to deliver a 10-day stress resilience intervention program and

provide continuous user interaction through a 24/7 chat feature. The persona of SabaiJai was developed based on a user survey and represents adults aged 25-35 years. It is designed to be empathetic, interactive, playful, educational, and supportive, ensuring an engaging and personalized user experience. Through these attributes, SabaiJai actively guides users in stress resilience-building activities while offering real-time responses and psychological support within the SabaiJaibot LINE application.

1.6.10 **Effectiveness of the Chatbot System** means the effectiveness of the chatbot innovation in five dimensions, including Effectiveness, Efficiency, Content Coverage, Accuracy of Information, Knowledge Acquisition, and User-Friendliness

1.6.11 **Experimental Group** means a group of 32 participants who meet the inclusion criteria, exposed to the stress resilience-enhancing intervention through the chatbot system (@sabaijaibot) on the Line application with the ID name "@sabaijaibot". This group is used for the purpose of assessing the intervention's impact on stress resilience levels.

1.6.11 **Control Group** means a group of 32 participants who meet the inclusion criteria and are not exposed to any stress resilience-enhancing intervention. The Control Group does not receive any intervention.

1.7 Expected Benefits

1.7.1 The development of an innovative chatbot system based on Buddhist Psychology is anticipated to contribute to enhanced stress resilience among Thai working-aged individuals.

1.7.2 The chatbot system serves as an accessible resource, providing stress resilience-enhancing interventions. This accessibility may empower users to proactively manage stress in their daily lives.

1.7.3 The research aims to provide insights into the comparative effectiveness of stress resilience interventions delivered via the chatbot system, and a control group. This information can guide future interventions and resource allocation.

1.7.4 The research contributes to the innovation of mental health support by leveraging technology (chatbot system) to deliver stress resilience interventions. This can pave the way for novel approaches in mental health care.

1.7.5 Positive outcomes from the chatbot system can validate its effectiveness as an intervention tool, potentially expanding its application in promoting mental health and stress resilience.

1.7.6 The research outcomes contribute to the scientific knowledge of stress resilience interventions, particularly in the context of Buddhist Psychology. This can benefit both researchers and practitioners in the field of mental health.

1.7.7 Analyzing user experiences with the chatbot system provides insights into user preferences for stress resilience interventions. This understanding can inform the design of future interventions to align with user needs.

1.7.8 Positive results may open avenues for replicating and implementing similar interventions in different populations or settings, broadening the potential impact on stress resilience enhancement.

Chapter 2

Related Concepts, Theories, and Research Works

To achieve the research objectives, relevant documents, concepts, and theories concerning innovation, chatbot, and stress resilience in working-aged people are investigated. This exploration encompasses textbooks, research works, and journals. The data collection focuses on the concepts of resilience in Gortberg's theory and the core teachings of Buddhism regarding resilience. The review of related literature is listed as follows:

2.1 Innovation

- 2.1.1 Definitions and conceptualizations of innovation
- 2.1.2 Significance of Innovation
- 2.1.3 Types of Innovation
- 2.1.4 Innovations in Stress Resilience Programs

2.2 Chatbot

- 2.2.1 Overview of Chatbot
- 2.2.2 Historical Development
- 2.2.3 Classification of Chatbots
- 2.2.4 Types of Chatbot
- 2.2.5 A Comparative Analysis of Chatbots
- 2.2.6 Chatbot-Based Mental Health Interventions

2.3 The Concept of Stress Resilience in Working-Aged People

- 2.3.1 Definition of resilience
- 2.3.2 Development of the concept of resilience
- 2.3.3 Main idea of Grotberg's theory of resilience
- 2.3.4 Resilience in Working-Aged Individuals
- 2.3.5 Stress and Resilience in the Workplace

2.4 Buddhist Psychology on Stress Resilience

2.4.1 Concepts of The Five Powers (*Pañcabala*) in Buddhist Psychology

2.4.2 Application and Case studies

2.5 Interventions for Enhancing Stress Resilience

2.5.1 Modern Psychology Approaches

2.5.2 Buddhist Psychology Approaches

2.6 Integration of Buddhist Psychological Principles in Stress Resilience Interventions

2.7 Relevant research

2.8 Conceptual framework

2.1 Innovation

2.1.1 Definitions and conceptualizations of innovation

Innovation, a central concept in contemporary discourse across various fields, encompasses the development and application of novel ideas, processes, products, or services that result in significant improvements or advancements. This multifaceted term has been approached and defined in various ways within the literature.

Numerous definitions of innovation are employed across diverse sectors, including academia, industry, government, and service provision. The extensive range of literature and terminology related to innovation contributes to diverse interpretations and perspectives on fundamental concepts surrounding its meaning. S. P. Taylor has conducted studies, presenting a sample of various innovation definitions found in the existing literature, as outlined in the table below.

Table 2.1 A Sample of Different Definitions of Innovation in the Existing Literature.[1]

No.	Definition	Justification
1.	Creation of new combinations of existing resources	Schumpeter recognized the importance of innovation in the 1930s
2.	Implementation of a new or significantly improved product (good/service) or process (method/practice/relationship)	International guidelines for proposed definition

[1] S. P. Taylor, "What Is Innovation? A Study of the Definitions, Academic Models and Applicability of Innovation to an Example of Social Housing in England," *Open Journal of Social Sciences*, Vol. 5 No. 11 (2017): 128-146.

Table 2.1 A Sample of Different Definitions of Innovation in the Existing Literature.[2] (Cont.)

No.	Definition	Justification
3.	Innovation is the creation and implementation of new processes, products, services and methods of delivery which result in significant improvements in outcomes, efficiency, effectiveness or quality	A widening of the definition
4.	The successful exploitation of new ideas or ones that are adopted from other sectors or organizations'	The UK government's definition of innovation
5.	Creation and application of good ideas	Australian National Audit Office (ANAO) definition
6.	A continuous and dynamic process in which ideas are transformed into value	This definition includes value as a part of innovation
7.	The successful introduction of new services, products, processes, business models and ways of working	The Economic and Social Research Council (ESRC) includes business models and ways of working in the definition
8.	The development (generation) and/or use (adaption) of new ideas or behaviors	This definition includes behaviors as well as ideas

[2] S. P. Taylor, "What Is Innovation? A Study of the Definitions, Academic Models and Applicability of Innovation to an Example of Social Housing in England," *Open Journal of Social Sciences*, Vol. 5 No. 11 (2017): 128-146.

Table 2.1 A Sample of Different Definitions of Innovation in the Existing Literature.[3] (Cont.)

No.	Definition	Justification
9.	The introduction of new elements into a service—new knowledge, new organization, new management/skills	This definition focuses on the new within a service
10.	Innovations are in a significant way new and disruptive towards the routines and structures prevailing	This definition views innovation as affecting the external environment
11.	Innovation is the process by which new ideas turn into practical value in the world	This definition focuses on the practical application of ideas

In conclusion, the literature review reveals a rich array of perspectives on the definition of innovation, encompassing various dimensions and justifications. Innovation is seen as the creation of new combinations of existing resources, the implementation of new or significantly improved products or processes, and a continuous, dynamic process transforming ideas into value. Widening the scope, innovation is also viewed as the successful exploitation of new ideas from other sectors, the creation and application of good ideas, and the development or adaptation of new behaviors.

It extends further to include the introduction of new elements into services, the disruption of prevailing routines and structures, and the practical transformation of new ideas into tangible value in the world. This comprehensive exploration underscores the multifaceted nature of innovation, capturing its diverse manifestations across

[3] S. P. Taylor, "What Is Innovation? A Study of the Definitions, Academic Models and Applicability of Innovation to an Example of Social Housing in England," *Open Journal of Social Sciences*, Vol. 5 No. 11 (2017): 128-146.

sectors and emphasizing its transformative impact on outcomes, efficiency, effectiveness, and quality.

2.1.2 Significance of Innovation

Understanding the significance of innovation is paramount across different sectors. In the business realm, innovation is recognized as a driver of growth and a means to gain a competitive edge. Beyond economics, innovation plays a crucial role in addressing societal challenges, enhancing healthcare outcomes, and fostering technological advancements. This section of the literature review explores the profound impact of innovation on organizational success and societal progress.

2.1.3 Types of Innovation

Innovation manifests in various forms, each serving distinct purposes and functions. The literature identifies key types of innovation, including product innovation, involving the development of new or improved goods; process innovation, focusing on enhancing operational methods; service innovation, aimed at improving service delivery; and business model innovation, which involves redefining how an organization creates, delivers, and captures value. Examining these types provides a comprehensive understanding of the diverse avenues through which innovation manifests and contributes to progress.

2.1.4 Innovations in Stress Resilience Programs

In recent years, there have been many innovations in how stress resilience programs are designed and delivered. These innovations aim to make interventions more effective, engaging, and accessible to diverse populations. Some notable trends include the followings:

1. Digital and Online Delivery: Perhaps the biggest shift has been the move towards digital platforms for resilience training. Mobile apps, web-based programs, and even virtual reality experiences are being used to teach stress management skills. Digital delivery allows interventions to reach people who might not attend in-person workshops, and it offers convenience (training available 24/7 on your phone). During the COVID-19 pandemic, for example, many resilience and mental health programs moved online. Studies have found that well-designed internet-based interventions can

significantly reduce stress, anxiety, and depression, with outcomes comparable to traditional in-person interventions in some cases. For instance, a meta-analysis in 2022 showed that online programs for college students during COVID-19 had positive effects on reducing stress and mental health symptoms.[4] This validates the potential of digital resilience training. Apps might include interactive modules, quizzes, or chatbots that guide users through exercises (more on chatbots below). Virtual reality (VR) is also being explored to simulate stressful situations in a controlled way to train coping skills (for example, a VR public speaking task to practice anxiety management techniques).

2. Personalization and Adaptive Learning: New resilience programs often use personalized content. Instead of a one-size-fits-all approach, they assess the user's specific stressors or skill gaps and tailor the training accordingly. For example, an app might first give a quiz about whether the users struggle more with time management or with negative thoughts and then prioritize modules that target user's biggest challenges. Some programs incorporate AI algorithms that learn from user input and progress – if a user is not engaging with mindfulness exercises but responds well to cognitive strategies, the program can adapt to emphasize the latter. Personalization increases relevance and can improve engagement and efficacy, as people get the content most applicable to them.[5]

3. Micro-Interventions and Nudges: Traditional stress management workshops might be half-day or multi-session courses. An innovative trend is delivering "bite-sized" micro-interventions. These are very brief (5-10 minute) exercises or tips that can be integrated into daily routines. The idea is to lower barriers

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[4] Malinauskas R, Malinauskiene V., "Meta-Analysis of Psychological Interventions for Reducing Stress, Anxiety, and Depression among University Students during the COVID-19 Pandemic", *International Journal of Environment Research and Public Health*, Vol. 19 No. 15 (2022): 9199.

[5] Gligorea, I., Cioca, M., Oancea, R., Gorski, A.-T., Gorski, H., & Tudorache, P., "Adaptive Learning Using Artificial Intelligence in e-Learning: A Systematic Review and Future Perspectives", *Education Sciences*, Vol. 13, No. 12 (2023): 1216.

to practice – it is easier to get a busy professional to do a 5-minute guided breathing break at lunch than to attend a 2-hour class. Apps now send nudges or reminders throughout the day: e.g., a notification might pop up, "Take 1 minute to breathe deeply" or "Think of 3 things you're grateful for today." Over time, these small practices accumulate into better stress management habits. Micro-interventions can also be context-triggered – for instance, using smartphone sensors, an app might detect that it is late at night and the user is still active, then remind them gently about the importance of sleep for resilience. Research indicates that such approaches can enhance engagement and foster better stress management habits.[6]

4. Integration with Wearables and Biofeedback: Some cutting-edge programs use wearable devices (such as smartwatches or biofeedback sensors) to monitor physiological indicators of stress (heart rate variability, galvanic skin response, etc.). These devices can then alert users or the program when stress is rising and prompt an immediate intervention. For example, if a user's smartwatch detects an elevated heart rate while the user remains stationary, potentially indicating stress, it may prompt the individual to engage in a 3-minute calming exercise. This real-time feedback loop helps people catch stress early and practice coping skills right when they are needed. It also gamifies progress – users can see metrics like improvements in resting heart rate or sleep quality as they practice resilience techniques, which can reinforce their motivation. For instance, a study described a wearable biofeedback system that monitors physiological responses and provides feedback to help individuals learn to control their stress responses.[7] This integration allows users to receive immediate prompts for calming exercises when elevated stress levels are detected, thereby enhancing self-regulation skills.

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[6] De Witte, N.A.J., Buyck, I., and Van Daele, T., "Combining Biofeedback with Stress Management Interventions: A Systematic Review of Physiological and Psychological Effects", *Applied Psychophysiology and Biofeedback*, Vol. 44, No. 1 (2019): 71-82.

[7] Wu, W., Gil, Y., and Lee, J., "Combination of Wearable Multi-Biosensor Platform and Resonance Frequency Training for Stress Management of the Unemployed Population", *Sensors*, Vol. 12, No. 10 (2012): 13225-13248.

5. Content Innovation – Third-Wave Therapies and Beyond: Many new programs incorporate elements from third-wave cognitive therapies such as Acceptance and Commitment Therapy (ACT) or Dialectical Behavior Therapy (DBT), which emphasize acceptance, mindfulness, and values-driven action. For example, rather than focusing only on eliminating negative thoughts, ACT-inspired interventions teach acceptance of difficult emotions and commitment to one's values despite stress. This is a subtle shift that resonates with resilience: sometimes the stressor cannot be removed, however one can still live aligned with their values (such as continuing to be a good parent or employee) and find meaning, which builds long-term resilience. Meaning-making and values clarification exercises are increasingly common innovations. There is also attention to self-compassion – teaching people to respond to their own suffering with kindness rather than self-criticism, which has been shown to reduce stress and build emotional resilience.[8]

6. Group and Community-Based Innovations: Research supports the effectiveness of group and community-based innovations in building resilience through peer support and coaching. Some programs leverage peer support and coaching in innovative ways. In workplace settings, peer support programs have been implemented to manage occupational stress and enhance resilience. For example, the 'Sustaining Resilience at Work' (StRaW) program provides peer support to employees, aiming to support psychological resilience by enhancing coping skills and providing social support.[9] Moreover, Team-Based Resilience Training in Workplaces are increasingly adopting resilience training programs to help employees cope with stress and adapt to challenges. These programs often include team-based activities, such as mindfulness

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[8] Neff, Kristin D. and McGehee, Pittman, "Self-compassion and Psychological Resilience Among Adolescents and Young Adults", *Self and Identity*, Vol. 9, No.3 (2010): 225-240.

[9] Agarwal, Bhavya, Brooks, Samantha K., and Greenberg, Neil, "The Role of Peer Support in Managing Occupational Stress: A Qualitative Study of the Sustaining Resilience at Work Intervention", *Journal of Occupational Health Psychology*, Vol. 68, No. 2 (2024): 57-64.

exercises and physical fitness challenges, to promote a culture of wellness. Such interventions have been associated with improved employee well-being, productivity, and perseverance.[10] These studies collectively indicate that leveraging peer support and community-based interventions can effectively build resilience and promote mental well-being.

7. Measurement and Gamification: Innovations also include how progress is measured and motivated. Gamification adds game-like elements – points, badges, streaks, leaderboards – to encourage consistent practice of resilience skills. For example, an app might award a "Mindful Master" badge after 10 days of meditation practice, or a company wellness program might have a friendly competition where teams earn points for doing stress-reducing activities. This can make the sometimes-difficult inner work of resilience more fun and engaging. On the assessment side, some programs have built-in psychological scales or journaling prompts that track changes in mood, stress level, or self-efficacy over time, giving users tangible feedback on improvement. Seeing one's stress rating go down over weeks can reinforce that the effort is paying off.

8. Specific Populations and Tailored Content: Another area of innovation is designing resilience interventions for specific high-stress groups: e.g., resilience training for healthcare workers, for military personnel, for new parents, or for students. These tailored programs account for the unique stressors of each context (such as trauma exposure in healthcare or combat, or academic pressure in students) and incorporate relevant scenarios and language. For instance, a resilience program for nurses might include training on managing compassion fatigue and incorporate real hospital scenarios in simulations.[11]Tailoring increases relevance and often effectiveness. Some programs are also culturally tailored – recognizing that concepts

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[10] Boatman, Andrea, "Resilience Training: Empower Employees to Thrive in the Face of Change", https://www.aihr.com/blog/resilience-training/ (accessed May 2, 2024).

[11] Scheuch, Ianina, Peters, Natalie, Lohner, Max S., Muss, Caroline, Aprea, Carmela, and Fürstenau, Bärbel, "Resilience Training Programs in Organizational Contexts: A Scoping Review," *Frontiers in Psychology*, Vol. 12 (2021): 733036.

of resilience and preferred coping methods can differ across cultures, developers might integrate culturally specific practices (like storytelling, traditional mindfulness practices such as Tai Chi or yoga, or even religious/spiritual elements if appropriate).

Many of these innovations have been accelerated by necessity (e.g., during COVID-19, digital solutions became essential) and by technology advances. They reflect a general trend: making resilience training more accessible (digital, bite-sized), more engaging (interactive, gamified), and more targeted (personalized, context-specific). Importantly, early evidence suggests these innovations maintain or even improve the efficacy of interventions. For example, several meta-analyses have found that internet-based cognitive-behavioral interventions can reduce stress and anxiety with effect sizes similar to in-person therapy, at least in the short term.[12] Likewise, brief daily app exercises have shown measurable boosts in positive affect and stress reduction in some studies.

However, these new approaches also come with challenges to address – ensuring user privacy in digital tools, avoiding over-reliance on tech (some experts caution that too much automation might reduce the human empathy element), and making sure content remains evidence-based and not diluted into just "wellness entertainment." There is also a need for long-term follow-up to see if these novel formats yield sustained resilience (since gamification might keep someone engaged for a month, but we want skills that last years).

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[12] Malinauskas R, Malinauskiene V., "Meta-Analysis of Psychological Interventions for Reducing Stress, Anxiety, and Depression among University Students during the COVID-19 Pandemic", *International Journal of Environment Research and Public Health*, Vol. 19 No. 15 (2022): 9199.

Concluding Remarks

Innovation in stress resilience programs are evolving rapidly. From smartphone apps that act as personal coaches, to VR simulations that build coping skills, to community challenges that make resilience a group mission, the landscape is rich with creativity. These innovations hold promise for reaching many more people with resilience training than ever before and doing so in ways that fit into modern life. By combining time-tested techniques (like meditation and CBT) with new delivery methods and motivational tools, they aim to empower individuals to manage stress effectively and flourish even amid life's difficulties.

2.2 Chatbot

2.2.1 Overview of Chatbot

Chatbots, short for chat robots, are computer programs designed to simulate conversation with human users, primarily through text or voice interactions. They have evolved significantly over the years, transforming from simple rule-based systems to sophisticated artificial intelligence (AI) entities capable of natural language processing.

2.2.2 Historical Development

Chatbots have a rich history, dating back to the 1960s. ELIZA, created by Joseph Weizenbaum[13], is often considered the first chatbot, demonstrating basic natural language understanding. The development of chatbots gained momentum in the 21st century with advancements in AI, machine learning, and natural language processing (NLP).

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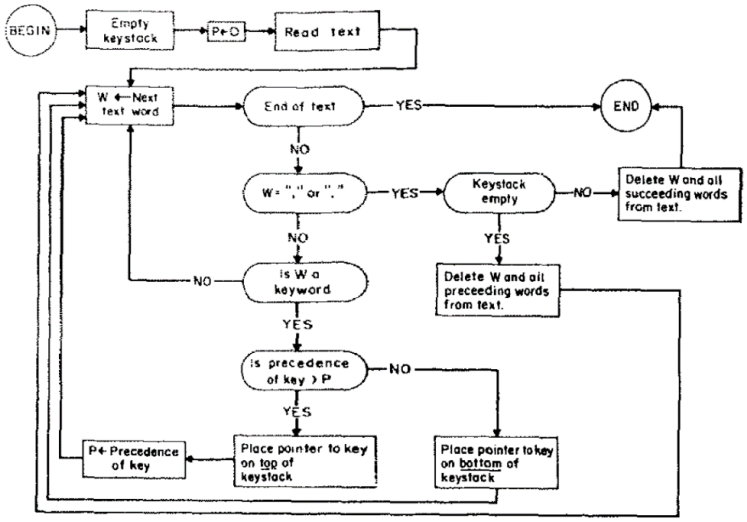
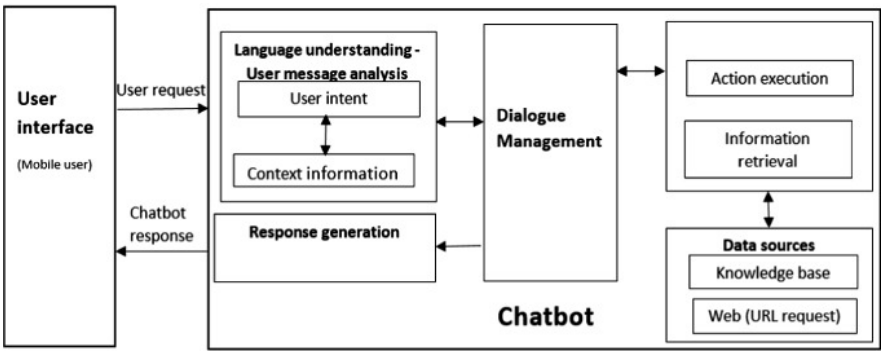
[13] Weizenbaum, Joseph, "ELIZA-A Computer Program for The Study of Natural Language Communication Between Man and Machine", *Communications of the ACM*, Vol 9 No 1 (January 1966): 36-45.

Figure 2.1 Basic Flow Diagram of Keyword Detection



Source: From Weizenbaum [14]

Figure 2.2 General Chatbot Architecture



Source: From Adamopoulou E, Moussiades L.[15]

[14] Ibid., p. 39.

[15] Ibid., p. 380.

2.2.3 Classification of Chatbots

Chatbots can be categorized into several types based on their functionality, design, and capabilities. Examining and analyzing the characteristics of contemporary chatbots has enabled the categorization of chatbot programs into seven distinct classes.as follows[16]:

1. By Purpose

1.1 Chatbots for Conversations on a Wide Range of Topics: Designed for dialogue on abstract topics without a clear goal.1.2 Chatbots Focused on Dialogue on a Specific Topic or to Solve a Particular Problem or Goal: Tailored for dialogue on specific topics or to address particular issues or goals, such as information distribution or setting reminders.

2. By Location

2.1 Chatbots n Sites: Embedded on websites to assist customers in answering questions or addressing communication requests regarding unique tasks or settings.

2.2 Chatbots in Messengers: Utilized in messaging platforms for fast interaction with customers, often in groups with common interests.

2.3 Chatbots in Specialized Software Applications: Facilitate and accelerate processes like ordering goods or services within dedicated software applications.3. By Type of Interface:

3.1 Button Interface Chatbots: Users interact with the bot by pressing buttons with different options, commonly used for ordering goods and services.

3.2 Text Interface Chatbots: Communication occurs through text messaging; chatbot recognizes words, clarifies questions, and offers solutions.

3.3 Mixed Models Interface Chatbots: The bot offers text responses but may also provide buttons with clarifying questions for user interaction.

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[16] Trofymenko et al., "Classification of chatbots," *System technologies*, Vol 2 No. 139 (March 2022): 147-159.

3.4 Voice Interface Chatbots: Users communicate via voice messages, converted into text for analysis and synthesized audio responses.

3.5 Runtime Interface Chatbots: Essential for connecting virtual agents to external systems, facilitating communication and action execution.

4. By the Number of Users

4.1 Personal Chatbots: For personal use without data transfer or interactive chatbots assisting in data exchange with others.

4.2 Business Chatbots: Designed for simultaneous business use, automating communication with many customers and performing various functions.

5. By Form of Access

5.1 Chatbots in Certain Groups (Chats) of the Messenger: Facilitate communication and coordination within specific groups, providing detailed information on various topics.

5.2 Chatbots in the Messenger Dialog: Directly called in any dialog by typing the @ symbol and the bot's name, offering options or actions.

5.3 Subscribed Chatbots: Allow the collection of a subscriber base and mass or personalized mailings within messaging platforms.

6. By Algorithm

6.1 Simple (Limited) Chatbots: Interact with users based on a pre-prepared script, providing answers selected from a template based on keywords.

6.2 Intelligent ("Smart") Chatbots: Based on artificial neural networks, understand the meaning of conversation and self-learn from training data for more nuanced responses.

6.3 Hybrid Chatbots: Combine predetermined communication with AI to recognize user intentions and extract valuable data from messages.

7. By Functionality

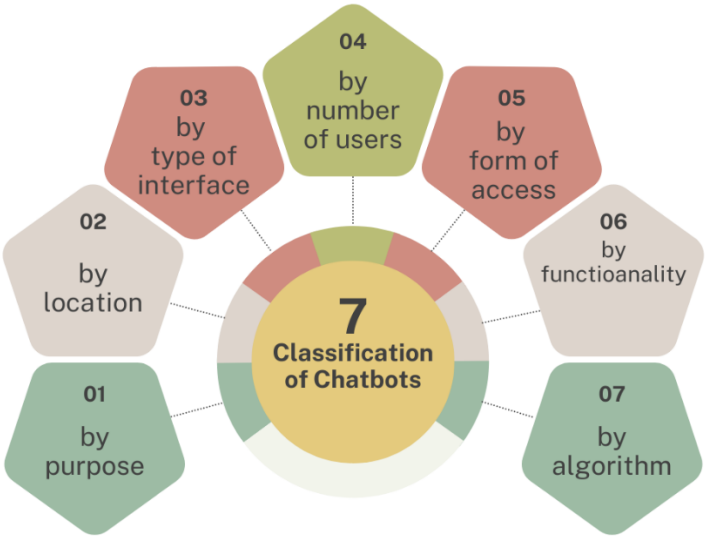
7.1 Information and Communication Chatbots: Support communication, share information about special offers, help choose products or services, and are often used for advertisement distribution.

7.2 “Questions and Answers” Chatbots: Provide simple answers to frequently asked questions, automating the processing of common customer queries.

7.3 Assistants Chatbots: Generate data based on user responses to achieve specific goals, such as filling out forms or managing online processes.

7.4 Functional Chatbots: Allow immediate action, such as transferring money, checking order status, or performing specific tasks in various domains.

Figure 2.3 Classification of Chatbots



Source: Adapted from Trofymenko et al.[17]

[17] Ibid., p. 182.

2.2.4 Types of Chatbot

Chatbots can be classified using different parameters such as the knowledge domain, the service provided, the goals, the input processing and response generation method, the human-aid, and the build method. Yellow AI, the industry's first generative AI-powered platform classified chatbots into six types[18]:

1. Rule-based Chatbots: Rule-based chatbots operate on predefined rules and regulations. They follow a set of instructions to respond to user queries or commands. These chatbots are suitable for scenarios where interactions are straightforward and can be anticipated based on established guidelines.

2. Keyword Recognition-based Chatbots: Unlike rule-based chatbots, these systems identify specific keywords in user inputs to generate responses. They recognize key terms or phrases and trigger predefined actions based on this recognition. This approach simplifies the chatbot's ability to understand and respond to user queries effectively.

3. Menu-based Chatbots: Menu-based chatbots present users with a predefined set of options or a menu to choose from. Users navigate through the conversation by selecting from these options. This structured approach streamlines interactions, making it easy for users to understand the available choices.

4. Contextual Chatbots (Intelligent chatbots): Contextual chatbots, also known as intelligent chatbots, incorporate artificial intelligence (AI) to understand the context of a conversation. They go beyond simple keyword recognition, considering the broader context of the dialogue. This enables them to provide more nuanced and relevant responses.

5. Hybrid chatbots: Hybrid chatbots combine elements of rule-based systems and AI-driven approaches. They leverage predefined rules for certain tasks while

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[18] Anirudh Shenoy, "6 Types of chatbots – How to choose the best for your business?", https://yellow.ai/blog/types-of-chatbots/ (accessed November 11, 2023).

employing machine learning or other AI techniques for more complex scenarios. This hybrid model aims to offer flexibility and efficiency in various interaction contexts.

6. Voice-enabled Chatbots: Voice-enabled chatbots utilize voice recognition technology to process and respond to spoken commands. Users interact with these chatbots using their voice, allowing for a more natural and hands-free experience. This type of chatbot is commonly used in voice-activated virtual assistants and other voice-enabled applications.

Rule-based bots and AI-based bots are the two predominant types of chatbots based on their underlying technologies and approaches[19]:

1. Rule-based bots operate on a predefined set of rules and conditions. These rules are explicitly programmed by developers to dictate how the bot responds to user inputs. The bot identifies keywords or patterns in user messages and follows predetermined instructions to generate a response. Rule-based bots are effective for handling specific and structured tasks but may struggle with understanding complex or ambiguous queries.

2. AI-based bots, on the other hand, leverage artificial intelligence (AI) and machine learning (ML) technologies to understand and respond to user inputs. Instead of relying on explicit programming, these bots learn from data and user interactions. Natural Language Processing (NLP) allows AI-based bots to comprehend the nuances of language, understand context, and generate more contextually relevant responses. These bots can adapt and improve over time as they encounter new data, making them capable of handling a wider range of queries and tasks compared to rule-based counterparts.

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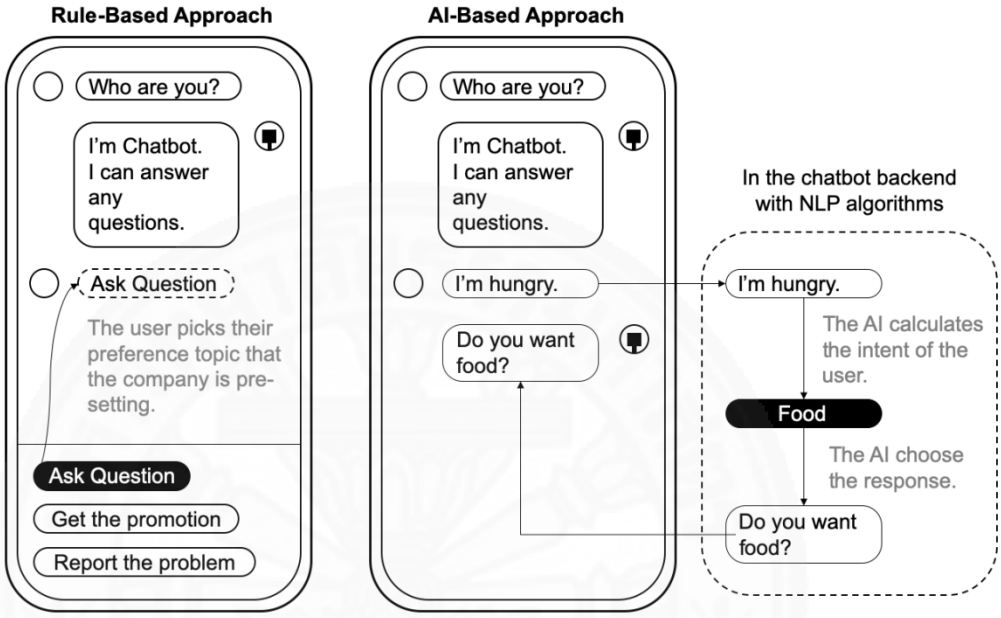
[19] Adamopoulou E, Moussiades L. "An Overview of Chatbot Technology," *Artificial Intelligence Applications and Innovations*, Vol 6 No. 584 (May 2020): 373-383.

Figure 2.4 The Rule-based Chatbot and AI-based Chatbot



Source: From Paphawit W.[20]

2.2.5 A Comparative Analysis of Chatbots

The evolution of chatbot technology has paved the way for enhanced user interactions and customer service across various industries. Two primary approaches have emerged in the development of chatbots: rule-based systems and artificial intelligence (AI)-powered models. Rule-based chatbots operate on predefined sets of rules and decision trees, offering simplicity and control in their responses. On the other hand, AI chatbots leverage machine learning algorithms and natural language processing to adapt, learn, and provide more sophisticated interactions.

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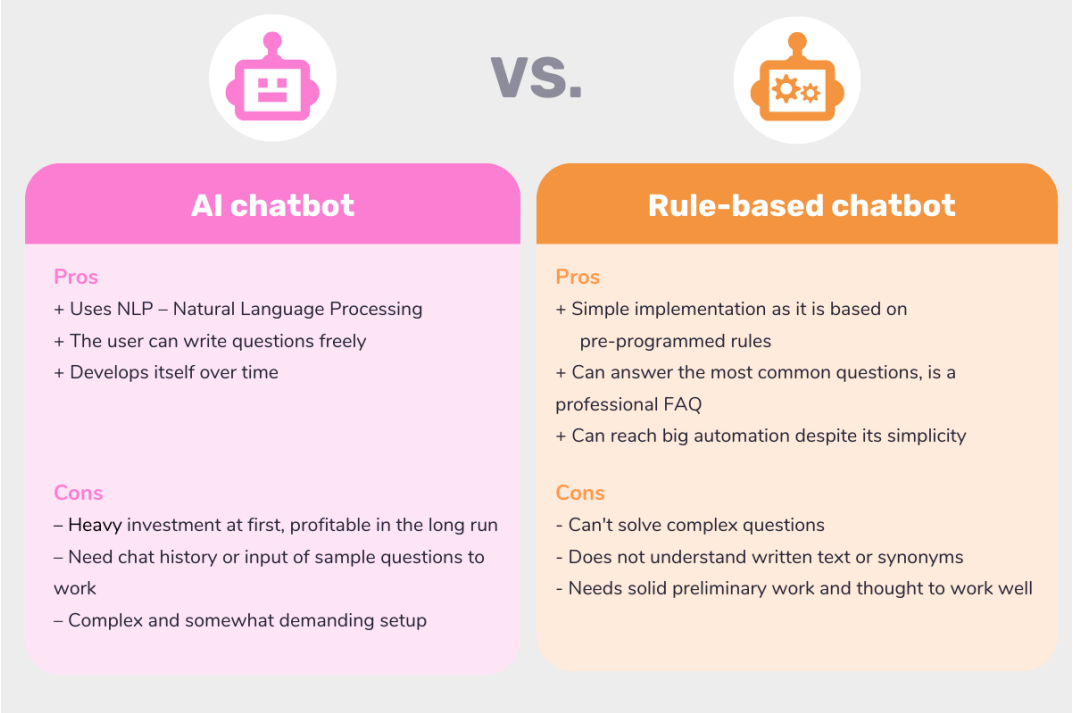
[20] Paphawit Wongtanasophon., "The Impact of Chatbot in Marketing in Thailand," An Independent Study of Master of Science Program in Marketing, Faculty of Commerce and Accountancy, Thammasat University, 2019.

Figure 2.5 Comparison of Pros and Cons between Rule-based Chatbot and AI-based Chatbot



Source: From Ida Sundstedt[21]

In this part, the researcher will conduct a comprehensive comparative analysis of rule-based chatbots and AI chatbots, aiming to unveil the strengths and weaknesses inherent in each approach. As chatbot technology continues to play a pivotal role in transforming user interactions and customer service across diverse industries, understanding the distinct characteristics of rule-based and AI chatbots becomes imperative. The research will delve into the intricacies of these two prominent methodologies, shedding light on their applications, advantages, and limitations.

This comparative analysis aims to explore the distinct advantages and limitations of both rule-based chatbots and AI chatbots, shedding light on their

[21] Ida Sundstedt, "AI Chatbot vs Rule-based Chatbot: Which is the smarter choice for your business?", https://www.giosg.com/blog/ai-chatbot-vs-rule-based-chatbot (accessed November 11, 2023).

applicability in different scenarios and guiding the choice between these technologies based on specific use cases, scalability requirements, and resource considerations.

By exploring their unique features, adaptability, and performance metrics, this analysis will help the researcher choose the suitable type of chatbot as the research instrument for the study on Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People. The ultimate goal is to contribute insights that facilitate the integration of an effective chatbot solution within the framework of stress resilience interventions, informed by the principles of Buddhist Psychology, for the well-being of working-aged individuals.

This comparative analysis aims to explore the distinct advantages and limitations of both rule-based chatbots and AI chatbots, shedding light on their applicability in different scenarios and guiding the choice between these technologies based on specific use cases, scalability requirements, and resource considerations.

Table 2.2 A Comparative Analysis of Rule-Based Chatbots and AI-Based Chatbot

Rule-Based Chatbots	AI Chatbots
Pros	
1. **Simple Implementation**: Rule-based chatbots are relatively easy to implement and deploy. They follow a predefined set of rules and decision trees. 2. **Controlled Responses**: Since the responses are based on predetermined rules, the chatbot has a high level of control over its output, ensuring consistency. 3. **Cost-Effective**: Rule-based chatbots can be cost-effective to develop and maintain, especially for specific, well-defined tasks. 4. **Transparent Logic**: The logic behind the chatbot's responses is explicit and can be easily understood, making it easier to debug and maintain.	1. **Adaptability and Learning:** AI chatbots, powered by machine learning, can learn from user interactions and adapt to changing patterns and contexts over time. 2. **Natural Language Processing (NLP):** AI chatbots can better understand and generate human-like responses, thanks to advanced NLP algorithms, making interactions more natural. 3. **Handle Complexity:** AI chatbots are more equipped to handle complex queries and conversations that go beyond simple rule-based scenarios. 4. **Continuous Improvement:** Through ongoing training, AI chatbots can continuously improve their performance and stay relevant in dynamic environments.

Table 2.2 A Comparative Analysis of Rule-Based Chatbots and AI-Based Chatbot (Cont.)

Rule-Based Chatbots	AI Chatbots
Cons	
1. **Limited Flexibility:** Rule-based systems can struggle to handle complex or unexpected queries that fall outside their predefined rules. 2. **Scalability Challenges:** As the number of rules increases, managing and updating them becomes more complex, making scalability an issue. 3. **Dependency on Data Quality:** Rule-based chatbots heavily depend on the quality of the rules. If the rules are not comprehensive or accurate, the chatbot's performance may suffer. 4. **Lack of Learning Capability:** Rule-based chatbots do not have the ability to learn from user interactions or adapt to changing patterns.	1. **Complex Implementation:** Developing and training AI chatbots can be more complex and may require expertise in machine learning and data science. 2. **Data Dependency:** AI chatbots rely heavily on large datasets for training. The quality and diversity of data can impact the bot's performance. 3. **Potential Bias:** If the training data is biased, the AI chatbot may exhibit biased behavior or responses. 4. **Higher Costs:** Developing and maintaining AI chatbots may involve higher initial costs due to the need for skilled professionals and computational resources.

2.2.6 Chatbot-Based Interventions for Stress Management and Mental Health

In the last decade, digital technology has opened new avenues for delivering mental health support and resilience training. Chatbot-based interventions – automated conversational agents that interact via text or voice – have emerged as a promising tool in this space. These chatbots simulate human-like dialogue and can provide psychoeducation, coaching, symptom monitoring, and even elements of therapy. The appeal of chatbots for mental health lies in their accessibility and scalability: they are available 24/7, can be used anonymously (reducing stigma barriers), and can reach many individuals at low cost.[22] Particularly for stress and mild mental health concerns, chatbots offer an always-available "friendly ear" and source of guidance, which may help users manage daily challenges before they escalate. This section reviews research on chatbot interventions for stress, anxiety, and related mental health outcomes, and compares notable chatbot platforms relevant to stress resilience.

Rationale and Development: The growing interest in therapeutic chatbots is partly driven by the global shortage of mental health professionals and the prevalence of unmet needs.[23] Many people experiencing stress or emotional difficulties do not seek help due to stigma or limited access. Chatbots aim to fill this gap by providing psychoeducation and self-help interventions in a user-friendly, stigma-free format. Technological advances in natural language processing and artificial intelligence (AI) have made these tools increasingly sophisticated and empathetic. Early mental health chatbots were often rule-based – following scripted responses to recognized keywords – but newer systems leverage AI and machine learning for more flexible, context-aware

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[22] Schillings, C., Meißner, E., Erb, B., Bendig, E., Schultchen, D., and Pollatos, O., "Effects of a Chatbot-Based Intervention on Stress and Health-Related Parameters in a Stressed Sample: Randomized Controlled Trial", *JMIR Mental Health*, Vol. 11, (2024): e50454.

[23] Abd-Alrazaq, A. A., Rababeh, A., Alajlani, M., Bewick, B. M., and Househ, M., "Effectiveness and Safety of Using Chatbots to Improve Mental Health: Systematic Review and Meta-Analysis", *Journal of Medical Internet Research*, Vol. 22, No. 7, (July, 2020): e16021.

interactions. Importantly, chatbots are not meant to replace human therapists, but to supplement care or offer support when human help is not available.[24] They can serve as a first step for individuals who might be hesitant to see a counselor, or as an adjunct for people between therapy sessions, reinforcing skills and providing check-ins. For instance, a stressed office worker might chat with a bot at midnight about a rough day, practicing a breathing exercise the bot suggests, whereas otherwise they would have to wait weeks to discuss coping strategies with a therapist. The convenience and immediacy of chatbots thus align well with the needs of those seeking resilience in the flow of daily life.

Evidence from Research: A number of studies and trials have evaluated chatbot-based mental health interventions, with generally positive, though preliminary, results. Overall, studies suggest that chatbots can indeed reduce users' distress and improve subjective well-being in the short term. For example, in one randomized controlled trial, college students who engaged for two weeks with a CBT-based chatbot (Woebot) reported significantly greater reductions in depressive symptoms than a control group that read online self-help material.[25] The Woebot users' depression scores (PHQ-9) dropped significantly (an average reduction of about 2 points more than control), and they also showed high engagement, completing an average of 12 chatbot sessions in those two weeks.

This was a landmark study demonstrating the feasibility, acceptability, and initial efficacy of a fully automated chatbot delivering a therapeutic program. Similarly, an evaluation of the chatbot Wysa – an AI "emotionally intelligent" bot geared toward

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[24] Inkster, B., Sarda, S., and Subramanian, V., "An Empathy-Driven, Conversational Artificial Intelligence Agent (Wysa) for Digital Mental Well-Being: Real-World Data Evaluation Mixed-Methods Study", *JMIR mHealth and uHealth*, Vol. 6, No. 11, (November, 2018): e12106.

[25] Fitzpatrick, K.K., Darcy, A., and Vierhile, M., "Delivering Cognitive Behavior Therapy to Young Adults With Symptoms of Depression and Anxiety Using a Fully Automated Conversational Agent (Woebot): A Randomized Controlled Trial", *JMIR Mental Health*, Vol. 4, No. 2, (June, 2017): e19.

mental well-being – found that users who engaged more intensely with the app showed larger improvements in mood. In a real-world study (no therapist involved), Wysa users who frequently chatted with the bot and practiced its recommended exercises had a greater decrease in self-reported depression scores (on average 5.8-point improvement on PHQ-9) compared to infrequent users (3.5-point improvement).[26] This dose-response pattern suggests the chatbot's activities (which include CBT reframing prompts, mindfulness exercises, and empathetic conversation) had a beneficial effect, and user engagement was key to outcomes. Notably, user feedback was largely positive – in the Wysa study, about two-thirds of users said the bot was helpful and encouraging . This underscores that many people do find value in interacting with a well-designed mental health chatbot.

Focusing specifically on stress resilience, the research is still emerging, but related studies on stress and anxiety management are illustrative. A recent pilot randomized trial tested a stress-management chatbot called "MISHA" with university students. Over four weeks, MISHA provided daily coaching tips, exercises (like time management and relaxation skills), and conversational check-ins. Results showed medium effect-size improvements in perceived stress levels (Cohen's $d \approx -0.36$) for the chatbot group compared to waitlist controls, as well as reductions in depression symptoms (d up to –0.60).[27] Although anxiety levels did not significantly change in that short span, the findings indicate the chatbot was effective in relieving stress and boosting aspects of well-being.

Another study[28] in a general stressed adult sample evaluated "ELME", a chatbot guiding users through a 3-week program focused on stress education, mindfulness practice, and body awareness. The trial did not find a significant difference

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[26] Loc. cit.

[27] Ulrich, S., Lienhard, N., Künzli, H., and Kowatsch, T., "A Chatbot-Delivered Stress Management Coaching for Students (MISHA App): Pilot Randomized Controlled Trial", *JMIR Mhealth Uhealth*, Vol. 12 (2024): e54945.

[28] Loc. cit.

in perceived stress between the chatbot and control groups by the end of 3 weeks, possibly due to the short intervention duration. However, the chatbot users did show significant improvement in mindfulness and emotion regulation (reappraisal) skills. This suggests that while immediate stress levels might not always drop with brief chatbot use, such tools can build underlying resilience factors (such as mindful awareness and coping abilities) that could lead to stress reduction over a longer term. The study concluded that the intervention shows potential, and that longer engagement might be needed to fully realize stress reduction benefits. Together, these studies highlight both the promise and the current limitations of chatbot-based interventions. Many report positive trends in mental health outcomes – decreases in stress, depression or anxiety, and increases in well-being – but effects can be variable, and not all results reach statistical significance.

A 2020 systematic review pooling 12 studies found "weak evidence" that chatbots are effective at improving mental health outcomes like depression, psychological distress and stress.[29] In that review, some chatbot interventions led to meaningful improvements, while others showed no significant effect on outcomes like anxiety or positive mood. The authors noted that overall, chatbots have the potential to improve mental health, but the evidence base is still too limited and mixed to draw firm conclusions. They also reported that in the few studies examining it, no serious adverse events were attributed to chatbot use – indicating that, so far, these tools appear safe, with no reports of harm or worsening of symptoms. Participants generally find them engaging rather than distressing.

2.2.6.1 Notable Chatbot Platforms for Mental Well-Being

A number of conversational agents have been developed with the aim of supporting mental health and stress management. Below are a few prominent examples, along with their characteristics and evidence:

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[29] Loc. cit.

1.**Woebot**[30] is a text-based chatbot grounded in Cognitive Behavioral Therapy principles. It delivers brief daily lessons and mood check-ins, uses humor, and guides users through CBT techniques like identifying cognitive distortions. Woebot is designed for young adults and has been tested in clinical research. Innovation: Fully automated CBT delivery in a conversational format. Evidence: In a randomized controlled trial, Woebot users had significantly lower depression scores after 2 weeks compared to an information-only control group. Users also reported the bot was engaging and easy to talk to, supporting its feasibility.

2. **Wysa**[31] is an AI chatbot that engages in empathetic conversations and offers tools for anxiety, stress, and sleep management. It is described as an "emotionally intelligent" chatbot aimed at building mental resilience and promoting mental well-being. Wysa uses a mix of open-ended chat (the bot responds with supportive dialogue) and specific exercises (guided meditations, breathing exercises, CBT prompts). Innovation: Emphasis on empathetic listening and a large toolkit of wellbeing exercises, with a user-friendly personality (represented by a penguin avatar). Evidence: Real-world data analyses have found that higher usage of Wysa correlates with greater improvement in depression and anxiety symptoms. In one study, 68% of users said Wysa helped them feel encouraged. Another evaluation noted that users often form a kind of "therapeutic alliance" with Wysa, reporting that the chatbot seems to understand and care, which can itself be stress-relieving. While large controlled trials are still needed, these findings suggest Wysa can meaningfully support users' mental health through an engaging, resilience-building approach.

3. **Tess**[32], a mental health chatbot developed by X2AI, has been evaluated in various studies for its effectiveness in reducing symptoms of anxiety and depression

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[30] Loc. cit.

[31] Loc. cit.

[32] Fulmer, R., Joerin, A., Gentile, B., Lakerink, L., and Rauws, M., "Using Psychological Artificial Intelligence (Tess) to Relieve Symptoms of Depression and Anxiety: Randomized Controlled Trial", *JMIR Mental Health*, Vol. 5, No. 4 (October, 2018): e64.

among college students. For instance, a randomized controlled trial involving 75 participants across 15 universities in the United States demonstrated that users of Tess experienced a significant reduction in anxiety symptoms compared to a control group. Another pilot randomized controlled trial conducted in Argentina assessed the viability and acceptability of Tess among Spanish-speaking university students. The study found promising evidence for the usability of Tess in this population, indicating its potential to alleviate symptoms of depression and anxiety.[33] These studies highlight Tess's potential as a scalable digital mental health intervention, particularly in educational settings. However, sustaining user engagement remains an ongoing challenge that necessitates further research and development.

4. **JoyBot**[34], a RASA-trained chatbot designed to enhance mental health among Australians. The study demonstrated the potential of AI chatbots in providing mental health support, highlighting the feasibility of such interventions in boosting mental well-being.

5. **Happify**[35,36], is a fully automated web and mobile well-being intervention grounded in positive psychology, cognitive-behavioral therapy, and mindfulness-based

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[33] Klos, M.C., Escobar, S., and Bunge, E.L., "Artificial Intelligence–Based Chatbot for Anxiety and Depression in University Students: Pilot Randomized Controlled Trial", *JMIR Formative Research*, Vol. 5, No. 8 (August, 2021): e20678.

[34] Adewunmi, Mary, Ashraff, Adish, Dixit, Tanya, Shrestha, Nikhil, Medrano, Veronica Gail, Chougule, Bhushan, Fahim, Ahmed, Tirupath, Navaneeth, and Sushma, Sudha, "JoyBot: RASA-Trained Chatbots to Provide Mental Health Assistance for Australians", *International Journal of Machine Learning*, Vol. 13, No. 3, (July 2023): 1-10.

[35] Boucher, Eliane M., Harake, Nicole R., Ward, Haley E., Stoeckl, Sarah Elizabeth, Vargas, Junielly, Minkel, Jared, Parks, Acacia C., and Zilca, Ran, "Artificially Intelligent Chatbots in Digital Mental Health Interventions: A Review", *Expert Review of Medical Devices*, Vol. 18, No. 1, (2021): 37-49.

[36] Parks, A. C., Williams, A. L., Tugade, M. M., Hokes, K. E., Honomichl, R. D., & Zilca, R. D. (2018). Testing a scalable web and smartphone-based intervention to improve

stress reduction, offering well-being programs to over 3 million registrants to date. The platform that incorporates an AI chatbot named "Anna" to deliver digital mental health interventions. A study focusing on Anna discussed the challenges and potential of chatbots within digital mental health interventions, suggesting that these AI-driven tools can be effective, usable, and adoptable. Additionally, a study evaluated the effectiveness of Happify's interventions by comparing changes in well-being over time between two randomized conditions—Happify and psychoeducation. The research specifically examined aspects of well-being such as depression, anxiety, and resilience, providing evidence of the platform's impact on mental health. JoyBot and Happify are chatbots within broader wellness apps focusing on positive activities to reduce stress.

6. **Replika** is an AI-driven chatbot designed to provide emotional support and companionship used by millions primarily for social support. Studies have shown that Replika can help alleviate loneliness and anxiety among users, and some have reported stopping thoughts of suicide after interacting with Replika as both a friend and a therapist.[37] Replika has gained significant attention due to its wide user base and potential psychological impact. While Replika provides an emotionally engaging experience, studies have highlighted both its positive and negative effects. It offers users a space to converse, alleviate loneliness, and manage anxiety, but there are concerns about the emotional dependence some users may develop on the chatbot. A previous study revealed that some users may experience increased emotional distress and confusion over the chatbot's responses, as they struggle to reconcile its human-like qualities with its artificial nature. This emotional dependence, while providing comfort, may inadvertently lead to psychological harm. Thus, while Replika offers a valuable

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depression, anxiety, and resilience: A randomized controlled trial. *International Journal of Wellbeing*, Vol. 8, No. 2, 22-49.

[37] Maples, Bethanie, Cerit, Merve, Vishwanath, Aditya, and Pea, Roy, "Loneliness and Suicide Mitigation for Students Using GPT-3-Enabled Chatbots," *npj Mental Health Research*, Vol. 3, No. 4 (2024): Article 4.

support tool, its implications for mental well-being, especially for vulnerable users, require careful consideration.[38]

2.2.6.2 Comparing Chatbot Interventions

Current chatbot interventions for mental health differ in their theoretical basis, interactivity, and target outcomes, but all aim to empower users to manage their well-being. A comparison can be drawn on a few dimensions:

1. Therapeutic Approach: Some chatbots rely primarily on Cognitive Behavioral techniques (identifying negative thoughts, doing thought challenges, setting action plans) – Woebot is a prime example. Others emphasize mindfulness and acceptance strategies – e.g. some dialogues in Wysa or InnerHour's chatbot guide users to observe and accept feelings. A few incorporate psychoeducation and journaling (encouraging users to reflect on triggers, as Tess does). The choice of approach influences user experience: CBT-oriented bots may feel more like a structured self-help program, whereas mindfulness-oriented ones feel like a calming guide, and supportive conversation bots feel like a nonjudgmental friend.

2. User Interaction Style: Chatbots also vary in how they engage the user. Rule-based bots follow a predetermined script and options (making them reliable in what they will say, but sometimes limited in depth). AI-driven bots (using machine learning or large language models) can offer more flexible, human-like responses. For instance, early Woebot was largely scripted, whereas newer bots leverage models akin to GPT-3 which can generate more nuanced replies. However, more advanced AI can also be less predictable and may sometimes produce irrelevant or confusing answers, so many mental health chatbots still use a hybrid of scripted and AI responses for safety. Engagement features (like gamified activities, progress tracking, or the use of humor) also differ. Woebot uses a playful tone with occasional jokes or cartoons to keep users engaged; Wysa uses a friendly, empathetic tone and allows the user to just vent freely

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[38] Laestadius, L. I., Johnson, S. E., & Seitz, H. H., "Too Human and Not Human Enough: A Grounded Theory Analysis of Mental Health Harms from Emotional Dependence on Replika," *New Media & Society*, Vol. 24, No. 8 (2022): 1975–1995.

at times. These design choices impact how effective the chatbot is at keeping users involved, which as noted is crucial for outcomes.[39]

3. Focus on Stress Resilience: Not all chatbots explicitly frame themselves as "resilience-building" tools, but many address components of resilience. For example, a chatbot may train coping skills (improving emotion regulation), encourage social connection (messaging a friend as homework), or help reframe perceptions of stress (thus reducing its impact). Wysa's developers specifically mention fostering resilience as a goal.[40] Woebot's CBT exercises (like gratitude practice or identifying cognitive distortions) are known to increase resilience factors such as optimism and cognitive flexibility. Some bots include modules on building healthy habits, sleep hygiene, or self-compassion – all of which bolster stress resilience. Therefore, when comparing these interventions, one can consider to what extent each addresses the known pillars of resilience. A chatbot that predominantly offers symptom tracking and relaxation exercises may help acute stress reduction, while one that also engages the user in learning perspective-taking or seeking social support may have broader resilience benefits.

4. Clinical Validation: Another point of comparison is the level of empirical validation. Woebot and a few others have been tested in randomized trials with published results (showing improvements in depression/ anxiety).[41]Many chatbots (especially newer ones) have only pilot or feasibility studies. For example, preliminary trials of XiaoIce (a popular Chinese social chatbot) showed reductions in users' loneliness after regular chats, but controlled studies are lacking. When evaluating these interventions, it's important to note which have demonstrated efficacy versus which are still experimental. A 2022 meta-analysis of AI chatbots for mental health found overall positive effects on depressive and anxiety symptoms but emphasized that more rigorous

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[39] Loc. cit.

[40] Ibid.

[41] Loc. cit.

research is needed to establish long-term efficacy and identify for whom and for what problems chatbots work best.

2.2.6.3 Challenges and Future of Chatbot Innovations

While chatbot-based mental health interventions are promising, they also face challenges. One issue is maintaining user engagement over time – many people try a wellness app or bot for a few days and then drop off. If users do not stick with the interaction, the potential benefits (which often accrue with practice) may not be realized. Some studies noted that attrition rates can be high, and those who benefit most tend to be the ones who use the chatbot more frequently.[42] Thus, developers are exploring ways to make bots more engaging, such as personalizing content, using a more natural conversational style, or integrating multimedia (images, quizzes, etc.). Another challenge is ensuring the quality and safety of chatbot responses. Unlike a human counselor, an AI agent might misunderstand a user's input or fail to detect nuance, possibly leading to responses that are off-base. Most mental health chatbots have built-in protocols to handle crisis keywords (like references to self-harm), typically by providing crisis line contacts or encouraging the user to seek professional help, to mitigate risk. Ongoing research is examining how to improve chatbot empathy and accuracy in understanding user emotions (through sentiment analysis or even analyzing voice tone in voice-based agents).

Looking ahead, innovations in AI are likely to further enhance chatbot capabilities. The newest generation of large language model (LLM)-driven chatbots (e.g., based on GPT-4 or similar) can carry on much more fluid and context-aware conversations. This could make interactions feel more natural and supportive, potentially increasing user trust and engagement. Early explorations have begun on using such advanced chatbots for mental health support, though careful oversight is needed given their unpredictability. Researchers are also combining chatbots with other technologies. For instance, a recent study experimented with integrating a wearable stress detector (like a smartwatch tracking physiological signs of stress) with an LLM-

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[42] Loc. cit.

powered chatbot that would automatically initiate a conversation or coping prompt when the wearer's stress spiked.[43] In that trial, two users interacted with custom chatbots triggered by their wearable device; they found that timely, tailored interventions (the chatbot suggesting a specific coping strategy right after a stressful event, using a brief description of the event) were more helpful than generic end-of-day reflections.[44] Such integrations point to a future where chatbots could provide just-in-time resilience coaching – essentially acting as a personal digital coach that steps in during a stressful moment (your heart rate rises and your phone's bot pops up: "I notice your stress is high. Want to do a quick calming exercise?"). This level of personalization and immediacy could greatly reinforce stress resilience in real-world settings. Nonetheless, these are nascent ideas, and more research is needed to validate them.

In summary, chatbot-based interventions represent a novel and increasingly researched approach to improving mental health and stress resilience. They draw on established therapeutic techniques and deliver them through friendly, interactive technology. The literature to date indicates that chatbots can reduce distress and teach coping skills, with several studies reporting improved stress, depression, or well-being outcomes in users.[45] While they are not a panacea and do not yet replace traditional interventions, they serve as a scalable complement – one that aligns with a preventative, skills-building paradigm of mental health (much as resilience training does). As technology advances, chatbots may become even more adept at fostering resilience, possibly incorporating realtime stress monitoring, personalized dialogues, and integration of wisdom from various disciplines (Western psychology and even Eastern

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[43] Neupane, Sameer, Dongre, Poorvesh, Gracanin, Denis, & Kumar, Santosh, "Wearable Meets LLM for Stress Management: A Duoethnographic Study Integrating Wearable-Triggered Stressors and LLM Chatbots for Personalized Interventions," *Extended Abstracts of the CHI Conference on Human Factors in Computing Systems (CHI EA'25)*, (2025): 1-6.

[44] Ibid.

[45] Loc. cit.

contemplative practices). Ultimately, the goal shared by both traditional and chatbot interventions is to empower individuals with the psychological tools and support needed to navigate stress and thrive in their personal and professional lives.

Concluding Remarks

Stress resilience is a multifaceted construct encompassing the ability to adapt, recover, and grow in the face of adversity. Key theories emphasize that resilience is not a rare trait but a common process that can be cultivated through various means – from cognitive skills and mindfulness to social support and spiritual practice. Traditional interventions (CBT-based training, mindfulness programs, etc.) have shown success in enhancing resilience and reducing stress, albeit with modest effect sizes in some cases. Time-honored wisdom from Buddhism similarly highlights cultivating inner strengths (faith, energy, mindfulness, concentration, wisdom) to develop an unshakable mind, adding a cross-cultural perspective that resilience stems from nurturing positive qualities.

In recent years, the advent of mental health chatbots has introduced a cutting-edge tool for resilience-building. Chatbot interventions leverage technology to provide accessible coaching, therapy techniques, and emotional support at scale. Early research and trials suggest that these AI-driven tools can alleviate distress and bolster well-being – for example, by guiding users to reframe negative thoughts, practice calming exercises, or simply by offering a compassionate listening ear at any hour. While the evidence base is still growing, and such tools work best as complements to (not replacements for) human care, they hold significant promise. They lower barriers to help, maintain user privacy, and can intervene early – all factors that could help working-age adults manage daily stresses more effectively and prevent burnout or mental health decline.

In comparing existing chatbot interventions, we see diversity in approaches (therapy-focused vs. general wellness, scripted vs. AI-driven, etc.), but all aim to reinforce users' capacity to cope. The most effective bots tend to be those that keep users engaged and deliver evidence-based strategies in a relatable manner. As both research and technology evolve, we can expect more refined and validated chatbot

programs targeting stress resilience. These might integrate the best of both worlds: psychological techniques proven by science and real-time, personalized support enabled by AI.

In conclusion, building stress resilience is a critical goal in our high-pressure modern lives, and it is achievable through deliberate practice and support. With a foundation in established methods and an eye on innovative solutions like chatbots, mental health professionals and researchers are increasingly equipped to help individuals not only weather the storms of stress but emerge stronger and more balanced. By combining insights from psychology, technology, and even ancient wisdom, we are moving toward a future where cultivating resilience is an accessible journey for everyone.

2.3 The Concept of Stress Resilience in Working-Aged People

This section focuses on exploring the concepts of adolescent resilience within Grotberg's psychological theory, presenting the definition of resilience, the evolution of the concept, the core idea of Grotberg's theory, and a concluding statement.

2.3.1 Definitions

Definitions of resilience consistently emphasize a shared core meaning, highlighting positive outcomes in response to major life challenges. Its influence extends across various disciplines, demonstrating its broad relevance. Across most fields and typologies, resilience is commonly described as the capacity to recover from disruption, stress, or change.[46] The term resilience entered the English language in the early 17th century, originating from the Latin verb *resilire*. From there, it evolved in multiple directions, reflecting its diverse applications.[47]

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[46] Ryan S. Santos, *A Review of Literature of Resilience and Implications for Further Educational Research*, (USA: Claremont Graduate University & San Diego State University, 2012), p. 2.

[47] McAslan A., *The Concept of Resilience: Understanding Its Origins, Meaning and Utility*, (Adelaide: Torrens Resilience Institute, 2010), p. 2.

Everly explains resilience as the capacity to recognize ourselves in the depths of failure, humiliation, or depression—and to rebound, not just to our previous state, but to even greater levels of success, happiness, and inner strength.[48] Masten[49] describes resilience as a common adaptive human process, rather han a magical process applicable to a select few. Tugade and Fredrickson[50] similarly define resilience as the ability to recover from negative emotional experiences and adapt flexibly to the evolving demands of stressful situations. This understanding seems to be closely related to the concept of hardiness, described by the researcher Kobasa.[51] Resilience also allows us to recover after facing stressful life events such as major change, adversity, hardship, and stress. Most importantly, it includes the idea of emerging from adversity stronger and more resourceful.[52]

Ginsburg and Jablow[53] describe resilience as the ability to rise above difficult circumstances—a trait that enables individuals to navigate an imperfect world while maintaining optimism and confidence. It is commonly understood as the capacity to recover from setbacks and the ability to bounce back. Resilience is comparable to

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[48] Everly, Strouse, McCormack, *Stronger: Develop the Resilience You Need to Success*, (New York: Amacom, 2015), p. 2.

[49] Masten, A. S., "Ordinary Magic: Resilience Process in Development," *American Psychologist*, Vol. 56 No. 3 (March 2001): 227-239.

[50] Tugade, M. M. and Fredrickson, B. L., "Resilient Individuals Use Positive Emotions to Bounce Back from Negative Emotional Experiences," *Journal of Personality and Social Psychology*, Vol. 86 No. 2 (February 2004): 320-333.

[51] Kobasa, S. C., "Stressful Life Events, Personality and Health: An Inquiry into Hardiness," *Journal of Personality and Social Psychology*, Vol. 37 No. 1 (January,1979): 1-11.

[52] Richardson, G. E., "The Metatheory of Resilience and Resiliency," *Journal of Clinical Psychology*, Vol. 58 No. 3 (March 2002): 307-321.

[53] Ginsburg and Jablow, *Building Resilience in Children and Teen*, 3rd Edition, (USA: American Academy of Pediatricts, 2015), p. 4.

buoyancy; just as a body submerged underwater instinctively rises to the surface, resilient individuals recover from adversity.

Resilience is a mindset. Those who are resilient view challenges as opportunities. While they do not seek out problems, they recognize that overcoming them ultimately leads to growth. Instead of succumbing to self-doubt, catastrophic thinking, or victimization (asking, "Why me?"), they focus on finding solutions.

Resilience is not uniform. A person may demonstrate strong resilience in one area of life while requiring greater support in another. It is not synonymous with invulnerability, perfection, or complete avoidance of risk. Parents strive to instill resilience in children, equipping them to navigate a complex and stressful world while still enjoying its many rewards.

Resilience is not a trait of "perfect" individuals. Perfectionists, fearing mistakes, may perform well but often hesitate to take risks that could help them reach their full potential. In contrast, resilient individuals achieve greater success because they push their limits and learn from their failures. Resilience may be a crucial factor in determining not only who adapts but also who thrives.

The concept of resilience is generally defined as the ability to endure adversity or recover from negative experiences. Much of resilience research has explored the interplay between protective factors and risk in high-risk populations. As a focus of developmental research, many studies have examined children—often in longitudinal studies—analyzing the factors in their lives that predict positive outcomes in adulthood.[54]

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[54] Sandra Prince-Embury and Donald H Saklofske, *Resilience in Children, Adolescents, and Adults: Translating Research into Practice*, (New York: Springer Science+Business Media, 2013), p. 3.

2.3.2 Development of the Concepts of Resilience

The scientific study of resilience only began in the 1960s and 1970s.55 Resilience in the face of adversity has been studied widely by developmental psychopathologists for the past 50 years.56 In order to understand how resilience research moved forward, a brief historical overview is explored. Prominent figures in resilience research have included Norman Garmezy[57], Emmy Werner and Ruth Smith58, and Michael Rutter.59 Based on their research, along with that of others, the concept of resilience has evolved from a narrow, specific notion to a broad and widely encompassing construct. The focus of research has shifted from examining individuals in isolation to considering children within the context of their families and communities, incorporating a much wider range of risk and protective factors.

In his studies on schizophrenia, Garmezy observed that some individuals exhibited more adaptive functioning than others. This led him to investigate children of parents with schizophrenia, where he became particularly interested in the protective factors that enabled many of these children to thrive despite being at high risk for psychopathology. Through *Project Competence*, Garmezy and his colleagues explored a wide range of factors influencing children's experiences with adversity, risk, and

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[55] Masten A.S., "Resilience in Developing Systems: Progress and Promise as the Fourth Wave Rises," *Development and Psychopathology*, Vol. 19 No. 3 (September 2007): 921-930.

[56] Sandra Prince-Embury and Donald H Saklofske, *Resilience in Children, Adolescents, and Adults: Translating Research into Practice*, p. 3.

[57] Garmezy N., Masten A.S., Tellegen A., "The Study of Stress and Competence in Children: A Building Block for Developmental Psychopathology," *Child Development*, Vol. 55 No. 1 (February 1984): 97–111.

[58] Werner, E. E. & Smith, RS, *Vulnerable but Invincible: A Longitudinal Study of Resilient Children and Youth*, (New York: McGraw-Hill, 1982), p.2.

[59] Rutter, M., "Resilience Concepts and Findings: Implications for Family Therapy," *Journal of Family Therapy*, Vol. 21 No. 2 (December 2002): 119-144.

resilience. Their research revealed that even within high-risk groups—such as children with physical disabilities or those living in homeless shelters—some were still able to demonstrate what they termed "'ok' competence," meaning ordinary or better-than-expected functioning,[60] despite exposure to extreme adversity.[61]

In the well-cited longitudinal study of children in Kauai, Hawaii, Werner[62] identified key factors contributing to successful coping mechanisms. These included (1) genetically based dispositional traits, (2) strong affectionate bonds within the family, and (3) external support systems that recognized and reinforced the individual's competencies. A combination of child, family, and community factors was found to be associated with positive adult outcomes. [63] These factors often differed for different age groups and between boys and girls.

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[60] Masten, A. S., Best, K., Garmezy, N., "Resilience and Development: Contributions from the Study of Children Who Overcome Adversity", *Development and Psychopathology*, Vol. 2 No. 4 (October 1990): 425-44.

[61] Masten, A. S., & Powell, J. L., "A Resilience Framework for Research, Policy and Practice", *Resilience and Vulnerability: Adaptation in the Context of Childhood Adversities*, ed. by S. S. Luthar, (New York: Cambridge University Press, 2003): 1-26.

[62] Werner, E. E., *Vulnerable and Resiliency: A Longitudinal Study of Asian Americans from Birth to Aged 30*, (New York: Grant (W.T.) Foundation, 1987), p. 1.

[63] Werner, E. E., "Resilience in development", *Current Directions in Psychological Science*, Vol. 4 No. 3 (June 1995): 81-85.

More recently prominent researchers such as Michael Rutter[64], Michael Resnick[65] and Suniya Luthar[66] have contributed to the discourse by critically evaluating the evidence and exploring key areas. Their work has focused on topics such as biological and gene-environment interactions, resilience in cross-cultural contexts, the social construction of resilience, and the role of protective factors in the lives of young people..

The term originally emerged in the fields of materials science and environmental studies before expanding to encompass resilience in individuals. It is appealing because it conveys the ability of something or someone to withstand adversity, recover, and return to normal after encountering an abnormal, distressing, or unexpected challenge.[67] When examining resilience, it is useful to consider how the discourse surrounding the concept has evolved over time and to identify the key ideas that have shaped these changes.

Early definitions referred to the idea of "invulnerable children," but more recent research has recognized that no child is truly invulnerable.[68] Although definitions of resilience vary, most agree that it refers to children demonstrating adaptive or competent functioning despite experiencing significant risk or adversity. Resilience

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[64] Rutter, M., "Resilience Concepts and Findings: Implications for Family Therapy," *Journal of Family Therapy*, Vol. 21 No. 2 (December 2002): 119-144.

[65] Resnick, M. D., Ireland, M., & Borowsky, I., "Youth violence perpetration: What protects? What predicts? Findings from the National Longitudinal Study of Adolescent Health", *Journal of Adolescent Health*, Vol. 35 No.5 (April 2004): 424.e1-424.e10.

[66] Luthar, S. S., "Resilience in Development: A Synthesis of Research Across Five Decades", *Developmental Psychopathology: Risk, Disorder and Adaptation*, ed. by D. Chicchetti, & D. Cohen, (New York: John Wiley & Sons, 2006): 739-795.

[67] McAslan A., *The Concept of Resilience: Understanding Its Origins, Meaning and Utility*, p. 1.

[68] Masten, A. S., & Obradovic, J., "Competence and Resilience in Development", *Annals New York Academy of Sciences*, Vol. 1094 No. 1 (February 2007): 13-27.

requires the presence of two key factors: adaptive functioning and exposure to risk or adversity. A well-functioning child who has not encountered substantial adversity would not be classified as resilient.[69]

Resilience has shifted from being viewed as a fixed personality trait to being understood as a dynamic process over time. Research indicates that resilience is not static but can fluctuate throughout a person's life.[70] There is no singular path to resilience, as both risk and protective factors can influence children differently depending on their stage of development.[71] Recognizing developmentally appropriate adaptive functioning is crucial in defining resilience. Some children may outwardly exhibit resilient behaviors while internally experiencing significant distress.[72] Children may demonstrate resilience or adaptive functioning in one area, such as emotional well-being, while facing considerable challenges in another, such as academic performance.

Resilience is a complex, multilevel process influenced by individual, family, and community-level risk and protective factors. At the individual level, protective factors may include emotional self-regulation, self-efficacy, and self-determination.[73] Family factors may include a close relationship with at least one caregiver and sibling

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[69] Vanderbilt-Adriance, E., & Shaw, D. S., "Conceptualizing and Re-evaluating Resilience Across Levels of Risk, Time, and Domains of Competence", *Clinical Child & Family Psychology Review*, Vol. 11 No.1-2, (June 2008): 30-58.

[70] Luthar, S. S., *Developmental Psychopathology: Risk, Disorder and Adaptation*, pp. 739-795.

[71] Masten, A. S., & Obradovic, J., "Competence and Resilience in Development", *Annals New York Academy of Sciences*, Vol. 1094 No. 1 (February 2007): 13-27.

[72] Luthar, S. S., *Developmental Psychopathology: Risk, Disorder and Adaptation*, pp. 739-795.

[73] Cicchetti, D., "Resilience Under Conditions of Extreme Stress: A Multilevel Perspective," *World Psychiatry*, Vol. 9 No. 3, (October 2010): 145-154.

attachment.[74] Community factors can include social assets such as schools, associations, and sporting clubs, along with a sense of connectedness within the community.[75] Determining how and which protective and risk processes are involved is imperative for designing effective interventions.[76]

More recently it has been suggested that 'resilient' functioning may be a more normative response to adversity than once considered. Masten[77] proposed that resilience is a common phenomenon, typically emerging from the normal functioning of human adaptation systems. The greatest threats to human development are those that undermine these protective systems. Researchers studying the psychological and social determinants of health adopted the concept and gradually expanded its application from mental health to overall health. While early resilience research focused on individuals, more recent studies have explored resilience as a characteristic of entire communities.[78]

2.3.3 Main Idea of Grotberg's Theory

Resilience is a dynamic and cumulative process involving the development of various skills, abilities, knowledge, and insights necessary for successful adaptation, overcoming adversity, and meeting challenges. According to Grotberg, resilience is

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[74] The Bridge Child Care Development Service, *Literature Review: Resilience in Children and Young People*, (London: NCH-The Bridge Child Care Development Service, 2007), pp. 3.

[75] Dean, J., & Stain, H. J., "The Impact of Drought on the Emotional Well-Being of Children and Adolescents in Rural and Remote New South Wales," *The Journal of Rural Health*, Vol. 23 No. 4, (September 2007): 356-364.

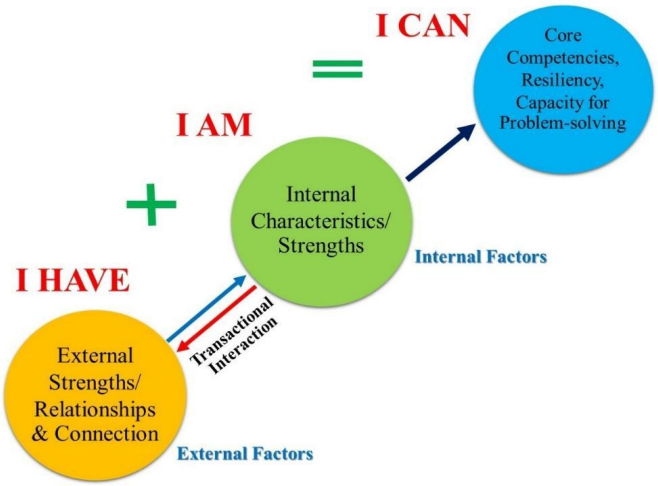
[76] Luthar, S. S., *Developmental Psychopathology: Risk, Disorder and Adaptation*, pp. 740-795.

[77] Masten, A. S., "Ordinary Magic: Resilience Processes in Development," *American Psychologist*, Vol. 56 No. 3, (March 2001): 227-239.

[78] John Fleming and Robert J. Ledogar, "Resilience, an Evolving Concept: A Review of Literature Relevant to Aboriginal Research," *Canadian Institutes of Health Research*, Vol. 6 No. 2 (October 2008): 1-2.

composed of internal personal strengths, social and interpersonal skills, and external supports and resources. These elements contribute to key building blocks—such as self-confidence, self-image, responsibility, independence, initiative, effectiveness, and trust—that form the foundation of personal resilience.

Figure 2.6 Grotberg's Theory of Resilience



Source: Adapted from Grotberg[79]

Figure 2.1 illustrates Grotberg's Theory of Resilience, depicting it as a dynamic and cumulative process involving the development of various skills, abilities, knowledge, and insights necessary for successful adaptation, overcoming adversity, and meeting challenges. According to Grotberg, resilience is composed of internal personal strengths, social and interpersonal skills, and external supports and resources. These elements collectively contribute to key building blocks—such as self-confidence, self-image, responsibility, independence, initiative, effectiveness, and trust—that form the foundation of personal resilience.

External supports and resources (*I have*) are connected to socio-cultural and environmental factors and are linked to both direct and indirect interpersonal relationships within the family and the broader community. These include peer

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[79] Grotberg, E., *A Guide to Promoting Resilience in Children: Strengthening the Human Spirit*, pp. 8-10.

relationships, household rules, shared values, schools, access to services, health and recreational resources, and religious institutions. The *I have* components help a child recognize the reliability of love, belonging, structure, and support within their family and community, fostering trust.

Inner personal strengths (*I am*) are shaped by an individual's bio-psycho-social characteristics and conditions, guiding their exploration of identity and the question, "Who am I?" These strengths contribute to the development of self-confidence, self-image, responsibility, and independence.

Social and interpersonal skills (*I can*) encompass the skills and knowledge necessary for active participation, effective communication, emotional expression and understanding, problem-solving, and setting realistic, optimistic future goals. The *I can* aspects strengthen a child's sense of initiative and effectiveness.[80]

Concluding Remarks

Modern resilience studies have their roots in psychology and psychiatry, evolving over the past 50 years. Research on resilience has progressed through several stages. Initially, studies focused on the individual traits of children and adolescents. Over time, the concept expanded beyond mental health to encompass overall well-being. The term *resilience* is used with some variation, but it is most commonly defined as the ability to recover from setbacks—the capacity to bounce back and function effectively despite adversity or stress. It also equips individuals with problem-solving skills and the ability to set realistic, optimistic future goals. Resilience enables a person to regain strength, health, or success after experiencing hardship. A resilient adolescent is better positioned to avoid risky behaviors, mitigate the negative effects of stress, overcome adversities, and transition into adulthood with strong coping abilities. According to Grotberg's theory, the sources of adolescent resilience stem from three key areas: external supports (*I have*), inner strengths (*I am*), and interpersonal and problem-solving skills (*I can*).

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[80] Ibid., p. 10.

2.3.4 Resilience in Working-Aged Individuals

For adults in the workforce, resilience has special relevance due to ongoing job demands, organizational changes, and work-life balance challenges. Occupational health research identifies resilience as a protective factor for employee well-being and performance.A systematic review of resilience in the workplace (covering 2003–2014) found that resilience is linked to better mental health, such as lower stress, depression and anxiety, and to positive outcomes like higher job satisfaction and productivity.[81] Notably, personal resilience can be improved: it is not static. This has prompted a shift in focus from simply documenting how stress causes problems to also understanding how building resilience can prevent problems.[82] In other words, alongside treating trauma and stress-related disorders, there is increasing interest in teaching methods to enhance resilience as a form of prevention and strength-building.[83] This outlook aligns with movements in positive psychology and preventative mental health, which view resilience as a capacity that can be cultivated in individuals, families, and organizations. Overall, the theoretical landscape portrays stress resilience as a multifaceted, dynamic competency – one that varies between people and contexts, but that can be bolstered through deliberate interventions.

2.3.5 Stress and Resilience in the Workplace

In working-aged adults, a major context for resilience (or its absence) is the workplace. Modern work environments often come with substantial stressors – tight deadlines, high job demands, organizational changes, interpersonal conflicts, and so on. How individuals cope with these pressures can significantly affect their mental health

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[81] Robertson, I., Cooper, C. L., Sarkar, M., and Curran, T., "Resilience Training in the Workplace from 2003-2014: A Systematic Review", *Journal of Occupational and Organizational Psychology*, Vol. 88, No. 2 (2015): 533-562.

[82] Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., and Yehuda, R., "Resilience Definitions, Theory, and Challenges: Interdisciplinary Perspectives", *European Journal of Psychotraumatology*, Vol. 5, (2014): 25338.

[83] Ibid.

and job performance. Psychological resilience is highly relevant to occupational stress: it acts as a buffer that can mitigate the negative impacts of stress on the individual. Research shows a clear link between chronic work stress and various adverse outcomes (burnout, errors, absenteeism), which has driven interest in resilience as a protective factor.[84] High levels of work stress, if unmanaged, can lead to burnout, a state of emotional exhaustion, depersonalization (cynicism), and reduced personal accomplishment. Burnout is associated with cognitive impairments (such as memory and concentration problems) and poorer job performance. Resilience can help prevent employees from spiraling into these outcomes. Essentially, resilience provides a form of psychological immunity: employees with higher resilience tend to cope better with workplace challenges, maintaining their well-being and productivity in the face of stress.

Empirical studies back this up. For example, one large survey study found that in high-strain work environments (jobs with high demands and low support), workers who scored high on resilience had significantly better outcomes than their less-resilient peers. They reported lower stress levels, less burnout, fewer sleep problems, and even lower likelihood of quitting.[85] Notably, resilience had a "protective effect" on almost all measured outcomes – it softened the impact of a tough work climate. In some cases, this protective effect was strongest under the worst conditions (for instance, resilience most strongly reduced depression risk in high-strain jobs). In essence, resilience serves as a shock absorber between job stressors and the individual's health.

Because of these benefits, organizations have begun viewing resilience as a key competence for employees. Many employers are now investing in resilience-building training for their workforce – in fact, such training has been adopted at a

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[84] Rees, Clare S., Breen, Lauren J., Cusack, Lynette, and Hegney, Desley, "Understanding Individual Resilience in the Workplace: The International Collaboration of Workforce Resilience Model", *Frontiers in Psychology*, Vol. 6, (2015): 1-7.

[85] Shatté, A., Perlman, A., Smith, B., and Lynch, W. D., "The Positive Effect of Resilience on Stress and Business Outcomes in Difficult Work Environments", *Journal of Occupational and Environmental Medicine*, Vol. 59, No. 2, (2017): 135-140.

growing rate, becoming one of the more popular workplace well-being interventions in recent years. By strengthening employees' coping skills and adaptability, companies aim to reduce the human and financial costs associated with stress (such as absenteeism and healthcare claims) and improve overall performance. Resilient employees are more likely to "remain psychologically steady and focused when faced with challenges or adversity," which in turn contributes to better work outcomes.[86] Additionally, there is recognition that organizational culture and leadership play a role in fostering resilience. Supportive leadership and a positive work climate can help employees view adversity as a challenge to overcome rather than an insurmountable threat.[87] In the workplace context, resilience refers to employees' ability to effectively manage stress, maintain their mental well-being, and sustain optimal performance despite challenging work conditions. Stress resilience, in particular, enables individuals to adapt to and recover from workplace stressors, mitigating the negative effects of prolonged pressure. A high level of resilience has been associated with enhanced overall well-being, improved job satisfaction, and greater adaptability to workplace challenges, ultimately benefiting both employees and organizations.

Concluding Remarks

Stress resilience in working-aged individuals is a crucial psychological construct that determines their ability to adapt, recover, and thrive in the face of stressors. In modern workplaces, employees encounter various pressures, including workload demands, job insecurity, and work-life balance challenges, all of which necessitate strong resilience mechanisms. Resilience is not merely about enduring stress but involves cognitive, emotional, and behavioral processes that enable individuals to maintain well-being and productivity despite adversity.

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[86] Ibid.

[87] Romano, D., Weiser, N., Santiago, C., Sinclair, C., Beswick, S., Espiritu, R., and Bellicoso, D., "An Organizational Approach to Improve Staff Resiliency and Wellness During the COVID-19 Pandemic", *Journal of Medical Imaging and Radiation Sciences*, Vol. 53, No. 4S, (2022): S93-S99.

Theoretical models of resilience highlight its dynamic nature, emphasizing that it develops over time through personal strengths, coping strategies, and social support systems. Psychological frameworks, such as Grotberg's model of resilience, underscore the role of internal resources (such as self-efficacy and emotional regulation), external support (such as workplace and social networks), and adaptive skills in fostering resilience. Studies also suggest that mindfulness-based interventions, cognitive reappraisal techniques, and lifestyle modifications contribute significantly to strengthening resilience in working-aged populations.

In recent years, chatbot-based interventions have emerged as innovative tools for enhancing stress resilience. AI-driven chatbots provide real-time support, personalized mindfulness exercises, cognitive restructuring techniques, and stress management strategies. These digital interventions offer accessibility, anonymity, and consistency in delivering psychological support, making them particularly beneficial for individuals who may lack access to traditional mental health resources. Research suggests that chatbot-based resilience programs can effectively improve emotional regulation, reduce perceived stress, and promote long-term psychological well-being.

Given the increasing prevalence of occupational stress, developing interventions that enhance resilience is essential for promoting long-term well-being. Employers and policymakers must recognize the significance of resilience training and mental health support in professional environments. The integration of chatbot-based interventions into workplace wellness programs presents a promising avenue for fostering resilience in working-aged individuals. Ultimately, enhancing stress resilience not only benefits individual employees but also contributes to overall organizational effectiveness and societal well-being.

2.4 Buddhist Psychology on Stress Resilience

The Buddhist psychological perspective on resilience emphasizes understanding and interpreting resilience through the lens of Buddhist teachings, particularly by examining the mind, emotions, and mental processes. In this context, resilience is viewed not merely as the ability to withstand adversity but as an ongoing process of adaptation, coping with, and transforming difficult experiences. It moves

beyond the conventional notion of ‘bouncing back’ and incorporates the development of inner strength, equanimity, and mental balance in the face of stress and hardship. Resilience, according to Buddhist psychology, is cultivated through practices that foster inner peace and stability, enhancing the mind’s clarity and control.

A key component of this process is the cultivation of the Five Spiritual Powers (*pañcabala*)—faith (*saddhā*), energy (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*). These powers are not abstract ideals; rather, they serve as practical tools that help deepen one's understanding of the mind and its habitual reactions, enabling individuals to manage and transform stress. Each of these powers contributes uniquely to the development of stress resilience. Faith (*saddhā*) cultivates trust in oneself and in the process of growth, offering a foundation for enduring adversity with hope and confidence. Energy (*viriya*) provides the motivation and perseverance necessary to face challenges head-on, ensuring continued effort and commitment, even in the face of obstacles. Mindfulness (*sati*) promotes awareness of the present moment, enabling individuals to recognize and interrupt habitual stress responses, leading to greater emotional regulation. Concentration (*samādhi*) enhances the ability to focus and stabilize the mind, providing the clarity and mental stability required to make thoughtful decisions in stressful situations. Wisdom (*paññā*) fosters understanding of the impermanent nature of stress and suffering, enabling individuals to gain insight into the root causes of stress and respond with compassion and equanimity.

By developing these Five Spiritual Powers, individuals are better equipped to cope with stress, navigate challenges with mental clarity, and transform difficult experiences into opportunities for spiritual and psychological growth. The cultivation of these powers leads to a profound inner transformation, where suffering is not only endured but also understood, transcended, and used as a means of fostering resilience. Thus, the Five Spiritual Powers are integral to enhancing stress resilience, providing the mental strength and insight needed to face life’s difficulties with a sense of balance and equanimity.

2.4.1 Concepts of The Five Powers (*Pañcabala*) in Buddhist Psychology

In Buddhism, the Five Spiritual Powers (*pañcabala*) comprise faith (*saddhā*), energy (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*), which are essential powers that can lead the mind to tranquility and insight into the reality. In Buddhist psychology, especially within the *Abhidhamma*, these powers are understood as mental factors (*cetasika*)[88] that play a crucial role in cognition, ethical behavior, and mental development.

In *Abhidhamma*, faith is classified as a beautiful mental factor (*sobhana cetasika*) called *saddhā*, a positive quality leading to confidence in the Triple Gem and the efficacy of the Dhamma and moral conduct. It counteracts doubt (*vicikicchā*), a hindrance (*nīvaraṇa*) that obstructs clarity and progress in meditation. Faith is also important for initial commitment to the spiritual path and fuels ethical conduct (*sīla*).

Effort is closely linked to the mental factor *viriya cetasika*, which is responsible for effort and perseverance. It counteracts sloth and torpor (*thīna-middha*) and plays a role in the right effort (*sammā-vāyāma*), which supports and sustains wholesome efforts.

Mindfulness (*sati*) is the ability to keep the mind aware of the present moment without distraction. It counteracts heedlessness (*pamāda*) and contributes to insight (*vipassā*).

Concentration (*samādhi)* is crucial for observing mental and physical phenomena without attachment or aversion, forming the foundation for wisdom. Concentration is linked to the mental factor *ekaggatā cetasika* (one-pointedness of mind). It is one of the *jhāna* factors that stabilize and unify the mind, suppressing restlessness and worry (*Uddhacca-kukkucca*). Properly developed, it leads to deeper absorption states (*jhāna*) and supports insight meditation (*vipassanā*).

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[88] Abhidh-s VII 27-28; Bhikkhu Bodhi (General Editor, tr. by Mahāthera Nārada), *A Comprehensive Manual of Abhidhamma: The Abhidhammattha Sangaha of Ācariya Anuruddha*, 3rd Edition, (Kandy: BPS, 2007) p. 280.

Wisdom or *paññā* is the ability to see things as they truly are (*yathābhūtañāṇa*), which corresponds to right understanding (*sammā-diṭṭhi*). It arises from a deep comprehension of impermanence (*anicca*), suffering (*dukkha*), and non-self (*anattā*). In the *Abhidhamma*, wisdom is the highest faculty, leading to the realization of *Nibbāna*. Among these Five Powers, *viriya* and *paññā* are sometimes called *iddhi*, because, unlike the other three faculties, they possess the strength necessary to facilitate spiritual progress when properly cultivated.

In *Samatha* Meditation (Tranquility Practice), faith (*saddhā*) motivates the meditator. Energy sustains the effort. Mindfulness (*sati*) makes the mind stay aware. *Concentration* stabilizes the mind. *Wisdom* ensures a correct understanding of meditative experiences.

In *Vipassanā* Meditation (Insight Practice): The Five Powers arise naturally as insight deepens. Each power overcomes a specific defilement, purifying the mind. Ultimately, they lead to path (*magga*) and fruition (*phala*) knowledge, culminating in enlightenment. In Buddhist psychology, these Five Powers work together to transform mental processes and overcome unwholesome states. They are supportive and interdependent on each other. These powers are essential both for meditation and ethical living.

2.4.1.1 Origin and Historical Roots of the Five Powers in Buddhist Teachings

Buddhism originates from the teachings of Gautama Buddha, who lived in northern India during the sixth and fifth centuries BCE. Among the various Buddhist traditions, *Theravāda* Buddhism, derived from the *Pāli* words *Thera* (elders) and *Vāda* (doctrine), translates as the “Doctrine of the Elders.” It is regarded as the oldest and most conservative school of Buddhism, adhering closely to the original teachings of the Buddha as recorded in the *Tipiṭaka* (Three Baskets) in the *Pāli* language. Throughout his discourses, the Buddha outlined thirty-seven essential factors for spiritual development, collectively known as the *Bodhipakkhiya Dhamma* (Requisites of Enlightenment). These factors serve as the foundation for the eradication of mental defilements and the attainment of *Nibbāna*, the ultimate state of liberation. Among

these, the Five Powers (*pañcabala*)—faith (*saddhā*), effort (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*)—are considered essential for overcoming obstacles in spiritual practice.

The term *bala* has been variously rendered as "strength, power, might, mental power, dhamma, army, military force, financial ability, etc.[89]" In Buddhism, *bala* usually signifies power, for instance, the Buddha's ten power (*dasabala*). *Bala* is also used when speaking of other powers such as physical power (*kāyabala*), wealth power (*bhogabala*), prime minister power (*amiccabala*), the power of being a noble lineage (*abhijaccabala*), and intellectual ability or power (*ñāṇabala*).

In Buddhism, the Five Spiritual Powers refer to the higher form of power that can quell the darkness and bring one to *Nibbāna*. Anyone aspiring for liberation must cultivate these Five Powers within themselves. The concept of the Five Spiritual Powers (*pañcabala*) has its origins in the earliest strata of the *Pāli* Canon and later developed into a systematic framework for mental cultivation (*citta bhāvanā*), particularly within the Buddhist Psychology (*Abhidhamma*) and commentarial traditions. Five Spiritual Powers are usually mentioned in relation to the Five Spiritual Faculties (*pañca indriya*)—faith (*saddhā*), energy (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*). The primary difference is that when these faculties are fully developed and unshakable (*akampanaṭṭhena*), they become powers (*bala*)[90]. In the *Sutta Piṭaka*, the *Bala Saṃyutta* in the Connected Discourses of the Buddha (*Saṃyutta Nikāya*)[91] discusses each power and its function in overcoming obstacles to

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[89] Digital Pāli Dictionary, "Bala", https://dpdict.net/?q=bala (accessed May 18, 2024).

[90] Ledi Sayādaw, *The Requisites of Enlightenment Bodhipakkhiya Dīpanī: A Manual, (*Kandy: Buddhist Publication Society, 2011), BPS Online Edition, p. 102.

[91] S V 249-250; Bhikkhu Bodhi (tr.), *The Connected Discourses of the Buddha: A New Translation of Saṃyutta Nikāya*, Vol. I, (Boston: Wisdom Publication, 2012), p.1713.

enlightenment. The Numerical Discourses of the Buddha (*Aṅguttara Nikāya*)[92] describes how these five qualities support each other and lead to liberation. In these early sources, the Five Spiritual Powers are portrayed as essential mental strengths that counteract defilements (*kilesa*) and support the path to enlightenment (*nibbāna*).

The historical roots of these Five Powers can be traced back to the Buddha himself. The Buddha summarized his teachings into 37 factors of enlightenment (*bodhipakkhaya dhamma*), among which one category is a group of these powers (*bala*). Another historical root can be found in its relation to faculty (*Indriya*), the root of which, according to bhikkhu bodhi, is derived from the name of the ancient Vedic god Indra, ruler of the devas who destroyed the demons and gained the utmost respect among the devas. These five faculties, says bhikkhu bodhi, are so designated to "exercise control in their own specific compartments of the spiritual life" and "to subdue a particular mental disability and to marshal the corresponding potency of mind toward the breakthrough to final enlightenment.[93]" Given that Buddha sometimes equates *indriya* with *bala* as if they are one and the same thing, saying, 'That, bhikkhus, which is the *indriya* of *saddhā* is the *bala* of *saddhā*, and that which is the *bala* of *saddhā* is the *indriya* of *saddhā*….," these Five Spiritual Powers do reflect a significant historical root in the buddha teaching.

Just as *indriya*, as assumed to derive from the god Indra, signifying his divine-like power, *bala* is also used to represent the Buddha's power, for instance, the *dasa-bala*, the Buddha's ten power of wisdom. Lastly, sheerer examining each of the individual powers also indicates their presence or existence in the early Buddhist teaching. For instance, except faith (*saddhā*), energy (*viriya*) occupies nine places, concentration (*sati*), eight, wisdom (*paññā*), five, and concentration (*samādhi*), four places out of the 37 factors of enlightenment. Their frequent recurrences in Buddha

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[92] A III 11-12; Bhikkhu Bodhi (tr.), *The Numerical Discourse of the Buddha. A Translation of Aṅguttara, Nikāya,* (Boston: Wisdom Publication, 2012), p. 636.

[93] Bhikkhu Bodhi, "The Five Spiritual Faculties", https://www.accesstoinsight.org/ lib /authors /bodhi/ bps-essay_22.html (accessed May 27, 2024).

teachings themselves reflect their doctrinal significance and historical roots in early Buddhism.

2.4.1.2 Significance of the Five Powers in Buddhist Texts (*Pāli* Canon)

The importance of cultivating the requisites of enlightenment is emphasized in various Buddhist scriptures. In the *Mahāparinibbāna Sutta*, found in the *Dīgha Nikāya* (Collection of the Buddha's Long Discourses), the Buddha underscores the necessity of learning, practicing, and developing these qualities for both personal and collective well-being. He states:[94]

"Monks, for this reason those matters which I have discovered and proclaimed should be thoroughly learnt by you, practiced, developed and cultivated, so that this holy life may endure for a long time, that it may be for the benefit and happiness of the multitude, out of compassion for the world, for the benefit and happiness of devas and humans. And what are those matters? They are: The four foundations of mindfulness, the four right efforts, the four roads to power, the five spiritual faculties the five mental powers [the five spiritual powers], the seven factors of enlightenment, the Noble Eightfold Path."

This passage highlights the Five Spiritual Powers as integral components of Buddhist practice that should be cultivated and practiced for the benefit, well-being, and happiness of humans, positioning them within the broader framework of enlightenment factors. Their role in fostering mental resilience and insight is further elaborated in other sections of the *Pāli* Canon, including the *Saṃyutta Nikāya* and *Aṅguttara Nikāya*, where their development is linked to the progressive stages of meditative attainment and spiritual realization. By examining the historical and scriptural foundations of the Five Powers, it becomes evident that they serve not only as protective faculties against unwholesome states but also as active forces that enable practitioners to cultivate wisdom and ultimately attain liberation. Their balanced

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[94] D II 120; Maurice Walshe (tr.), *The Long Discourses of the Buddha.: A Translation of Dīgha Nikāya*, (Boston: Wisdom Publication, 1995), p. 253.

development is thus essential for both meditative progress and the realization of the ultimate goal in Buddhist practice.

The Mahāsatipaṭṭhāna Sutta, found in the twenty-second discourse of the Long Discourses (*Dīgha Nikāya*)[95], links mindfulness to the cultivation of the Five Powers. The practice of *Satipaṭṭhāna*, which has characteristics that promote the Five Powers (*pañcabala*), results in the various components of the *pañcabala* becoming more complete, as follows:

1. *Satipaṭṭhāna* promotes Faith (*saddhābala*): The practice of *Satipaṭṭhāna* enables one to see the true nature of phenomena (*sabhāvadhamma*) as they really are. One sees the body (*kāya*), feelings (*vedanā*), mind (*citta*), and mental objects (*dhamma*) as impermanent (*anicca*), suffering (*dukkha*), and not-self (*anattā*). Upon perceiving this reality, faith (*saddhā*) in the enlightened wisdom (*paññā*) of the Buddha arises. One believes that the Buddha is truly enlightened and no longer has doubts. This is *saddhā* that has strength, becoming *saddhābala* in the *pañcabala*, which has the power to suppress the lack of faith.

2. *Satipaṭṭhāna* promotes Effort (*viriyabala*): This refers to *ātāpi*, which is a component of the practice of *Satipaṭṭhāna*. It is the characteristic of making effort and striving continuously until it becomes strong as *viriyabala*. It promotes the *pañcabala* and suppresses laziness.

3. *Satipaṭṭhāna* promotes Mindfulness (*satibala*): Mindfulness (*sati*) is a component of the practice of *Satipaṭṭhāna.* When one cultivates *sati*, that is, continuously recollecting, *sati* becomes strong as *satibala*. It promotes the *pañcabala* and suppresses heedlessness.

4. *Satipaṭṭhāna* promotes Concentration (*samādhibala*): The continuous practice of *Satipaṭṭhāna* leads to the development of concentration (*samādhi*) that has strength, becoming *samādhibala*. It promotes the *pañcabala* and suppresses distraction.

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[95] D II 290-315; Maurice Walshe (tr.), *The Long Discourses of the Buddha.: A Translation of Dīgha Nikāya*, (Boston: Wisdom Publication, 1995), p. 335.

5. *Satipaṭṭhāna* promotes Wisdom (*paññābala*): *Sampajañña* in the practice of *Satipaṭṭhāna*, which is another name for wisdom (*paññā*), is a component of the practice of *Satipaṭṭhāna.* When one cultivates *sampajañña* or *paññā,* that is, being fully aware continuously, it leads to the development of *paññābala*, which suppresses delusion (*moha*) or ignorance (*avijjā*).

In the *Abhidhamma Piṭaka*, the Five Spiritual Powers are known as mental factors (*cetasikas*). *Saddhā* and *sati*, for instance, are classified as beautiful mental factors, *samādhi* under the name of *ekakkada*, as a universal mental factor, and *viriya*, as an occasional mental factor. They all can be developed to help one gain a tranquil mind or insight into reality. In the *Dhammasaṅgaṇī* (First book of the *Abhidhamma*), they are included among wholesome mental factors[96]. In *Abhidhammattha-saṅgaha*, they are classified as requisites of enlightenment[97]. Given that any moment of insight (*vipassanā ñāṇa*) will include these Five Powers to varying degrees, they can be categorized as universal qualities of the path. The *Theravāda* post-canonical and commentarial texts, such as the *Visuddhimagga* (The Path of Purification) by Buddhaghosa, provide a practical roadmap for the development of these Five Powers along the stages of insight meditation (*vipassanā*).

2.4.1.3 Meaning/Definition

The Five Spiritual Powers (*pañcabala*) are the power of the mind and insight that need to be cultivated, and which is attainable by the human being. They are essential strengths that support a Buddhist practitioner on the path to enlightenment. While their functions, definitions, natures, etc. are similar to those five faculties (*indriya*), they are different in terms of capacity. Power is regarded to be 'unshakable' by their opposite forces. The Five Powers are faith (*saddhā*), energy (*viriya*),

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[96] Dhs I 9; C.A.F. Rhys Davids (tr.), *A Buddhist Manual of Psychological Ethics*, 3rd Edition, (London: PTS, 2004), p. 3.

[97] Abhidh-s VII 27-28; Bhikkhu Bodhi (General Editor, tr. by Mahāthera Nārada), *A Comprehensive Manual of Abhidhamma: The Abhidhammattha Sangaha of Ācariya Anuruddha*, 3rd Edition, (Kandy: BPS, 2007) p. 280.

mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*). Faith gives confidence in the *Buddha*, *Dhamma*, and *Saṅgha*, helping one overcome doubt. Energy supports and sustains effort and perseverance, preventing laziness. Mindfulness keeps the mind attentive and aware, ensuring clarity in thought and action. Concentration stabilizes the mind, allowing deep meditative absorption. Wisdom discerns reality, leading to insight into impermanence, suffering, and non-self. These powers are significant because they counteract the Five Hindrances (doubt, sloth, restlessness, sensual desire, and ill-will) and create a strong foundation for spiritual progress. Faith is balanced by wisdom to avoid blind belief, while energy is balanced by concentration to prevent agitation. When these Five Powers are fully developed, they work together to remove ignorance and craving, ultimately leading to liberation (*Nibbāna*).

Definition of the Five Powers (*Pañcabala*)

The mental powers (*balāni*) are thus called because "they overpower opposing mental states." (*Pati pakkkha dhamme, balīyantīti balāni*)[98]. The commentarial explanation is that "they are powerful in the sense of being unshaken (*akampanaṭṭhena*) by the opposition. They are like five generals or commanders engaged in destroying the hostile kingdom of personality belief. They are the fivefold strength on which bhikkhus and lay-folk can place their reliance. And the Buddha said, "Bhikkhus, there are these Five Powers. What five? The power of faith, the power of energy, the power of mindfulness, the power of concentration, and the power of wisdom.

These Five Powers are often compared with or mentioned in their relation to *'Indriya'* (faculty). *Indriya saddhā* is a controlling faculty with limitations, and its control does not extend to the capacity to control the unstable minds of ordinary folk in the work of meditation (*bhāvanā*). This limited control is exercised over the instability only to the extent of leading to acts of almsgiving, morality, and rudimentary meditation. When this same *Indriya saddhā* becomes powerful and unshakable, then it

[98] Paramattha dīpanī, p. 347.

is called *saddhā bala.* Thus, *indriya* and *bala* share the same characteristics but different levels of power.

Definition of Faith (*Saddhā*)

Faith (*saddhā*) is mental clarity and confidence in the truth of the Buddha, Dhamma, and Sangha, and morality. It is not blind belief, but a trust rooted in reason and understanding. In the Numerical Discourses of the Buddha (*Aṅguttara Nikāya*, A 5.14), the Buddha said, "And what, bhikkhus, is the power of faith? Here, a noble disciple is endowed with faith. He places faith in the enlightenment of the *Tathāgata* thus: 'The Blessed One is an *arahant*, perfectly enlightened, accomplished in true knowledge and conduct, fortunate, knower of the world, unsurpassed trainer of persons to be tamed, teacher of devas and humans, the Enlightened One, the Blessed One.' This is called the power of faith."[99]

Faith is explained as '*adhimokkha*,' meaning making the decision, which refers to acceptance without confusion. When faith decides, the other mental factors follow automatically and perform their assigned tasks respectively. Mental factors that can follow and work with faith include twenty-five beautiful, six occasional, and seven universal mental factors. In Buddhist scripture, faith refers to trust in the Buddha's enlightenment, *'Tathagatassa bodhi.*[100]' It is this trust that is what it means by faith.

The power of faith (*saddhā-bala*), just as in the case of the faculties, is divided into two kinds:1) The power of ordinary faith (*pakatisaddhā*), and 2) the power of developed faith (*bhāvanāsaddhā*). "Ordinary faith" lacks development through specific practice and associates with *taṇhā* according to circumstances. As a result, it can produce only ordinary good actions (*pakati-kusala-kamma*) such as generosity or liberality, *dāna*, morality (*sīla*), etc. The limited measure of the strength of 'ordinary faith' cannot overcome craving, thus putting itself under the control of *taṇhā*. The second, the developed faith, is both strong and powerful enough to combat

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[99] A III 11-12; Bhikkhu Bodhi (tr.), *The Numerical Discourse of the Buddha. A Translation of Aṅguttara Nikāya,* (Boston: Wisdom Publication, 2012), p. 636.

[100] Mahāvaggasaṃyuttapāḷi, p. 172.

and dispel the craving that takes pleasure and enjoyment in three kinds of worldliness (*āmisa*). Because, as it said, it has 'its genesis in the successful practice of body contemplation (such as mindfulness of breathing) and being pursued until the disappearance of the distraction and unsettled condition of the mind.[101]'

Definition of Effort (*Viriya*)

Effort (*viriya*) is the mental effort to maintain and develop wholesome qualities while overcoming laziness. In the Numerical Discourses of the Buddha (*Aṅguttara Nikāya*, A 5.14), the Buddha said, "And what is the power of energy? Here, a noble disciple has aroused energy for abandoning unwholesome qualities and acquiring wholesome qualities; he is strong, firm in exertion, not casting off the duty of cultivating wholesome qualities. This is called the power of energy."[102]

In *Pāli*, the characteristic of *viriya* is '*paggaha lakkhaṇaṃ*' (lifting up), meaning that *viriya* lifts or holds the mind up. It also helps lift up other concurrent mental factors. As it is natural that people can feel exhausted, tired, low, or lack interest, etc., without the support of *viriya*, all other powers, such as mindfulness, concentration, and wisdom, can digress to their normal states. Thus, *viriya* is essential in supporting and sustaining the effort in mental development. When *viriya* exerts and lifts them, they can function and progress without falling. San Kyaung Sayadaw said, 'Wisdom is like a leader, and effort is like the workers,[103]' meaning without effort, wisdom cannot accomplish anything alone.

Sayadaw also explains the nature of *viriya* using different terms as they represent a specific aspect of effort. *Ārambha*, for instance, means 'arousing energy, or making an effort'. *Nikkama* means energy can make a person escape from the state of

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[101] Ledi Sayādaw, *The Requisites of Enlightenment Bodhipakkhiya Dīpanī: A Manual, (*Kandy: Buddhist Publication Society, 2011), BPS Online Edition, pp. 103-104.

[102] A III 11-12.

[103] San Kyaung Sayādawgyi, *Thesis on the Exposition of Kamma, Ñāṇa, and Viriya*, (Socialist Republic of the Union of Burma: Shewhintha Forest Pāli University, 1980), p. 100.

being a lazy person, and *parakkama* means effort has the character of causing one to a higher state of life, position, realization, etc. Other terms that present *viriya* include: *uyyāma, vāyāma, ussāha, ussoḷhi, thāma, diti, parakkamatā, anikkhitta chandatā anikkhittadhūratā, dhurasampaggaha, viriyindiya, vīriyabala, and sammāvāyāma*[104].

The function of *viriya* is '*upatthambhanarasa*,' which is translated as 'supporting, upholding, or stiffening up'. It can support, uphold, or stiffen up others, etc. It manifests in the practitioner as '*anosīdanapaccupaṭṭhānaṃ*,' meaning 'not slumping or collapsing.' *Osīdana* is translated as 'slums, retreats, collapses, immerses, sinks down, falls down, descends, etc.' Combined with na, it refers to a condition that is not slumping, collapsing, sinking down, retreating, etc. Most venerable Dr. Nandamalābhivamsa speaks of this as a state that is not slumping, a state where the mind and object are working tightly or closely[105]. Definition of Mindfulness (*Sati*)

Mindfulness (*sati*) is non-forgetfulness of the present moment and maintains a clear awareness of reality as it is. Forgetfulness (*muṭṭhasati*) is the obstacle that leads to distraction and heedlessness. To combat this, *sati* prevents negligence (*pamāda*) and allows attention to remain in the present moment. In the Numerical Discourses of the Buddha (*Aṅguttara Nikāya*, A 5.14), the Buddha said, "And what is the power of mindfulness? Here, the noble disciple is mindful, possessing supreme mindfulness and alertness, one who remembers and recollects what was done and said long ago. This is called the power of mindfulness." [106]

In Abhidhamma, Mindfulness is classified as *universal sobhana cetasika* which ensures awareness in all wholesome states. It is central to meditation and insight (*vipassanā*). As a person's *sati* progresses, clear comprehension (*sampajañña*) and sustained attention to the object of meditation increases. Mindfulness is a state that controls sense or retains attention (*ārāmaṇa patiggahahita*). Mindfulness brings the

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[104] Ibid., pp. 108-109.

[105] University of Wisdomland, *The Examination of the Bodhipakkhaya Dhamma, B.A part (3)*, The Curriculum Textbook,, p. 192.

[106] A III 11-12.

mind to meet the object. When one is mindful, one will be fully aware of the object. The function or task of mindfulness is to bring the object to mind. Without mindfulness, comprehension or understanding cannot arise (*na hi sativirahitā paññā nama atthi*).[107]

Definition of Concentration (*Samādhi*)

Concentration (*samādhi*) is the ability to keep the mind focused on a single object, free from distraction. In the Numerical Discourses of the Buddha (*Aṅguttara Nikāya*, A 5.14), the Buddha said, "And what is the power of concentration? Here, secluded from sensual pleasures, secluded from unwholesome states, a bhikkhu enters and dwells in the first *jhāna*, which consists of rapture and pleasure born of seclusion, accompanied by thought and examination. With the subsiding of thought and examination, he enters and dwells in the second *jhāna*, which has internal placidity and unification of mind and consists of rapture and pleasure born of concentration, without thought and examination. With the fading away as well of rapture, he dwells equanimous and, mindful and clearly comprehending, he experiences pleasure with the body; he enters and dwells in the third *jhāna* of which the noble ones declare: 'He is equanimous, mindful, one who dwells happily.' With the abandoning of pleasure and pain, and with the previous passing away of joy and dejection, he enters and dwells in the fourth *jhāna*, neither painful nor pleasant, which has purification of mindfulness by equanimity. This is called the power of concentration."[108]

Restlessness (*uddhacca*) is the opposite of concentration (*samādhi*), which scatters the mind. To stop restlessness, *saddhā* unifies the mind and prevents distraction (*uddhacca*). Another obstacle is worry (*kukkucca).* It refers to mental distress from regret, worry, or self-reproach over past actions or inactions. It is unwholesome (*akusala*) and hinders both meditation and peace of mind. When one is worried or distressed, one's mind can stay quiet but wander. Concentration is crucial for meditative absorption (*jāhana*) and supports wisdom by stabilizing attention. *Samādhi* removes these *uddhacca and kukkucca and establishes the mind in peace. Samādhi* has the

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[107] Visuddhimaggamahāṭīkā, p. 15.

[108] A III 11-12.

characteristics of not scattering. In *Pāli*, it is called '*avikkhepa lakkhaṇā,*[109]' meaning not 'being waving motion or throwing apart.' *Vikkhepa* means 'waving motion, throwing apart, disjunction, disconnection, disturbance, derangement, and confusion.[110]

Definition of Wisdom (*Paññā*)

Wisdom (*paññā*) is the ability to see reality as it truly is through insight into impermanence (*anicca*), suffering (*dukkha*), and non-self (*anattā*). In the Numerical Discourses of the Buddha (*Aṅguttara Nikāya*), the Buddha said, "And what is the power of wisdom? Here, a noble disciple is wise; he possesses the wisdom that discerns arising and passing away, which is noble and penetrative and leads to the complete destruction of suffering. This is called the power of wisdom."[111]

Delusion (*moha*) is the opposite force that obscures reality. The task of wisdom is to dispel ignorance (*moha*) and lead to right understanding (*sammā-diṭṭhi*). Proper attention (*yoniso manasikāra*), learning from wise teachings and cultivation of minds and wisdom are essential in developing insightful wisdom. Among all the faculties and powers, wisdom is the highest that culminates in insight and ultimate liberation. San Kyaung sayadaw classifies wisdom as '*jānatīti ñāṇaṃ*, meaning 'that which has the nature or capable of understanding or simply understands, is called wisdom.' Another meaning is '*yamdhammajātaṃ*,' meaning 'that acuteness or shrewdness which can understand the matter of any kind very well,' is called wisdom. Wisdom is used by different terms for its different nature and capacity. *Dhī*, for instance, is the term that represents one aspect of wisdom, which is the capacity to bring about success in any matter and affairs. Other terms include *Buddhi, mati, muti, vajjā, mantā, medhā, bhūrī, yonī, paṭibhāṇa, amoha*. In the *Dhammasangani*, the words that represent wisdom are *paññā/pajānanā, vicaya/pavicaya/ dhammavicaya, sallakkhaṇā/upalakkhaṇā, paccupalakkhaṇā, paṇḍicca, kosalla, nepuna, vebhabyā,*

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[109] Mūlapaṇṇāsaaṭṭhakathā, p.50.

[110] Digital Pāli dictionary, "Vikkhepa", https://dpdict.net/?q=Vikkhepa%20 (accessed May 27, 2024)

[111] A III 11-12.

cintā, medha, pariṇāyikā, vipassanā, patoda, paññindriya, paññābala, paññāsattha, paññāloka/ paññābhasa/ pannapajjota, and paññāratana.[112]

2.4.1.3 Key Principles

These Five Spiritual Powers are essential for the cultivation of mind and insight. In *Samatha* Meditation, *faith* aspires the meditator and prevents doubt, *energy* sustains the effort and bars laziness, *mindfulness* ensures present-moment awareness and prevents distractions, *concentration* stabilizes the mind and deepens the meditative state, and wisdom penetrates reality and dispels the illusion. In *Vipassanā* Meditation, these Five Powers arise naturally as insight deepens. Each power overcomes a specific defilement, purifying the mind. Ultimately, they lead to path (*magga*) and fruition (*phala*) knowledge, culminating in enlightenment.

The Role of the Five Powers in Cultivating Mental Strength and Resilience

The Five Powers play a critical role in strengthening the mind and developing insight, both of which are essential for overcoming and guarding against negative mental states. These powers contribute to mental strength and resilience by counteracting psychological obstacles and fostering stability in meditative practice. The highest form of mental resilience, however, is only achieved through the complete eradication of defilements (*kilesa*), a process facilitated by the cultivation of these Five Powers.

According to the principles of Buddhist psychology, as outlined in A Comprehensive Manual of Abhidhamma, the Five Powers are considered unshakable by their opposites. Each power functions to overcome specific mental hindrances: faith (*saddhā*) dispels doubt (*vicikicchā*), effort (*viriya*) counters laziness (*kosajja*), mindfulness (*sati*) eradicates negligence (*pamāda*), concentration (*samādhi*) stabilizes agitation and restlessness (*uddhacca*), and wisdom (*paññā*) eliminates delusion (*moha*).

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[112] San Kyaung Sayādawgyi, *Thesis on the Exposition of Kamma, Ñāṇa, and Viriya*, (Socialist Republic of the Union of Burma: Shewhintha Forest Pāli University, 1980), pp. 81-83.

These states, when developed, become unwavering and incapable of being subdued by their opposing forces. In the cultivation of these powers, it is crucial to maintain balance. Faith and wisdom must be harmonized to prevent the extremes of blind belief and mere intellectualism. Similarly, effort and concentration should be balanced to avoid restlessness on one end and mental stagnation on the other. However, mindfulness remains indispensable, as it functions as the supervisory faculty that ensures the proper development and equilibrium of the other powers. Each of these Five Powers can be examined in greater detail as follows:[113]

1. The Role of Faith/Confidence (*Saddhā*) – Helps Overcome Doubt and Indecision: Faith counteracts doubt (*vicikicchā*), one of the five hindrances (*nīvaraṇa*), which leads to hesitation and confusion about the path. Faith inspires one to take refuge in the Buddha, Dhamma, and Sangha, serving as the foundation for practice. Doubt arises from ignorance (*moha*) and lack of direct experience. Faith removes mental wavering and fosters a clear commitment to the path, which can lead one to liberation from mental suffering and dwell at ease. When a person has strong faith and trust in something or in his doings, that trust, in turn, can be a great source of motivation for him to start working.

2. The Role of Energy/Effort (*Viriya*) – Helps Overcome Laziness: Energy awakens the mind and keeps it engaged in spiritual practice. Energy counteracts sloth and torpor (*thīna-middha*), which cause mental dullness and stagnation. Properly balanced energy prevents both excessive striving (which leads to restlessness) and laxity (which leads to laziness). Sloth arises from attachment to comfort, overindulgence in food, or lack of motivation.

3. The role of Mindfulness (*Sati*) – Helps Overcome Negligence: Mindfulness brings clarity and presence, preventing distractions. By maintaining awareness, mindfulness keeps the mind on the right path. Mindfulness

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[113] Abhidh-s VII 27-28; Bhikkhu Bodhi (General Editor, tr. by Mahāthera Nārada), *A Comprehensive Manual of Abhidhamma: The Abhidhammattha Sangaha of Ācariya Anuruddha*, 3rd Edition, (Kandy: BPS, 2007) p. 281.

counteracts heedlessness (*pamāda*) and forgetfulness (*muṭṭhasati*), which lead to unwholesome habits and uncontrolled mental activity. Heedlessness allows unwholesome habits to take control.

4. The Role of Concentration (*Samādhi*) – Helps Overcome Agitation and Restlessness: Concentration (*samādhi*) counteracts restlessness (*uddhacca*), which scatters attention and prevents deep meditation. A concentrated mind is powerful, leading to both tranquility and insight. Restlessness arises from craving and excessive thinking. Concentration leads to deep mental stability, necessary for insight.

5. The role of Wisdom (*Paññā*) – Helps Overcome Delusion: Wisdom leads to liberation by seeing the nature of existence correctly. Wisdom counteracts delusion (*moha*), which obscures the truth and causes attachment and suffering. Delusion arises from ignorance and attachment to self-view and distorted views such as *vipallāsa*[114]. Wisdom leads to insight (*vipassanā ñāṇa*) and ultimately to liberation.

Concluding Remarks

The Five Spiritual Powers *(pañcabala*) in Buddhist psychology function as integral resilience factors, closely aligning with a number of evidence-based resilience factors identified in contemporary psychological research. For example, faith (*saddhā*) corresponds to a positive outlook and the ability to find meaning in adversity; energy (*viriya*) mirrors perseverance and the drive to push through challenges; mindfulness (*sati*) is akin to self-awareness and emotion regulation, helping individuals maintain emotional equilibrium under stress; concentration (*samādhi*) relates to cognitive control and the ability to focus amidst distractions; and wisdom (*paññā*) reflects insight and the capacity to maintain perspective during difficult situations.

Developing the Five Powers, therefore, can be conceptualized as a blueprint from the Buddha's teachings for cultivating a resilient mind. As noted by Buddhist teachers, applying these powers helps individuals in stressful events, preventing them from becoming traumatic. Instead, such experiences are integrated into one's

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[114] A II 52; Bhikkhu Bodhi (tr.), *The Numerical Discourse of the Buddha. A Translation of Aṅguttara Nikāya,* (Boston: Wisdom Publication, 2012), p. 438.

psychological framework, leading to personal growth. In this context, when difficult events are faced with the guidance of mindfulness, effort, faith, and wisdom, the pain associated with these experiences may pass, leaving individuals more resilient and better equipped to handle future challenges.

In essence, the Five Powers enhance an individual's capacity to endure crises without succumbing to breakdown, while simultaneously promoting recovery with greater wisdom and compassion. They address both the reactive side of resilience, which involves calming the mind and preventing destructive reactions to stress, and the proactive side, which involves finding meaning and taking positive, constructive actions in response to adversity. Through this integrated approach, the Five Powers provide a comprehensive framework for developing enduring mental strength and resilience.

2.5 Interventions for Enhancing Stress Resilience

Given the importance of resilience for mental well-being, a range of interventions have been developed to strengthen people's ability to cope with stress. Traditional psychological approaches to enhance resilience include cognitive-behavioral therapies, stress management programs, skills training workshops, and mindfulness and acceptance-based practices. In recent years, these approaches have been complemented by technology-based innovations (such as mobile apps and chatbots) designed to expand the reach of resilience-building strategies. This section reviews evidence on both conventional and technology-assisted interventions that aim to increase stress resilience.

2.5.1 Modern Psychology Approaches

1. Cognitive-Behavioral and Skills Training: Many resilience programs incorporate cognitive-behavioral therapy (CBT) principles, teaching individuals to reframe negative thoughts, manage reactions, and develop proactive coping skills. For example, *stress inoculation training* (Meichenbaum) uses CBT techniques to gradually expose individuals to manageable stressors and build coping strategies, thereby "inoculating" them against future stress. Such interventions often include psychoeducation about stress, training in relaxation techniques, and problem-solving

exercises. Evidence suggests these programs can modestly but significantly improve resilience. In a meta-analysis of 25 randomized trials of resilience training (across diverse adult samples), training interventions showed a *small-to-moderate* improvement in resilience scores (pooled standardized mean difference ~0.37) compared to controls. These interventions also tended to reduce psychological distress. For instance, trials targeting trauma-related stress have demonstrated reductions in stress symptoms (pooled SMD ~–0.53) and depression (SMD ~–0.51) in those who received resilience training, relative to no-training groups.[115] Although effects vary by program, this indicates that structured training can yield measurable gains in one's capacity to cope with stress.

2. Mindfulness and Relaxation-Based Interventions: Another widely used approach is training in mindfulness, meditation, and relaxation techniques. Mindfulness-Based Stress Reduction (MBSR), developed by Kabat-Zinn, is one well-known program that cultivates non-judgmental present-moment awareness to reduce stress reactivity. Mindfulness practices are thought to enhance emotional regulation, a key component of resilience. Reviews of digital and in-person mindfulness interventions show they consistently help reduce perceived stress and improve well-being. For example, guided mindfulness programs have been found to lower stress levels and boost positive mood, especially when practiced regularly.[116] Such practices likely bolster resilience by increasing tolerance of discomfort, improving focus, and preventing ruminative responses to stress. Deep-breathing exercises, progressive muscle relaxation, and yoga are related techniques often included in stress resilience workshops to reduce physiological arousal and build a habit of calming oneself amid challenges.

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[115] Leppin, A. L., et al., "The Efficacy of Resiliency Training Programs: A Systematic Review and Meta-analysis of Randomized Trials", *PLoS ONE*, Vol. 9, No. 10, (2014): e111420.

[116] Schultchen, D., et al., "Effects of a Chatbot-based Intervention on Stress and Health-related Parameters in a Stressed Sample: Randomized Controlled Trial", *JMIR Mental Health*, Vol. 11, No. 5, (2024): e43051.

3. Positive Psychology and Social Support: Resilience has also been enhanced through interventions that build on positive psychology concepts – for instance, fostering optimism, gratitude, and social connectedness. Coaching programs sometimes train individuals in optimistic thinking patterns (disputing catastrophic thoughts, recognizing personal strengths) following the model of *learned optimism*. Other programs emphasize strengthening one's social support network, given that having caring relationships is one of the strongest buffers against stress.

4. Group-based resilience trainings allow participants to share experiences and solutions, thereby enhancing social connectedness and collective efficacy. One example is the Penn Resilience Program, originally developed for U.S. Army soldiers and later adapted to workplaces and schools, which combines CBT and positive psychology exercises to build mental resilience (e.g. identifying "thinking traps," using gratitude journals, setting goals). Social and emotional learning programs for youth – while outside the working-age scope – also contribute to resilience by instilling coping and interpersonal skills early in life.

Overall, traditional interventions have shown encouraging results in increasing resilience and reducing stress-related problems, though effects are sometimes modest. A systematic review of workplace resilience training programs (14 studies across 2003–2014) reported that 12 of 14 studies found significant positive impacts from the trainin. Common outcomes included decreases in stress, depression or anxiety symptoms and improvements in positive mood and well-being.[117] Beyond mental health, some broader benefits were noted – for example, some trainings led to improved psychosocial functioning (e.g. higher self-efficacy, work satisfaction, social skills) and better job performance (e.g. goal attainment, productivity).

These findings suggest that bolstering resilience has ripple effects on various aspects of an individual's work and life functioning. However, the evidence base is still

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[117] Robertson, I. T., Cooper, C. L., Sarkar, M., & Curran, T. (2015). Resilience training in the workplace from 2003 to 2014: a systematic review. **Journal of Occupational and Organizational Psychology**, 88(2), 533–562

limited (many studies had small samples or short follow-ups), so conclusions must be tentative. A more recent mixed-method study during the COVID-19 pandemic further supports the value of resilience interventions: French employees who underwent a brief online resilience coaching (the SPARK Resilience program, 8 sessions) showed significant gains in resilience, meaning in life, positive affect, and reduced perceived stress compared to a control group (with moderate effect sizes $d \approx 0.40–0.56$).[118] These improvements illustrate that even amid acute global stressors, structured training can strengthen adults' capacity to adapt. Participants in that program also reported high satisfaction and described concrete benefits, underscoring the practicality and acceptability of such interventions.

Concluding Remarks

Modern psychology approaches – from cognitive-behavioral techniques to mindfulness and coaching – provide a toolkit for enhancing stress resilience. They typically work by increasing adaptive thinking, emotional regulation, and social resources, which in turn mitigate the impact of stress. While not everyone responds equally to a given approach, the overall research indicates that resilience *can* be learned and reinforced. This sets the stage for exploring new delivery methods, such as digital technologies, to make resilience-enhancing practices more accessible.

2.5.2 Buddhist Psychology Approaches

Ancient contemplative traditions have long addressed mental resilience and well-being. In Buddhist psychology, a notable framework for developing inner strength is the teaching of the Five Spiritual Faculties or Powers, called *pañcabalā* in *Pāli*/Sanskrit. These five qualities – *faith* (confidence or trust, *saddhā*), *energy* (persevering effort, *viriya*), *mindfulness* (*sati*), *concentration* (mental focus, *samādhi*), and *wisdom* (discernment, *paññā*) – are considered fundamental powers that protect and empower the mind. The Buddha is recorded in the *Pāli* Canon as saying:

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[118] Boniwell, I., Osin, E., et al. (2023). SPARK Resilience in the workplace: Effectiveness of a brief online resilience intervention during the COVID-19 lockdown. **PLoS ONE**, 18(3): e0271753

*"*Bhikkhus, there are these five powers. What five? The power of faith, the power of energy, the power of mindfulness, the power of concentration, and the power of wisdom. These are the five powers."[119]

These five powers, when cultivated, contribute to mental stability and are counted among the thirty-seven factors of enlightenment in Buddhist doctrine. According to Buddhist teachings, each of the Five Powers counteracts a particular weakness or obstacle in the mind. Faith (*saddhā*) counteracts doubt and despair, providing a sense of trust in oneself, others, or a higher purpose. Energy (*viriya*) overcomes laziness and resignation, supplying the courage and effort to face difficulties.

Mindfulness (*sati*) counters heedlessness and confusion by keeping one's awareness grounded in the present reality. Concentration (*samādhi*) dispels distraction and agitation, leading to a calm and collected mind. Wisdom (*paññā*) dispels ignorance and delusion, enabling one to see situations clearly and respond appropriately. In essence, these powers function as internal resources that make the mind resilient against stress and adversity – they are "powers" in the sense that they cannot be easily shaken by their opposites once fully developed.[120]

The Five Powers are cultivated through Buddhist practices such as ethical living, meditation, and insight development. For example, *mindfulness and concentration* are strengthened via meditation training, which in modern contexts has been shown to improve stress tolerance. *Energy/effort* is developed by consistently engaging in wholesome practices even when challenges arise (building a habit of persistence). *Faith* in a positive outcome or in one's practice can foster optimism and reduce anxiety. *Wisdom* grows from learning and reflection, giving one a deeper understanding of life's ups and downs. Together, these qualities reinforce each other;

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[119] A III 13; Bhikkhu Bodhi (tr.), *The Numerical Discourse of the Buddha. A Translation of Aṅguttara, Nikāya,* (Boston: Wisdom Publication, 2012), p. 636.

[120] Conze, E., *The Five Spiritual Faculties*, (Kandy: Buddhist Publication Society, 1968), pp. 4-68.

traditional sources note that *"each power reinforces the next"* – e.g. faith inspires effort, effort sustains mindfulness, mindfulness leads to concentration, and deep concentration cultivates wisdom[121].

Modern interpretations often frame these powers as internal *resources* that anyone (not only monastics) can develop to enhance psychological well-being. Indeed, contemporary mindfulness-based therapies implicitly draw on these principles: for instance, mindfulness and wisdom correspond to awareness and cognitive insight in therapy, energy/effort relates to actively engaging in one's healing, and faith can be likened to the client's trust in the process and hope for change. By integrating such qualities, individuals become more *centered, adaptive, and resilient* in the face of stress. It is worth noting that the Buddhist concept of resilience is not merely about *bouncing back* to a prior state, but about growing inner strengths that prevent suffering in the first place. In Buddhist thought, true resilience might manifest as equanimity – remaining mentally steady and compassionately engaged amid life's vicissitudes.

The Five Powers provide a framework for cultivating this equanimity. For example, a person grounded in mindfulness and wisdom might respond to a work crisis with clear awareness and insight, rather than panic; with sufficient faith and effort, they maintain confidence and diligence until the issue is resolved. Such a person would likely experience less mental turmoil and recover faster, demonstrating resilience. Traditional texts even claim that one who fully develops the Five Powers "dwells happily in this very life without distress or fever" despite life's difficulties[122] – essentially describing a state of robust mental well-being. While secular interventions do not use this language, the essence is similar: building inner strengths that confer the ability to handle stress and thrive. Thus, Buddhist psychology, through teachings like the Five Powers, offers a spiritual perspective on resilience that complements

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[121] Conze, E., *The Five Spiritual Faculties*, (Kandy: Buddhist Publication Society, 1968), pp. 4-68.

[122] A III 3; Bhikkhu Sujato (tr.), "The Numerical Discourse of the Buddha: Power of a Trainee", https://suttacentral.net/an5.3/en/sujato?lang=en&layout=plain&reference=none&notes=asterisk&highlight=false&script=latin (accessed May 29, 2024).

psychological approaches, emphasizing moral and contemplative practices to develop enduring mental strengths.

2.6 Integration of Buddhist Psychology in Stress Resilience Interventions

Integrating Buddhist principles – specifically the Five Powers – into modern stress resilience interventions is an innovative approach that could enrich these programs. The idea is to map each of the Five Powers to activities or techniques that cultivate that quality in a secular, accessible way. Many contemporary interventions already incorporate one or more of these elements (especially mindfulness), but a Five Powers framework ensures a holistic coverage of resilience-building from a Buddhist psychology perspective.

1. Cultivating Faith/Confidence: In a resilience program, this could be translated into building optimism, hope, and a sense of purpose in participants. Exercises might include identifying one's strengths and past successes, practicing gratitude, or visualization of coping successfully. In Buddhist practice, faith is also nurtured by being part of a supportive community (Sangha) and hearing inspirational stories – similarly, group resilience workshops could involve sharing success stories or mentorship to instill confidence. The key is to help individuals believe "I can handle this" (self-efficacy) and "Life can improve" (hope). Even without religious connotations, fostering a positive outlook and trust – in oneself and possibly in something greater (like trust in the process of growth) – corresponds to the "I Have" and "I Am" aspects of resilience (having support, and being capable). This addresses the tendency toward despair or helplessness.

2. Cultivating Energy/Perseverance: Interventions can include goal-setting and action plans to encourage people to take initiative in the face of stress. For example, a coach or chatbot might prompt users to set a small daily challenge (like taking a walk or tackling one feared task) and then cheer their effort. Techniques from behavioral activation (a therapy approach that encourages engagement in meaningful activities) fit well here – they essentially boost one's viriya by getting the person moving and re-engaged with life. Another method is teaching about the importance of healthy routines

(sleep, exercise, nutrition) – because physical vitality feeds mental energy. In a workshop, facilitators might use motivation-enhancing questions (e.g., "Think of a time you overcame a difficult obstacle – what kept you going?") to help participants tap into their innate perseverance and learn strategies to fight procrastination or fatigue. The goal is to strengthen one's resilient action – the ability to keep putting one foot in front of the other under stress.

3. Cultivating Mindfulness: This is perhaps the most direct integration, as mindfulness meditation has already been widely adopted in stress reduction programs (like MBSR) with great success. An intervention might include guided mindfulness sessions (focusing on breath or body scan), mindful movement (such as yoga or Tai Chi), or simply training in mindful breathing to use during stressful moments. Participants learn to observe their stress reactions non-judgmentally. Many digital interventions (apps, online courses) teach mindfulness through audio exercises, and some chatbots guide users through short mindfulness check-ins.[123] By training mindfulness, individuals gain greater awareness of their thoughts and feelings, which is the first step in managing them. Mindfulness also complements cognitive techniques – for instance, one must be mindful of a negative thought's occurrence before one can reframe it. In resilience terms, mindfulness enhances emotion regulation and present focus, preventing excessive worry about past/future.

4. Cultivating Concentration: In a modern context, this might not be taught as often explicitly, but it is implicit in many practices. Any form of meditation or breathing exercise also builds concentration. Some interventions might include focus-enhancing practices like attention training (e.g., focusing on a candle flame or a mantra for a short period) to improve mental discipline. Another angle is teaching time-management and attention-management skills: helping people create environments that minimize distractions, or techniques like Pomodoro (focused work intervals) which strengthen one's ability to concentrate on tasks despite stress. By improving

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[123] Haque, M. D. R. and Rubya, S., "An Overview of Chatbot-Based Mobile Mental Health Apps: Insights From App Description and User Reviews", *JMIR Mhealth Uhealth*, Vol. 11 (May 2023): e44838.

concentration, a person becomes less scatterbrained under pressure and can stick with helpful practices (such as continuing to journal or exercise rather than quitting out of restlessness). In essence, we want to cultivate a stable mind that can center itself. Biofeedback or tech tools that encourage single-pointed focus (such as mindfulness apps that ask users to continually return to a sound or visual) can serve this goal as well.

5. Cultivating Wisdom/Insight: Integrating wisdom might involve reflective components in interventions. For example, journaling exercises where participants write about a stressful event and then reflect: "What did I learn from this? Could there be any silver lining? How might someone else view this situation?" – such prompts encourage perspective-taking and meaning-making, which are aspects of wisdom. Another approach is teaching some principles of cognitive appraisal – essentially educating why our interpretations matter (which aligns with Buddhist insight that our mind's view shapes our experience). Storytelling or discussing philosophical perspectives on life's challenges (in a non-dogmatic way) can also spark insight. Some resilience programs incorporate elements of values clarification (from Acceptance and Commitment Therapy): identifying one's core values and how adversity can sometimes deepen one's commitment to those values. This echoes the Buddhist idea of using challenges as fuel for enlightenment – in secular terms, as fuel for personal growth. By fostering wisdom, we help individuals see beyond the immediate discomfort of stress and understand the bigger picture, thereby reducing catastrophic thinking. Wisdom also means knowing what one can change and what one cannot, akin to the serenity prayer – an extremely useful resilience skill.

Some existing resilience interventions already implicitly cover similar ground. For instance, Acceptance and Commitment Therapy (ACT) teaches acceptance (mindfulness/faith) and committed action (energy) towards values (wisdom) – which overlaps significantly with the Five Powers approach. The integration of Buddhist psychology can thus provide a cohesive narrative and centuries-old wisdom to underpin these techniques. Moreover, Buddhist-derived practices like mindfulness and loving-

kindness meditation have empirical support for improving emotional well-being and resilience, so incorporating them can enhance an intervention's effectiveness.[124]

While formal research specifically on "Five Powers-based" interventions is still sparse, the concept aligns with well-known protective factors. For example, positive psychology interventions often cultivate optimism/faith and character strengths (self-belief), CBT cultivates problem-solving and coping skills ("I can"), and mindfulness-based programs obviously cultivate mindfulness and a degree of concentration and insight. A review of resilience factors notes that having meaning in life, active coping, self-efficacy, optimism, cognitive flexibility, and social support are all associated with greater resilience.[125]

These map remarkably well onto the Five Powers plus social support. Faith gives meaning and optimism, energy relates to active coping and self-efficacy (the will to act), mindfulness and concentration contribute to cognitive flexibility and emotion regulation, and wisdom helps one leverage support and see the value of relationships. Thus, integrating the Five Powers can be seen as an elegant way to ensure a resilience program touches all these evidence-based factors in a balanced manner.

In summary, blending Buddhist psychological principles like the Five Powers into stress resilience interventions can provide a spiritually informed, yet practical toolkit for individuals. It addresses resilience at a deeper level – not just changing surface behaviors but transforming one's mind and relationship to stress. This holistic cultivation (confidence, perseverance, mindful awareness, focus, and insight) can empower people to face life's inevitable difficulties with greater calm, courage, and wisdom.

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[124] Helmreich, I., Kunzler, A., Chmitorz, A., König, J., Binder, H., Wessa, M., and Lieb, K., "Psychological Interventions for Resilience Enhancement in Adults", *Cochrane Database of Systematic Reviews*, Vol. 2017, No. 2 (February 2017): CD012527.

[125] Ibid.

2.7 Relevant Research

An increasing number of chatbots focused on mental health are emerging, addressing a range of mental health challenges. These chatbots offer diverse functions, including educational resources, self-help techniques, as well as diagnostic and counseling services.

Gabrielli S., et al.[126], conducted a proof-of-concept study on Engagement and Effectiveness of a Healthy-Coping Intervention via Chatbot for University Students. In the study, Atena, a psychoeducational chatbot was designed to support healthy coping with stress and anxiety among university students during the challenging period of the COVID-19 pandemic. The study involved 71 university students who engaged with the Atena chatbot over a 4-week period. Notably, participants demonstrated substantial engagement, interacting with the chatbot an average of 78 times. Attrition rates were relatively low, with 86% of participants completing the first 2 weeks and 58% completing the full intervention.

Results from the study indicated a significant decrease in anxiety symptoms for participants, particularly in more extreme Generalized Anxiety Disorder (GAD-7) score ranges. Moreover, there was a notable reduction in stress symptoms, as measured by the Perceived Stress Scale (PSS-10), for all participants post-intervention. Positive improvements were also observed in participants' mindfulness, particularly in the describing and nonjudging facets.

The study underscores the potential benefits of deploying digital healthy-coping interventions via chatbots to support university students experiencing elevated distress, especially during the unique circumstances of the COVID-19 pandemic. While the findings show promise, the authors acknowledge the need for further research to confirm and extend these conclusions.

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[126] Gabrielli, S., et al., "Engagement and Effectiveness of a Healthy-Coping Intervention via Chatbot for University Students During the COVID-19 Pandemic: Mixed Methods Proof-of-Concept Study", *JMIR Mhealth Uhealth*, Vol. 9, No. 5, (2021): e27965.

In addition, in this exploratory study by Mauriello et al.[127], a suite of mobile chatbot, termed Popbots, was developed and evaluated for daily stress management. Recognizing that a significant percentage of primary care visits involve psychological stress components, the study aimed to address the gap in stress management advice provision. The researchers conducted an initial Wizard of Oz study to evaluate the feasibility of a suite of multiple chatbots, followed by a web-based study with 47 participants randomly assigned to different Popbots based on proven cognitive or behavioral intervention methods.

Results from the study, involving 66% completion by participants, indicated that users found conversations with Popbots helpful or at least neutral, fostering a positive sentiment toward chatbots for proactive stress management. Notably, users engaging more frequently with the system experienced a decrease in depression symptoms. Follow-up interviews highlighted that half of the common daily stressors could be effectively discussed with chatbots, potentially alleviating the burden on human coping resources.

The study's findings suggest that suites of shallow chatbots, like Popbots, may offer benefits for both users and designers. The contributions of this research include the design and evaluation of a novel suite of shallow chatbots for daily stress management, insights into the benefits and challenges of random delivery of multiple conversational interventions, and valuable design guidelines for future research in similar systems, encompassing both chatbot systems and artificial intelligence-enabled recommendation algorithms.

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[127] Mauriello, et al., "A Suite of Mobile Conversational Agents for Daily Stress Management (Popbots): Mixed Methods Exploratory Study", *JMIR Form Res*, Vol. 5, No. 9, (2021): e25294.

Furthermore, in the randomized, controlled trial conducted by Eckhard F. Kleinau et al.[128], the effectiveness of the interactive chatbot, Vitalk, in improving the mental wellbeing and resilience outcomes of health workers in Malawi during the COVID-19 pandemic was investigated. The 8-week study involved 1,584 participants from various professional cadres in healthcare facilities. The treatment arm utilized Vitalk, while the control arm received links to Internet resources. Results, analyzed through mixed-effects linear models, effect size estimates, and reliable change assessments, supported the hypothesis. Vitalk demonstrated a reduction in depression, anxiety, and burnout, with significantly greater improvements in resilience and resilience-building activities compared to the control group. This study, the first of its kind in Southern Africa during the pandemic, revealed the potential of Vitalk to address mental health challenges among healthcare workers in a region where such support is not readily available.

Buddhist Psychology as a Framework for Stress Resilience

Buddhist psychology provides a comprehensive framework for understanding and managing stress, emphasizing the Five Spiritual Powers (*pañcabala*) as key to cultivating mental resilience. Its positive approach to mental health has been increasingly recognized in psychological literature.[129] Previous research has demonstrated a significant positive correlation between the Five Spiritual Powers—faith (*saddhā*), effort (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*)—and resilience levels.[130] Substantial evidence supports the role of these components in enhancing resilience and managing stress. Each of the Five Spiritual

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[128] Eckhard, F. Kleinau, et al., "Effectiveness of A Chatbot in Improving the Mental Well-being of Health Workers in Malawi During The COVID-19 Pandemic: A Randomized, Controlled Trial", *MedRxiv***,** (2023): 1-15.

[129] Wallace, B. A. and Shapiro, S. L., "Mental Balance and Well-Being: Building Bridges Between Buddhism and Western Psychology", *American Psychologist*, Vol. 61, No. 7 (2006): 690-701.

[130] Phophichit, N., "Buddhist Psychological Factors Related to Resilience of Adolescents in Bangkok", *Journal of MCU Peace Studies*, Vol. 5, No. 1, (2017): 253-263.

Powers contributes to stress management and resilience-building in distinct yet interconnected ways.

For instance, Faith (*saddhā*) – Confidence and Emotional Stability refers to trust in the Dhamma, in one's practice, and in the potential for inner transformation. It reduces stress by fostering hope and emotional security, minimizing anxiety and self-doubt when facing challenges. Faith encourages a positive outlook and strengthens one's ability to persevere in difficult situations. Studies have shown that religious belief (*saddhā*) positively impacts coping mechanisms, particularly in response to crises such as COVID-19-related stress.[131] Effort (*viriya*) – Motivation and Perseverance represents persistent effort and determination when encountering difficulties. It supports stress management by encouraging proactive coping strategies, ensuring that individuals continue practicing mindfulness, meditation, or problem-solving rather than remaining passive or succumbing to despair. Research has demonstrated that effort (*viriya*) has a significant impact on resilience, accounting for 43.60% of the variance, with statistical significance at $p < .001$, highlighting its crucial role in fostering resilience.[132]

Mindfulness (*sati*) – Awareness and Presence in the Moment is a core mechanism for stress reduction, allowing individuals to recognize stress triggers without reacting impulsively. By maintaining awareness of thoughts, emotions, and bodily sensations, mindfulness interrupts automatic stress responses, fostering clarity and composure. While mindfulness is central to Buddhist teachings, it has also been widely adopted in Western psychological interventions such as Mindfulness-Based

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[131] Petrov, A., Poltarykhin, A., Alekhina, N. and Nikiforov, S., "The Relationship Between Religious Beliefs and Coping with the Stress of COVID-19", *HTS Teologiese Studies / Theological Studies*, Vol. 77, No. 1 (2021).

[132] Phophichit, N., "The Effects of Buddhist Psychological Factors on the Resilience of Adolescents in Bangkok", *Journal of International Association of Buddhist Universities*, Vol. 12, No. 3 (2019): 353-365.

Stress Reduction (MBSR).[133] However, Buddhist psychology extends beyond mindfulness alone, incorporating a broader set of principles that contribute to resilience-building. Studies indicate that mindfulness (*sati*) significantly enhances resilience, explaining 41.20% of the variance, with the same high level of statistical significance ($p < .001$).[134] Moreover, mindfulness-based interventions (MBIs) have been extensively studied for their effectiveness in reducing stress, anxiety, and depression.[135]

Concentration (*samādhi*) – Mental Stability and Focus allows individuals to remain centered and focused, preventing emotional overwhelm. Deep meditative absorption (*samādhi*) is linked to reduced anxiety and fosters lasting transformations in attention, emotional regulation, and cognitive flexibility.[136] Developing focused attention helps individuals disengage from stress-inducing distractions and negative thought patterns, promoting inner calm and psychological stability.

Wisdom (*paññā*) – Insight and Understanding of Reality enables individuals to perceive stress and impermanence with clarity, reducing attachment to distressing emotions. It encourages cognitive reappraisal, allowing individuals to see stress as a learning experience rather than a threat. By realizing the Three Characteristics (*tilakkhana*)—that stress or stressors are impermanent (*anicca*), inherently unsatisfactory (*dukkha*), and beyond one's control (*anattā*)—one develops a deeper

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[133] Kabat-Zinn, J., "Mindfulness-Based Interventions in Context: Past, Present, and Future", *Clinical Psychology: Science and Practice*, Vol. 10, No. 2 (2003): 144-156.

[134] Phophichit, N., "The Effects of Buddhist Psychological Factors on the Resilience of Adolescents in Bangkok", *Journal of International Association of Buddhist Universities*, Vol. 12, No. 3 (2019): 353-365.

[135] Khoury, B., Lecomte, T., Fortin, G., Masse, M., Therien, P., Bouchard, V., Chapleau, M.-A., Paquin, K. and Hofmann, S. G., "Mindfulness-Based Therapy: A Comprehensive Meta-Analysis", *Clinical Psychology Review*, Vol. 33, No. 6 (2013): 763-771.

[136] Yamashiro, J., "Brain Basis of Samadhi: The Neuroscience of Meditative Absorption", *Journal Name*, Vol. 13, No. 1 (2015): 1-10.

sense of acceptance and resilience. This wisdom forms the foundation for stress resilience and the alleviation of suffering. Previous research has shown that wisdom and knowledge play a significant role in enhancing resilience for individuals experiencing stress.[137] Additionally, resilience, mastery, and perceived stress fully mediated the positive association between wisdom and subjective well-being in adults, highlighting the critical role wisdom plays in well-being and stress management.[138] Through this realization, individuals enhance their capacity to navigate life's fluctuations with clarity, ultimately fostering greater psychological flexibility and well-being.

The findings collectively highlight the importance of the Five Spiritual Powers in enhancing stress resilience. Each power fosters cognitive, emotional, and behavioral tools essential for coping with stress and building resilience. Faith instills confidence in overcoming challenges, while energy drives consistent effort in applying stress management techniques. Mindfulness and concentration cultivate awareness and mental clarity, and wisdom provides insight into the nature of stress and its triggers. The SabaiJai intervention program is structured around these Five Powers, offering users a comprehensive, culturally grounded framework for stress resilience. Additionally, Buddhist teachings on compassion and equanimity contribute to resilience by promoting balanced emotional responses and reducing interpersonal stress.[139] By incorporating these teachings into SabaiJai's content, the program aligns with contemporary research that highlights the effectiveness of compassion-focused

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[137] Yuliasih, Y. and Akmal, S. Z., "The Role of Wisdom and Knowledge on Resilience in Students Experiencing Academic Stress", *Jurnal Psikologi Ilmiah*, Vol. 9, No. 2 (2017): 1-15.

[138] Ardelt, M. and Dilip, V. J., "Wisdom as a Resiliency Factor for Subjective Well-Being in Later Life", *Psychosoziale und Medizinische Rehabilitation*, Vol. 118 (2022): 13-28.

[139] Gilbert, P., *The Compassionate Mind*, (London: Constable & Robinson, 2010), p. 215.

interventions in enhancing mental well-being.[140] Furthermore, the synergy between Buddhist concepts and contemporary resilience theories underscores the potential of Buddhist psychology as a culturally resonant framework for stress management.[141]

Gaps in Existing Research

Despite the growing body of research on mental health chatbots and the recognized value of Buddhist principles in enhancing stress resilience, several gaps remain in the literature:

Limited culturally adapted chatbots: Most mental health chatbots have been developed and tested in Western contexts, with limited research on their effectiveness in non-Western cultures, particularly in Southeast Asian countries like Thailand. Unique sociocultural factors, such as face culture—the emphasis on maintaining one's social reputation and avoiding shame—and the stigma surrounding mental health in Asia, complicate the deployment of AI-based mental health interventions in these regions, which underscores the need for culturally adapted mental health interventions in Southeast Asia, to effectively address local mental health challenges.[142]

Integration of Buddhist principles: While numerous psychological interventions for stress resilience exist, many rely on Western frameworks like Cognitive Behavioral Therapy (CBT) and Mindfulness-Based Stress Reduction (MBSR), which lack cultural adaptation for societies where religion plays a key role. Existing mental health chatbots in Thailand, such as Psyjai and Pakjai, also do not

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[140] Van Gordon, W., Shonin, E. and Griffiths, M. D., "Towards a Second-Generation of Mindfulness-Based Interventions", *Australian & New Zealand Journal of Psychiatry*, Vol. 49, No. 7 (2015): 591-592.

[141] Christopher, J. C. and Maris, J. A., "Integrating Mindfulness as Self-*Care into Counselling and Psychotherapy Training", Counselling* and Psychotherapy Research, Vol. 10, No. 2 (2010): 114-125.

[142] Day, M. J., "Towards Ethical Artificial Intelligence in Universities: ChatGPT, Culture, and Mental Health Stigmas in Asian Higher Education Post COVID-19", *Journal of Technology in Counselor Education and Supervision*, Vol. 4, No. 1 (2023): Article 5.

integrate Buddhist principles, limiting their cultural relevance and appeal. Therefore, there is a lack of research on comprehensive chatbot systems that fully integrate Buddhist psychological principles. Moreover, to our knowledge, no chatbots developed so far have integrated the principles of Buddhist Psychology and the Buddha's teaching.

Focus on the working-aged population: Many studies on mental health chatbots have focused on younger populations, such as college students.[143] There is a need for more research on interventions tailored specifically for working-aged individuals facing occupational stress.[144] This group is ideal for chatbot-based interventions since moderate work-related stress is less risky and less ethically sensitive to address with a chatbot-based support tool, unlike broader mental health issues, which often require human professionals.

Combination of fixed content and AI-driven interactions: While some chatbots offer predefined content and others use AI for free-form conversations, there is limited research on systems that effectively combine both approaches. Incorporating AI into a mental health chatbot carries unique ethical issues, and there is a growing need for research into their benefits and risks.[145]

This study aims to address these gaps by developing and evaluating SabaiJai, a culturally adapted chatbot that integrates Buddhist principles with modern stress

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[143] Mahmud, T. R. and Porntrakoon, P., "The Use of AI Chatbots in Mental Healthcare for University Students in Thailand: A Case Study", *2023 7th International Conference on Business and Information Management (ICBIM)*, (2023): 1-6.

[144] Carolan, S., Harris, P. R. and Cavanagh, K., "Improving Employee Well-Being and Effectiveness: Systematic Review and Meta-Analysis of Web-Based Psychological Interventions Delivered in the Workplace", *Journal of Medical Internet Research*, Vol. 19, No. 7 (2017): e271.

[145] Coghlan, S., Leins, K., Sheldrick, S., Cheong, M., Gooding, P. and D'Alfonso, S., "To Chat or Bot to Chat: Ethical Issues with Using Chatbots in Mental Health", *Digital Health*, Vol. 9 (2023): 20552076231183542.

resilience techniques, targets working-aged Thai individuals, and combines structured interventions with AI-driven free-form interactions.

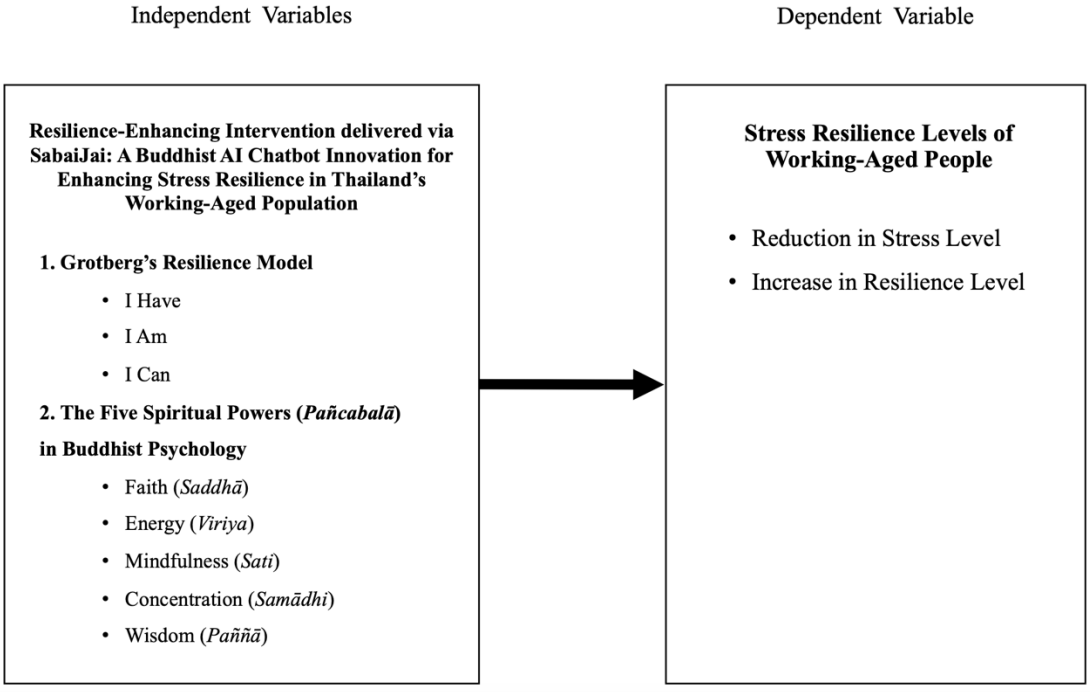
2.8 Conceptual Framework

The conceptual framework of this research, titled “Chatbot Innovation for Enhancing Stress Resilience Based on Buddhist Psychology in Working-Aged People,” is designed to investigate the development and effectiveness of an innovative chatbot system aimed at enhancing stress resilience. The primary objectives of this research are to develop and evaluate the chatbot system and assess its impact on stress resilience in working-aged individuals.

The study utilizes independent and dependent variables to measure the effectiveness of the stress resilience-enhancing intervention. The independent variable is the Stress Resilience-Enhancing Intervention, delivered through the chatbot innovation (@sabaijaibot) on the Line application. The dependent variable is the stress resilience levels of working-aged individuals, which will be assessed using two key instruments. The Stress Test Questionnaire (ST-5), developed by the Department of Mental Health, Ministry of Public Health, Thailand, measures stress levels, with a lower score indicating reduced stress. The Resilience Assessment, also developed by the Department of Mental Health, evaluates psychological resilience, with a higher score indicating an enhanced ability to adapt and thrive under stress. These two measures will provide a comprehensive assessment of stress resilience for participants in the study.

The research hypotheses predict that the experimental group will experience positive changes in stress resilience levels compared to the control group. Additionally, significant changes in stress resilience levels are expected within the experimental group between the pretest and posttest assessments. The conceptual framework aims to explore the impact of the novel chatbot system, grounded in Buddhist Psychology, on stress resilience in Thai working-aged individuals. By employing a mixed-methods approach, the framework seeks to provide a thorough understanding of the chatbot system's effectiveness in enhancing stress resilience, as illustrated in the figure below.

Figure 2.7 The Conceptual Framework



Chapter 3

Research Methodology

The research, titled “Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People,” employed a mixed-methods research methodology. The first phase of the study utilized a qualitative research design involving literature review and in-depth interviews. This approach facilitated a broad and profound understanding of the concept of stress resilience within both the western psychological paradigm and Buddhism. Subsequently, a quantitative research design was applied in the second part of the study. Data obtained from the qualitative phase were employed to develop content for the Stress Resilience-Enhancing Intervention (SREI) delivered via Chatbot Innovation (@sabaijaibot) on the Line application as a research instrument. The mixed-methods approach is illustrated as follows:

3.1 Research Design

3.2 Phrase 1: Qualitative Research Design

- 3.2.1 Key-informants
- 3.2.2 Research Instruments
- 3.2.3 Data Collection
- 3.2.4 Data Analysis

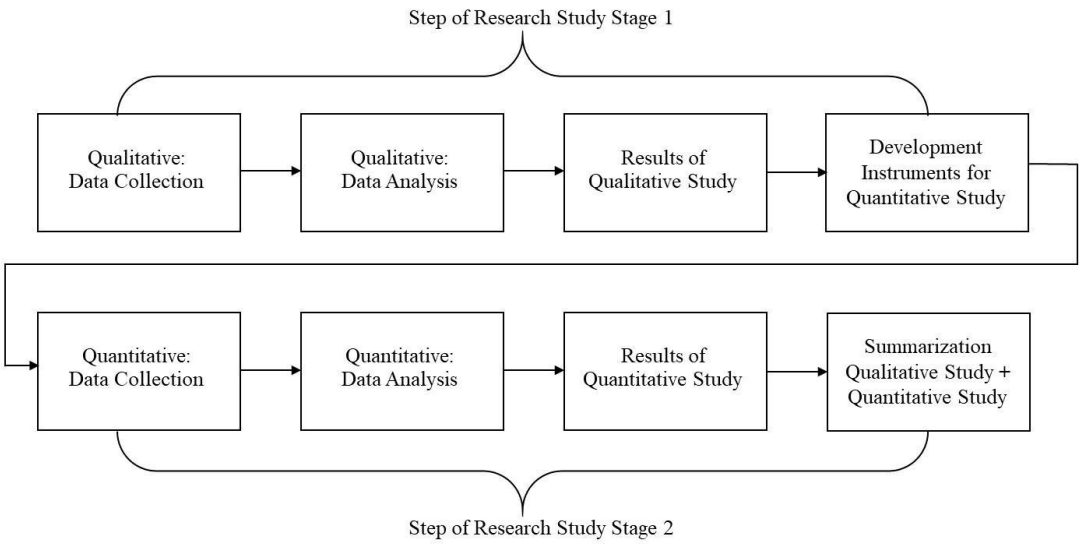
3.3 Phrase 2 - Quantitative Research Design

- 3.3.1 Population/ Samples
- 3.3.2 Research Instruments
- 3.3.3 Data Collection
- 3.3.4 Experiments
- 3.3.5 Data Analysis
- 3.3.6 Statistical Usage
- 3.3.7 Human Research Ethical Consideration

3.1 Research Design

This research is mixed methods Research. It consists of both qualitative research and quantitative research. The first stage of the research is qualitative research which aims to collect the variables and then design the instruments in the quantitative research in the second stage.

Figure 3.1 Flow of Research Design[1]



From the above figure 3.1, the below steps describing both qualitative research and quantitative research including sampling design, measurement design and data analysis.

3.2 Research Design Stage 1: Qualitative Research

The early stage of this study is divided into two parts: Firstly, collecting data from the primary sources of English translations of Tipiṭaka in order to carry out an exploration the factors in Buddhism on stress resilience in the Buddhist scriptures for its major influence. The secondary sources of commentaries, textbooks, research works, and Buddhist journals are also investigated. The data collection focuses on the concepts

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[1] Rattana Buasonte, *Mixed Methods in Research and Evaluation*, (Bangkok: Chulalongkorn University Printing, 2012), p.115.

of resilience in Gortberg's theory and the core teaching of Buddhism regarding stress resilience. This is to investigate the viewpoint from the related literatures in detailed explanation for clearer comprehension.

Secondly, conducting in-depth interviews. Open-ended questions regarding the stress resilience-enhancing intervention (SREI) for working-aged people delivered via the innovative chatbot system are asked to obtain data from four groups of key-informants including Buddhist Scholars, Modern psychologists and Experts in stress management and resilience. The goal is to carry out an exploration of perspectives and points of view from the key-informants who are highly knowledgeable about or involved with this research topic to design the SREI program.

3.2.1 Key-informants

In the first stage of the research, 14 key-informants were selected by using purposive sampling. The key-informants are experts who are highly knowledgeable about or involved with Buddhism, psychology, stress management, resilience, and mental health chatbot creator/developer. In-dept interviews are conducted with 2 groups of key-informants as listed in table 3.1.

Table 3.1 Name lists of the Key-informants

Group	No.	Name	Position	Temple/ Institution/ University
1. Buddhist Scholars	1.	Phramedhavinaiyaros, Dr.	Associate Professor	Mahamakut Buddhist University, Thailand
	2.	Phrakru Bhavanasarapundit, Dr.	Director of Administrative Division Office of Buddhism Promotion and Social Services	Mahaculalongkorn rajavidyalaya University, Thailand

Table 3.1 Name lists of the Key-informants (Cont.)

Group	No.	Name	Position	Temple/ Institution/ University
1. Buddhist Scholars	3.	Phramaha Anon Anando, Asst. Prof. Dr.	Director of Master of Arts in Buddhist Studies (Chinese Program)	Mahaculalongkorn rajavidyalaya University, Thailand
	4.	Phramaha Duangthip Pariyattidhari, Dr.	Director of Doctoral of Philosophy in Peace Studies (International Program)	Mahaculalongkorn rajavidyalaya University, Thailand
	5.	Dr. Gábor Karsai	Rector	Dharma Gate Buddhist College, Budapest, Hungary
	6.	Péter GYŐRI	Study Director	Dharma Gate Buddhist College, Budapest, Hungary
	7.	Asst. Prof. Dr. Zoltán CSER	Lecturer	Dharma Gate Buddhist College, Budapest, Hungary
	8.	Asst. Prof. Dr. Norbert NÉMETH	Lecturer	Dharma Gate Buddhist College, Budapest, Hungary
	9.	Ferenc BODÓ	Lecturer	Dharma Gate Buddhist College, Budapest, Hungary

Table 3.1 Name lists of the Key-informants (Cont.)

Group	No.	Name	Position	Temple/ Institution/ University
1. Buddhist Scholars	10.	Melinda FÖLDINÉ IRTL	Lecturer	Dharma Gate Buddhist College, Budapest, Hungary
2. Modern Psychologists and Experts in Stress Resilience	11.	Gellért Fodor	Psychologist and Experts in Stress Resilience	Online Pszichológia Kft, Budapest, Hungary
	12.	Székely József Csaba	Psychologist and Experts in Stress Resilience	Hungarian Institute for Forensic Sciences
	13.	Police Major General Dr. Tamás Terdik	Psychologist and Experts in Stress Resilience	Budapest Police Headquarters
	14.	Laurentzi-Jármai Noémi	Psychologist and Experts in Stress Resilience	Budapest Police Headquarters

3.2.2 Research Instruments

Semi-Structured Interviews: In the initial phase of the research, a semi-structured interview was utilized as the primary instrument to collect perspectives and insights from key informants. The questions were designed to explore methods for developing the stress resilience-enhancing intervention (SREI) tailored specifically for working-aged individuals. This intervention is delivered via Chatbot Innovation (@sabaijaibot), hosted on the Line application, and the questions further delved into the practical application of this intervention in real-life contexts and its assessment. Key informants were prompted to provide insights into the creation of suitable content and the optimal duration for the SREI.

3.2.3 Data Collection

1. **Literature Review:** The data collection focuses on the concepts of resilience in Gortberg's theory and the core teaching of Buddhism in regard to stress resilience. Review of related literatures were studied and explored from both primary sources: English translations of Tipiṭaka and the secondary sources: commentaries, textbooks, research works, and Buddhist journals. The aim of collecting data in this early stage is to carry out an investigation into the concept of stress resilience in regard to the western psychological paradigm and Buddhism.

2. **In-depth Interview:** Construct interview questions to explore suitable content, determine the optimal duration, and identify methods for developing the stress resilience-enhancing intervention (SREI) tailored for working-aged individuals via Chatbot Innovation (@sabaijaibot), hosted on the Line application. The questions further delved into the practical application of this intervention in real-life contexts.

3. **Ethical Approval**: This study was approved by the Research Ethics Committee of the Buddhist Research Institute, Mahachulalongkornrajavidyalaya University, under case number R.218/2024 on April 20, 2024.

4. **Key Informant Engagement**: The letters, along with the interview questionnaires, were sent to twelve key informants from the International Buddhist Studies College (IBSC), Mahachulalongkornrajavidyalaya University to kindly request their participation in data collection for the research.

3.2.4 Data Analysis

The content analysis method [2] was employed to analyze raw data obtained from the in-depth interviews. Using this approach, the researcher systematically worked through each transcript, assigning codes to specific characteristics within the interview data. The data and factors obtained from the key informants in the qualitative research conducted in the first stage of the study will be utilized to develop the stress resilience-enhancing intervention (SREI) for working-aged people via Chatbot Innovation (@sabaijaibot), hosted on the Line application.

3.3 Research Design Stage 2: Quantitative Research

In the second stage, the data collection from the in-depth interviews were used to develop the stress resilience-enhancing intervention (SREI) for working-aged people via Chatbot Innovation (@sabaijaibot), hosted on the Line application as the independent variables in the quantitative research.

3.3.1 Sampling Design

Population

Population is working-aged people in Thailand. The target population is working-aged people between 25 and 60 years old.

Sampling size

The minimum total sample size for the t-test was calculated using G*Power software version 3.1.9.7 where the estimated effect size of 0.5, α value of 0.05, with 2 groups assumed[3] The minimum total sample size calculated was 32 per group. Statistics employed in this research included percentage, mean ($\bar{x}$), standard deviation (S.D.), independent t-test, and paired t-test.

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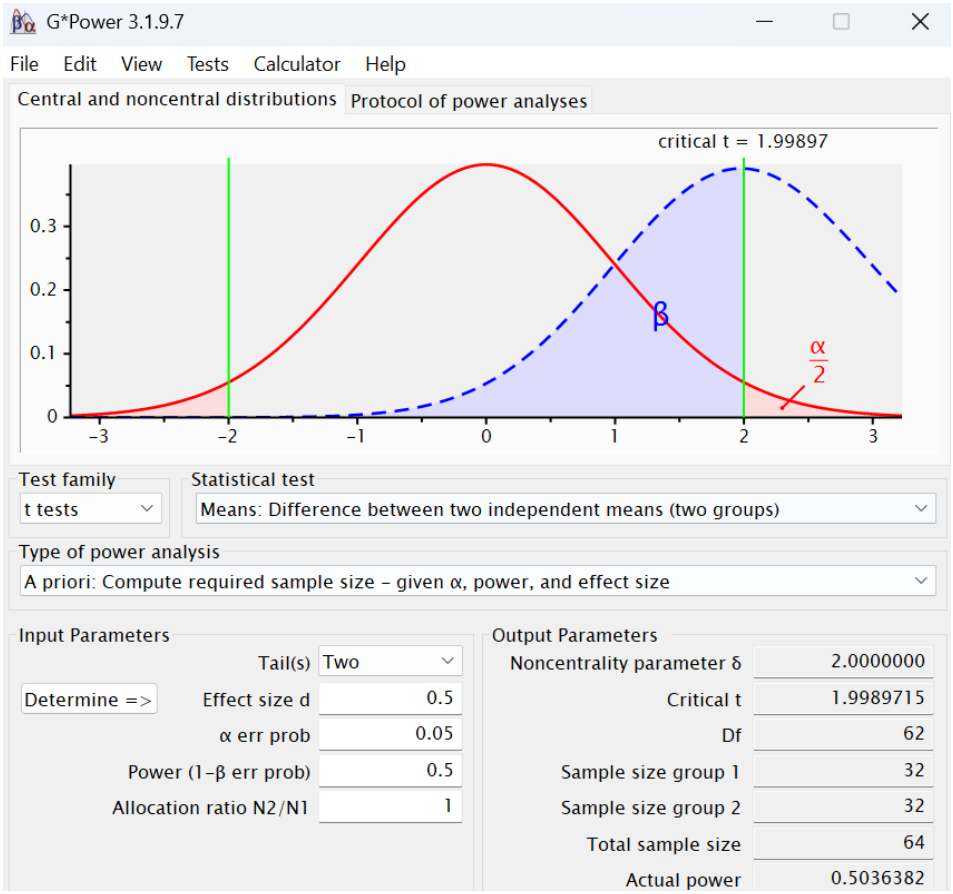
[2] Dr. Catherine Dawson, Introduction to Research Methods: *A Practical Guide for Anyone Undertaking a Research Project*, 4th Edition, (Oxford: How To Books Ltd., 2009), p. 122.

[3] Cohen, J., "The Effect Size Index: d.", *Statistical Power Analysis for The Behavioral Sciences*, Vol. 2 (1988): 284–288.

Figure 3.2 G*Power software version 3.1.9.7



The statistical power for this pilot study was set at 0.5 (50%) in consideration of both practical and conceptual factors specific to this project. As an exploratory pilot study, the goal of the research is to balance the pursuit of preliminary quantitative insights with the constraints of limited sample sizes and the significant engineering effort required to develop a Chatbot that integrates Buddhist psychological principles. Achieving the conventional power of 0.8 typically demands substantially larger sample sizes, which are difficult to secure for a 10-day intervention—particularly one that relies on sustained user engagement throughout. By opting for a power of 0.5, it was ensured a feasible recruitment strategy while still being positioned to identify meaningful trends. This decision aligns with the fundamental purpose of pilot research: to assess feasibility, refine SabaiJai's technological implementation and content, and collect both qualitative and quantitative feedback that will inform the next phase of its development, rather than to definitively confirm or reject a hypothesis based on an early-stage prototype.

The sampled group comprises 64 working-aged people who meet the inclusion criteria. They were randomly divided into two groups: the first experimental group using the chatbot system (n=32), and the control group without access to the intervention (n=32).

The sample group was selected based on the following inclusion criteria:

Inclusion Criteria

1. Working-aged individuals aged between 25 to 60 years.
2. Thai nationality.
3. Individuals residing in Thailand.
4. Participants with a medium stress level as determined by the screening test, the Stress Test Questionnaire (ST-5) developed by the Department of Mental Health, Ministry of Public Health, with scores between 5-7.
5. Ability to read and understand the Thai language.
6. Capability to use the Line application, which will be the platform for the chatbot intervention.
7. Individuals willing to actively participate in the research study.
8. Commitment to follow the entire experimental program, including engaging with the chatbot system, participating in assessments, providing feedback.

Exclusion Criteria

1. Individuals outside the specified working-age range of 25 to 60 years.
2. Non-Thai nationals.
3. Individuals residing outside of Thailand.
4. Lack of proficiency in reading and understanding the Thai language.
5. Inability to use the Line application, the platform for the chatbot intervention.

6. Individuals unwilling to actively engage and participate in the research study.
7. Lack of commitment to follow the entire experimental program, including engaging with the chatbot system, participating in assessments, providing feedback.

3.3.2 Research Instrument

In the second phase of the research, a quantitative study design is implemented, employing five research instruments to comprehensively assess stress levels, deliver interventions, evaluate resilience, and assess the effectiveness of the chatbot system. These research instruments are strategically chosen to cover various aspects of stress and resilience. The instruments include:

1. Stress Test Questionnaire (ST-5): Developed by the Department of Mental Health, Ministry of Public Health, the ST-5 is a concise 5-item questionnaire designed for screening purposes. It assesses symptoms or feelings experienced by participants over the past 4-2 weeks, providing a baseline for evaluating stress levels.

The Measurement of the Instrument

In this research, Stress Test Questionnaire (ST-5) was invented by the Department of Mental Health, Ministry of Public Health. The researcher put the question items in Chatbot (@sabaijaibot) on the Line Application. The try-out test was distributed to 32 practitioners who met the same inclusion criteria as those in the sample group.

The Analysis of Reliability

Reliability is to ensure the internal consistency of the items in the questionnaire. This research measured the Internal Consistency Reliability by using Cronbach's Alpha Coefficient. Louis Cohen, Lawrence Manion & Keith Morrison (2007) illustrated the value of Coefficient Cronbach's Alpha (a) as shown in table 3.2.

Table 3.2 The Analysis of Reliability

Cronbach's Alpha Coefficient	Internal Consistency Level
≥ 0.90	Very highly reliable
0.80-0.90	Highly reliable
0.70-0.79	Reliable
0.60-0.69	Marginally/minimally reliable
< 0.60	Unacceptably low reliability

The results of reliability, if the reliability score is nearly 1, it means that the consistent of questionnaire is high. This research questionnaire, the scales have good reliabilities which more than 0.7 as shown in table 3.3.

Table 3.3 The Results of Reliability Analysis – Cronbach's Alpha Coefficient

Name of Questionnaires	Number of Questions	Results of Cronbach's Alpha Coefficient
Stress Test Questionnaire (ST-5)	5	0.82

Examples of the Questionnaire

The example of the questionnaire used to collect data and the criteria of scoring scale of the questionnaire in the research are described as follows:

Table 3.4 Question Items of Stress Test Questionnaire (ST-5)

No.	Symptoms or feelings experienced over the past 2-4 weeks.	Scale ranging			
		0	1	2	3
1.	Having sleep problems, either difficulty falling asleep or excessive sleep				
2.	Decreased concentration				
3.	Irritable / Restless / Confused				
4.	Feeling bored / Frustrated				
5.	Avoiding social interactions / Not wanting to meet people				

Criteria of Scoring Scale

The question items in this part were constructed with negative questions ranging from 0-3 from 'Very rare or Almost never' to 'Regularly', as illustrated in the table 3.5.

Table 3.5 Criteria of Scoring Scale of the ST-5 Questionnaire

Question Items	Score Level			
	Very rare or almost never	Occasionally	Frequently	Regularly
Question	0	1	2	3

Data interpretation and the average criteria of the ST-5 Questionnaire are divided into 4 groups as follows:

Score	0 – 4	represents	Mild stress
Score	5 – 7	represents	Moderate stress
Score	8 – 9	represents	High stress
Score	10 – 15	represents	Very high stress

2. Resilience Assessment: Developed by the Department of Mental Health, Ministry of Public Health. Resilience Assessment is a concise 20-item questionnaire designed to evaluate an individual's capabilities in three areas: emotional resilience (endurance), encouragement (determination), and problem-solving ability (overcoming obstacles). This assessment is intended for adults aged 25-60 years and consists of 20 questions. These questions inquire about thoughts, feelings, and behaviors over the past three months.

The Measurement of the Instrument

In this research, Resilience Assessment was invented by the Department of Mental Health, Ministry of Public Health. The researcher put the question items in Chatbot (@sabaijaibot) on the Line Application. The try-out test was distributed to 32 practitioners who met the same inclusion criteria as those in the sample group.

The Analysis of Reliability

Reliability is to ensure the internal consistency of the items in the questionnaire. This research measured the Internal Consistency Reliability by using Cronbach's Alpha Coefficient. Louis Cohen, Lawrence Manion & Keith Morrison (2007) illustrated the value of Coefficient Cronbach's Alpha (a) as shown in table 3.6.

The results of reliability, if the reliability score is nearly 1, it means that the consistent of questionnaire is high. This research questionnaire, the scales have good reliabilities which more than 0.7 as shown in table 3.6.

Table 3.6 The Results of Reliability Analysis – Cronbach's Alpha Coefficient

Name of Questionnaires	Number of Questions	Results of Cronbach's Alpha Coefficient
Resilience Questionnaire	20	0.86

Example of the Questionnaire

The example of the questionnaire used to collect data and the criteria of scoring scale of the questionnaire in the research are described as follows:

Table 3.7 Question Items of Resilience Assessment

No.	Thoughts, feelings, and behaviors experienced over the past 3 months	Scale ranging			
		1	2	3	4
1.	A minor concern is making me feel anxious.				
2.	I don't care about people who laugh at me.				
3.	When I make a mistake or cause harm, I accept responsibility or the consequences.				
4.	I have endured hardships for a better future.				
5.	When I'm very distressed, I fall ill.				
6.	I teach and remind myself.				
7.	Difficulties make me stronger.				
8.	I don't dwell on bad memories from the past.				
9.	Even though problems are severe, my life isn't completely terrible.				
10.	When I'm troubled, I have someone to				

	confide in.				
11.	My past experiences make me confident that I can solve the problems that come into my life.				
12.	I have family and close people as my support.				
13.	I have plans to move my life forward.				
14.	When a crisis occurs, I feel incapable.				
15.	It's difficult for me to improve my life.				
16.	I want to escape if I'm faced with heavy responsibilities.				
17.	Solving problems gives me more experience.				
18.	In conversations, I find reasons that everyone can accept or agree with.				
19.	I prepare solutions in case the problem is more serious than expected.				
20.	I like listening to opinions that differ from mine.				

Criteria of Scoring Scale

Resilience Assessment evaluates an individual's capabilities in three areas: emotional resilience (question no.1-10), encouragement (question no.11-15), and problem-solving ability (question no.16-20). The question items were constructed. with questions ranging from 1-4 from 'Almost Never True' to 'Almost Always True'. Data interpretation and the average criteria of the Resilience Assessment are divided into 2 groups, as illustrated in the table 3.8.

Table 3.8 Criteria of Scoring Scale of the Resilience Assessment

Question Items	**Score Level**			
	Almost Never True	**Occasionally True**	**Often True**	**Almost Always True**
Positive Questions	1	2	3	4
Negative Questions	4	3	2	1

* Negative questions are question no. 1, 5, 14, 15, and 16. The rest are positive question.

Table 3.9 Interpretation of the Resilience Assessment

Question Items	Score Level		
	Below the normal standard	**Normal standard**	**Above the normal standard**
1. Emotional Resilience	Less than 27	27-34	More than 34
2. Encouragement	Less than 14	14-19	More than 19
3. Problem-solving ability	Less than 13	13-18	More than 18
Total (80)	Less than 55	55-69	More than 69

Interpretation of individual's capabilities in three areas of resilience

1. Emotional resilience refers to having stable emotions, not being easily swayed or triggered, not getting stressed easily, being able to cope under pressure, and having ways to manage emotions to regain calmness and stability.

2. Encouragement refers to having a determined mindset toward achieving desired goals, not giving up easily, and having a source of guidance or advice when facing difficulties or crises.

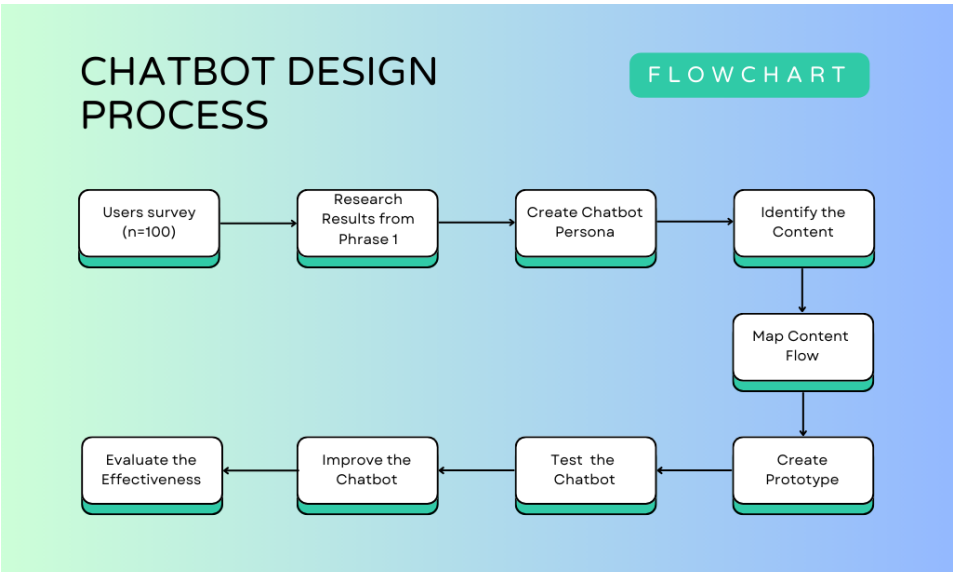
3.Problem-solving ability refers to having a positive outlook on problems, not avoiding them, gathering information, and having strategies for resolving issues.

These two questionnaires comprehensively evaluates the stress resilience of participants in both experimental and control groups across the Pretest, Posttest stages.

3. Stress Resilience-Enhancing Intervention (SREI): Developed by the researcher through synthesis from literature review and insights obtained from in-depth interviews, the SREI is a structured program implemented through the chatbot system. It aims to enhance stress resilience among users by providing targeted interventions.

4. Chatbot (@sabaijaibot) on the Line Application: Operating on the Line application, @sabaijaibot serves as the primary platform for delivering stress resilience interventions, information, and support to the participants.

Figure 3.3 Chatbot Design Process



Sabaijaibot, the chatbot utilized in this research, offers users a range of features through its five main menus:

1. How to Chat with Sabaijaibot: This menu provides users with guidelines and instructions on effectively engaging with Sabaijaibot, ensuring a seamless and user-friendly interaction.

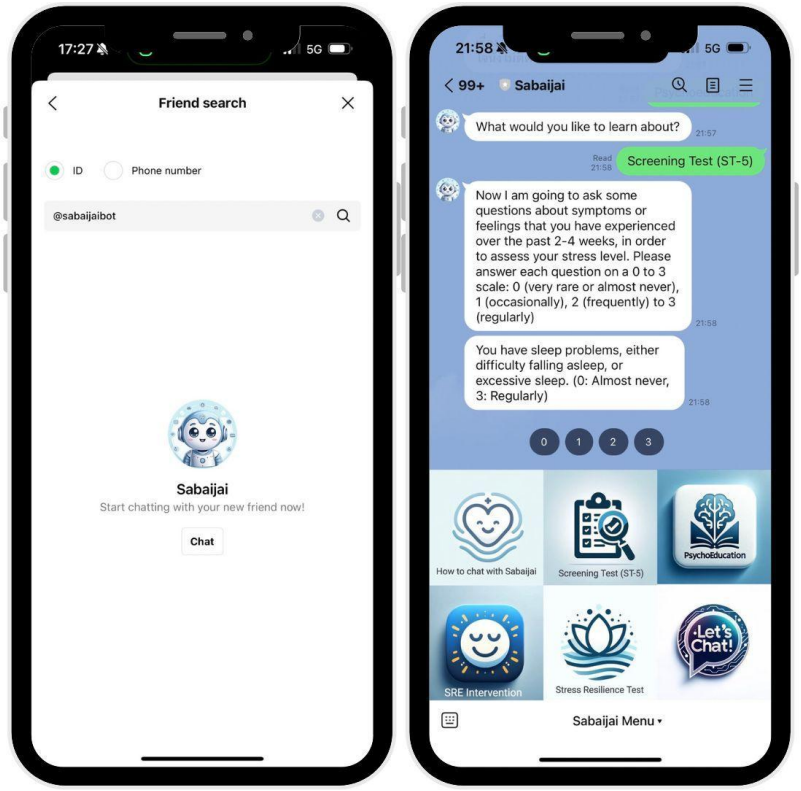
2. Screening Test (ST-5): Users can access a screening test (ST-5) through this menu, allowing for a quick and efficient assessment of their stress levels. This serves as an initial step to identify individuals with a medium stress level for inclusion in the research study.

3. Psychoeducation: This menu is designed to offer users psychoeducational content, providing valuable information and insights into stress, mental well-being, and relevant topics. Users can enhance their understanding of stress-related concepts through educational resources.

4. Stress-Resilience Enhancing Intervention: The chatbot provides a structured stress-resilience enhancing intervention program. Users can engage with this feature to receive targeted interventions aimed at enhancing their stress resilience. The intervention is based on insights from literature reviews and in-depth interviews, offering a tailored approach to SREI for the working-aged people.

5. Stress and Resilience Tests: Users can access stress and resilience tests through this menu. This feature allows users to evaluate their stress resilience levels during various stages of the research, including pretest and posttest.

Figure 3.4 Chatbot (@sabaijaibot) on the Line Application



5. Questionnaire to Evaluate the Effectiveness of the Chatbot System (@sabaijaibot) on the Line Application: This questionnaire, structured in six dimensions—Effectiveness, Efficiency, Content Coverage, Accuracy of Information, Knowledge Acquisition, and User-Friendliness—is employed to rigorously assess the impact and performance of the chatbot system throughout the research stages.

The objective of the questionnaire is to assess the effectiveness of the chatbot innovation in six dimensions with the details as follows:

5.1 Effectiveness: Measure the overall impact and success of the chatbot in delivering stress resilience interventions.

5.2 Efficiency: Evaluate the efficiency and responsiveness of the chatbot in providing timely support and information.

5.3 Content Coverage: Examine the comprehensiveness of stress resilience content delivered through the chatbot.

5.4 Accuracy of Information: Verify the accuracy and reliability of information provided by the chatbot.

5.5 Knowledge Acquisition: Assess the extent to which users acquire stress resilience knowledge through the chatbot.

5.6 User-Friendliness: Evaluate the ease of use and user-friendliness of the chatbot interface.

This detailed evaluation aims to capture nuanced insights into participants' experiences with the chatbot, contributing valuable data to the research objectives.

3.3.3 Data Collection

In the second phase of the research, a comprehensive quantitative research design was implemented, employing a set of five research instruments to meticulously collect data and evaluate the effectiveness of the stress resilience interventions. The data collection process unfolded in the following steps:

1. **Informed Consent**: Before participating in any phase of the study, participants were required to sign an informed consent form, affirming their willingness to take part in the research after being provided with detailed information about the study's purpose, procedures, and potential risks.

2. **Stress Test Questionnaire (ST-5)**: The initial step involved administering the Stress Test Questionnaire (ST-5), developed by the Department of Mental Health, Ministry of Public Health. This questionnaire served as a screening tool to identify 64 working-aged individuals with a medium stress level (scores between 5-7) for inclusion in the study.

3. **Stress Resilience-Enhancing Intervention (SREI):** Following the screening, the Stress Resilience-Enhancing Intervention (SREI) was introduced. This structured program, synthesized from literature reviews and insights gained from in-depth interviews, was delivered through the innovative chatbot system (@sabaijaibot) on the Line application.

4. **Resilience Assessment:** The Resilience Assessment was administered as a measurement tool during the pretest and posttest stages. It gauged the resilience levels of participants between the experimental group using the chatbot system, and the control group without access to the chatbot system.

5. **Chatbot (@sabaijaibot) on the Line Application:** The Chatbot system (@sabaijaibot) on the Line application played a central role in delivering the stress resilience interventions to the first experimental group. Participants engaged with the chatbot to access the SREI, providing a digital platform for the intervention.

6. **Questionnaire to Evaluate the Effectiveness of the Chatbot System (@sabaijaibot) on the Line Application:** The effectiveness of the chatbot system was evaluated based on six dimensions: effectiveness, efficiency, content coverage, accuracy of information, knowledge acquisition, and user-friendliness.

3.3.4 Experiment

The experimental design and the experimental plan of the research titled "Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People" are described as follows:

3.3.4.1 Experimental Design

The purpose of the experimental study in the second phase of this research is to examine the impact of the stress resilience-enhancing intervention delivered via the innovative chatbot system. This is achieved by comparing stress resilience levels between the experimental group (n=32) using the chatbot system and the control group (n=32) without access to the intervention. Additionally, the study aims to compare stress resilience levels at the pretest and posttest stages within and between these two groups.

The experimental study employs a True-Experimental Design, utilizing a two-group pretest-posttest design. The sample comprises 64 working-aged individuals aged between 25 to 60 years in Thailand who meet the inclusion criteria. They are randomly divided into two groups:

The experimental group receiving intervention via the chatbot system (@sabaijaibot) on the Line application (n=32)

The control group without access to the intervention (n=32)

The two-group pretest-posttest design in this research is illustrated in the figure below.

Table 3.10 Two-group Pretest-Posttest Design

Group	***Pre-test***	**Treatment**	***Post-test***
Experimental	O_1	X_1	O_2
Control	O_1	-	O_2

Where O_1 = *Pre-test*

O_2 = *Post-test*

X_1 = Treatment (SREI via Chatbot Innovation)

3.3.4.2 Experimental Plan

The experimental plan for the research, “Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People,” unfolds in four key stages aligned with the research objectives:

1. **Pretest**

Activities: Participants are required to complete Stress and Resilience tests before the commencement of the experiment. This pretest stage serves as a baseline to measure initial stress resilience levels among the participants.

2. **During the Experiment**

Activities:

Experimental Group: Receives Intervention (Stress Resilience-Enhancing Intervention (SREI) via Chatbot (@sabaijai) on the Line application).

Control Group: Receives no intervention.

This stage involves the active implementation of the stress resilience interventions tailored for each group.

3. **Posttest**

Activities: After the experiment concludes, participants in all groups are required to complete the Stress and Resilience tests. Additionally, participants in Experimental Group 1 are asked to evaluate the Chatbot system. This posttest stage provides insights into the immediate impact of the interventions.

Table 3.11 Experimental Plan

Time Series	Activities	Research Instruments
Pretest (Before the experiment)	Participants complete the questionnaires	Stress and Resilience Tests (ST-5 & Resilience Assessment)
During the experiment	Experimental Group: Receives intervention via Chatbot (@sabaijai)	A 10-day Stress Resilience-Enhancing Intervention (SREI) Program
	Control Group: No intervention	-
Posttest (After the experiment)	Participants complete the questionnaires	Stress and Resilience Tests (ST-5 & Resilience Assessment)
	Experimental Group Only: Evaluates the chatbot system	Chatbot Effectiveness Evaluation Questionnaire

3.3.5 Data Analysis

The quantitative data analysis for this research involved a systematic approach using various statistical methods. The statistical software IBM SPSS Statistics version 29.0. was employed for the analysis. The following steps outline the data analysis process:

1. **Descriptive Statistics:** Descriptive statistics, including frequencies and percentages, were used to present demographic characteristics such as gender, age, and level of education among the working-aged participants.

2. **Screening Test Analysis:** Descriptive statistics were employed to summarize and analyze the results of the Stress Test Questionnaire (ST-5) screening test. This included calculating the mean, standard deviation, and percentage distribution of stress levels among the participants.

3. **Group Comparison Analysis:** An Independent Sample t-Test was utilized to compare stress resilience levels between the experimental group (using the chatbot system) and the control group (without access to the intervention). This analysis was conducted at two stages: pretest and posttest, to assess the effectiveness of the chatbot intervention.

4. **Effectiveness Evaluation:** The effectiveness of the chatbot system was assessed using a specific questionnaire. Descriptive statistics and frequencies were employed to analyze the effectiveness of the chatbot system in terms of dimensions such as Efficiency, Content Coverage, Accuracy of Information, Knowledge Acquisition, and User-Friendliness.

5. **Time-Related Analysis:** A Paired Sample t-Test was conducted within each group (experimental and control) to assess changes in stress resilience levels between the pretest and posttest stages.

6. **Significance Level:** A significance level of .05 was determined for all statistical analyses, ensuring reliability in drawing conclusions from the study.

3.3.6 Statistical Usage

The study employed statistical methods for both tool quality inspection and data analysis to ensure the reliability and validity of the research findings.

1. Statistics for Tool Quality Inspection[4]

Cronbach's Alpha Coefficient[5]: Used to assess the internal consistency and reliability of the measurement tools, ensuring that the questionnaire items demonstrate a high level of reliability.

2. Statistics for Data Description and Hypothesis Testing[6]

Descriptive Statistics: Mean, standard deviation, and percentage were used to summarize and describe the key characteristics of the data.

Paired Sample t-Test: Conducted to compare the pre-test and post-test scores within the experimental and control groups, determining the effectiveness of the chatbot intervention.

Independent Sample t-Test: Used to compare the post-test stress resilience levels between the experimental and control groups, evaluating the impact of the chatbot-based intervention.

These statistical methods provided a comprehensive analysis of the intervention's effectiveness in enhancing stress resilience among working-aged individuals.

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[4]Thongsanga Pongpaew, **Educational Research**, (Mahasarakhram: Mahasarakhram University, 2009), p. 114.

[5] Cronbach, L. J., "Coefficient Alpha and the Internal Structure of Tests," **Psychometrika**, Vol 16 No. 3 (1951): 297-334.

[6] Darren Langdridge, **Research Methods and Data Analysis in Psychology** (England: 2004), p. 106.

3.3.7 Human Research Ethical Considerations

Ethical approval for this study was obtained from the Research Ethics Committee of the Buddhist Research Institute, Mahachulalongkornrajavidyalaya University (Case Number: R.218/2024) on April 20, 2024. To ensure the rights, privacy, and well-being of all participants, informed consent was obtained prior to their involvement in the study. Additionally, data confidentiality was strictly maintained throughout the research process.

Chapter 4

Result of Data Analysis

This chapter presents the results of the data analysis, highlighting both qualitative and quantitative research methods used to evaluate SabaiJai, a chatbot system designed to enhance stress resilience among working-aged individuals in Thailand. The primary objective of the research was to integrate Buddhist teachings and modern stress management techniques to create a culturally relevant, AI-driven intervention. This chapter is divided into sections, detailing the findings from semi-structured interviews with mental health experts, Buddhist scholars, and potential users, as well as quantitative data collected through user surveys. Key insights from the interviews informed the development of SabaiJai's features, content, and technical implementation, while the survey data provided valuable feedback on the chatbot's user experience and effectiveness. Through this analysis, the study aims to contribute to the growing body of knowledge on digital mental health interventions, offering practical and culturally sensitive solutions for stress resilience.

4.1 Analysis Results of Qualitative Research Method

The primary objective of this study is to develop and introduce SabaiJai, an innovative chatbot system designed to enhance stress resilience among working-aged Thai individuals. Specifically, the study aims to design and implement a chatbot based on advice from mental health experts (psychologists) and Buddhist scholars, integrating the Buddha's teaching with modern stress management techniques for enhancing stress resilience. The chatbot should incorporate the most requested features and needs from potential users, develop a user-friendly interface that provides easy access to stress resilience tools through the LINE messaging application, create a comprehensive stress resilience intervention program including psychoeducation, daily exercises, and interactive real-time chat features, and leverage state-of-the-art AI technology (GPT-4o) to enable free-form conversations about stress management and resilience.

Semi-structured interviews were conducted in person with mental health experts, Buddhist scholars, and potential users. These interviews focused on ethical considerations in chatbot development, appropriate content and intervention strategies, integration of Buddhist principles in enhancing stress resilience, user experience and interface design preferences, and potential limitations and areas for improvement. Interviews were recorded and analyzed using thematic analysis to identify key insights and recommendations. Data collection from potential users were conducted via Google forms, where potential users answered questions about their experience with chatbot systems, work-related stress and requested features for SabaiJai.

4.1.1 Key Insights from Qualitative Expert Interviews

Insights from the interviews with Buddhist scholars highlighted the importance of promoting the Five Spiritual Powers (*pañcabala*) to increase mental health and stress resilience. Each factor of these Five Spiritual Powers can contribute to stress resilience, even if not cultivated in any specific order. Moreover, they explained how the Five Spiritual Powers (*pañcabala*) in Buddhism offer a comprehensive framework for enhancing stress resilience. Namely, Faith (*saddhā*) instills confidence in one's ability to overcome challenges, providing motivation and purpose. Energy (*viriya*) drives consistent effort in applying stress management techniques and maintaining self-care practices. Mindfulness (*sati*) cultivates awareness of thoughts, feelings, and bodily sensations, enabling early recognition of stress triggers and more skillful responses.

Concentration (*samādhi*) promotes mental clarity and emotional stability, improving decision-making under pressure. Wisdom (*paññā*) fosters insight into the nature of stress and one's reaction patterns, leading to a more balanced perspective on stressful situations. Together, these Five Powers create a holistic approach to stress resilience, equipping individuals with cognitive, emotional, and behavioral tools to effectively manage stress, maintain balance, and adapt to challenging circumstances. Buddhist scholars also emphasized the need for users to have the freedom to choose between a male-style and female-style model, and suggested that the chatbot should incorporate voice elements to convey information. Additionally, they recommended that the chatbot's responses be brief and concise.

The scholars also noted that having a strong religious background, including the Five Spiritual Powers, can help combat stressful situations. Some Buddhist scholars provided valuable insights for the chatbot's development, emphasizing the importance of integrating chat functionality, recreational games, dharma discussions, and various stress-relief methods. For the 10-day program, the scholars recommended a diverse range of content, including Buddhist chanting and dhamma stories presented in contemporary contexts. These stories aim to shift working-aged individuals' attitudes towards stressful situations and bolster their resilience. The scholars also suggested assessing stress resilience through multiple factors, such as physical behavior, conversation style, thought patterns, community involvement, and task achievement. Importantly, they emphasized that the chatbot should embody its name, "SabaiJai" (which roughly translates to "Ease of Mind" in English), by creating a genuinely relaxing and comforting experience for its users.

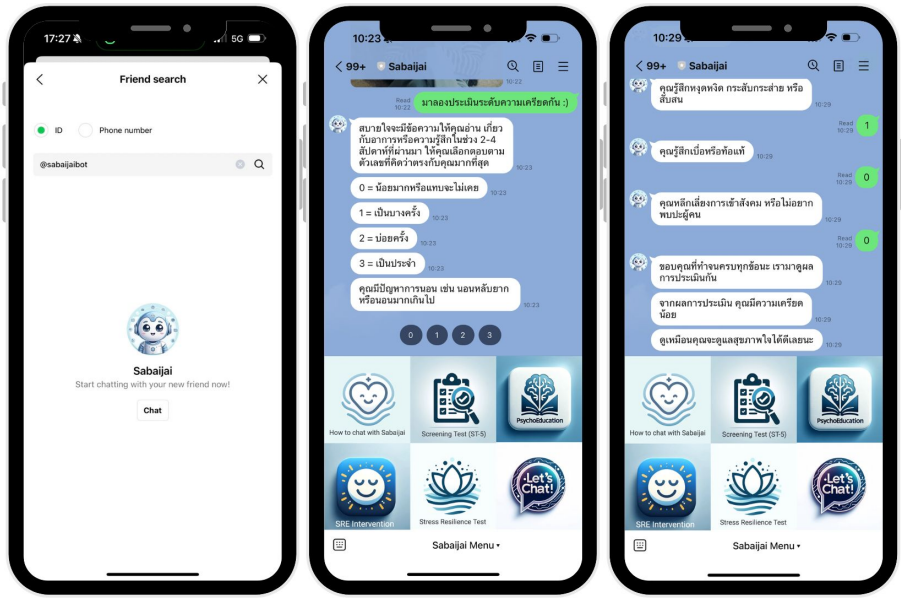
Psychologists provided insights on how the chatbot should aim to change users' attitudes and offer different/alternative perspectives about their situation when they feel stressed. They suggested that the chatbot should promote awareness and acceptance of stressful situations and encourage a stable social background outside of work to help cope with work-related stress. Constant appreciation of positive aspects of life was also highlighted as a way to enhance stress resilience. The mental health experts stressed the importance of the chatbot having a way to screen and filter out users for whom the system might be detrimental, and in cases of serious mental health issues, refer users to human mental health professionals.They also emphasized the importance of clear boundaries for the chatbot's role, ensuring users understand it is a supplementary tool rather than a replacement for professional help, which is in line with concerns raised by several scholars in the past about accountability, transparency and privacy.

4.1.2 Chatbot Development

The development of SabaiJai followed an iterative process. First, conceptualization was based on literature review and expert input, leading to the development of a conceptual framework integrating Buddhist principles and modern stress resilience techniques. Next, educational content, including psychoeducation

videos and stress resilience intervention materials, was created based on the qualitative interviews conducted with mental health experts and Buddhist scholars. The chatbot was then developed using the LINE Messaging API (Application Programming Interface) for user interaction and integrated with OpenAI's GPT-4o model for the free chat feature. The system was deployed on Heroku for scalability and reliability. An intuitive interface was designed within the LINE application, featuring easy-to-use menus and clear navigation options. Various features were implemented, including user registration, stress screening (ST-5), psychoeducation videos, 10-day stress resilience intervention program, and the Resilience Quotient test. Finally, free chat interaction with the GPT-4o model was integrated into the system, with a custom system prompt to ensure responses aligned with Buddhist principles and stress management best practices.

Figure 4.1 Landing screen and user interface of SabaiJai



The development of SabaiJai involved a multifaceted approach, integrating psychological principles, Buddhist teachings, and advanced technology to create a comprehensive stress resilience tool tailored for the Thai population. This chapter details the design, features, content development, and technical implementation of the chatbot.

4.1.3 Design and Features of SabaiJai

SabaiJai was conceptualized as an all-encompassing stress resilience-enhancing assistant, accessible through the LINE messaging application, a platform widely used in Thailand. The choice of LINE as the delivery medium was strategic, aiming to leverage familiarity and ease of access for Thai users. To develop a functional and intuitive user interface (UI) and user experience (UX), the first phase of UI/UX testing was conducted by the developer to ensure technical functionality and flow within the LINE messaging app. This was followed by a second round of testing conducted by the research team, focusing on user experience. The chatbot's core functions include user registration, stress screening, psychoeducation, a structured stress resilience intervention program, resilience assessment, and a free-chat feature for open-ended stress-related discussions. The user journey begins with registration, where demographic information and preferences are collected to personalize the experience. Following registration, users can access various features through a menu-based interface. The ST-5 questionnaire is employed for initial stress screening, determining user eligibility for the full intervention program.

4.1.4 Features of the SabaiJai System

The iterative development process of the SabaiJai prototype resulted in the creation of several key features. The chatbot includes a user registration process where users provide biographical information (e.g. age, gender, relationship and employment status) and can choose the chatbot's interaction style (male or female), which is especially relevant in Thai language due to the usage of gender-specific first-person personal pronouns and polite particles. To personalize user interaction, this information is made available to ChatGPT-4o in the free chat mode, with the system prompt specifically guiding GPT-4o to take this information into account when responding to user messages. The stress screening feature, using the ST-5 questionnaire, assesses users' eligibility for using the bot. The chatbot also offers psychoeducation videos that provide information on stress and stress management, integrating Buddhist principles.

A central component of the chatbot is the 10-day stress resilience intervention program, which includes daily video clips and exercises designed to build

stress resilience. The Resilience Quotient Test, a 20-item test, was integrated into the system to be administered pre- and post-intervention to measure changes in stress resilience. Additionally, the chatbot features a free chat function driven by the GPT-4o model, allowing users to freely discuss stress-related issues. The development of SabaiJai was guided by expert input and potential user's suggestions, ensuring the chatbot was culturally appropriate and met the needs of working-aged Thai individuals. The integration of Buddhist principles and modern psychological techniques aimed to create a holistic tool for enhancing stress resilience. SabaiJai is currently operational and can be interacted with through the LINE messaging application by searching the "@sabaijaibot" LINE ID, but iterative refinement and safety testing of the system is needed before the system can be rolled out to a wider audience.

4.1.5 Content and Educational Material

Central to SabaiJai's effectiveness is its rich educational content. The psychoeducation component comprises a series of concise video clips, typically under one minute in duration, covering fundamental aspects of stress. These clips elucidate the nature of stress, its physiological and psychological effects, common workplace stressors, and the relationship between stress and performance. The brevity and visual appeal of these clips were designed to maintain user engagement and facilitate easy absorption of information. The psychoeducation component was structured to provide a comprehensive understanding of stress and resilience. It begins with an introduction to what stress is, followed by an exploration of the causes of stress and the different types of stress.

A dedicated section examines stress from a Buddhist perspective, offering insights into how Buddhist teachings interpret and address stress. The program then covers the effects of stress on both physical and mental health, emphasizing the importance of basic stress awareness in daily life. To equip individuals with practical strategies, the curriculum includes SabaiJai Techniques, which focus on returning to the present moment, alongside Buddhist principles for building stress resilience. Additionally, mindfulness practices are introduced to further enhance resilience. Finally, the program incorporates stories and fables for stress resilience, encouraging a shift in perspective and a more adaptive attitude toward stressors.

The cornerstone of the intervention is a 10-day program featuring daily video content, each 1-5 minutes long. This program progressively guides users through understanding stress from a Buddhist perspective, recognizing stress symptoms, applying Buddhist psychology to enhance stress resilience, practicing mindfulness and cognitive restructuring, building emotional resilience through compassion, and integrating stress management techniques into daily life. Some videos are accompanied by reflective exercises or practical tasks, reinforcing learning and encouraging real-world application.

The intervention content is designed to enhance stress resilience through a structured framework. It begins with an introduction to stress resilience, setting the foundation for understanding its key components. The program then explores the "I Have" aspect, which focuses on external support systems, followed by "I Am", which emphasizes inner strengths, and "I Can", which develops problem-solving skills. Building on these resilience factors, the content integrates core Buddhist principles, including faith (*saddhā*), effort (*viriya*), mindfulness (*sati*), concentration (*samādhi*), and wisdom (*paññā*)—collectively known as the Five Spiritual Powers *(pañcabala*). Finally, the program introduces the concept of The Three Common Characteristics (*Tilakkhana*), with a particular focus on the idea that "This Too Shall Pass," reinforcing the impermanent nature of stress and fostering a balanced perspective on life's challenges. This structured approach combines cognitive, emotional, and spiritual strategies to foster resilience, helping users manage stress in a culturally resonant and practical manner.

4.1.6 Incorporation of Buddhist Psychology

A distinctive feature of SabaiJai is its integration of Buddhist principles with modern psychological approaches. The chatbot's content incorporates Edith Grotberg's resilience model of "I Have," "I Can," and "I Am," reinterpreted through a Buddhist lens. For instance, "I Have" is aligned with Buddhist concepts of sangha (community) and kalyanamitra (spiritual friendship), emphasizing external support systems. Furthermore, the Five Powers (*pañcabala*) from Buddhist psychology form the structural backbone of the chatbot's content and interactions. These Five Spiritual Powers - faith/conviction (*saddhā*), energy/effort (*viriya*), mindfulness (*sati*),

concentration (*samādhi*), and wisdom/discernment (*paññā*) - are woven throughout the intervention program, providing a cohesive framework for developing stress resilience.

4.1.7 Technical Implementation

The technical architecture of SabaiJai was built on a Node.js backend with an Express web server, chosen for its efficiency in handling asynchronous operations and its robust ecosystem. This setup facilitates rapid response times and efficient management of concurrent user interactions. Integration with the LINE Messaging API was crucial for enabling rich user interactions. The API allows for the implementation of various message types, including text, images, videos, and interactive elements like buttons. A webhook endpoint was established to receive and process user messages and events, ensuring real-time responsiveness. The free-chat feature leverages OpenAI's GPT-4o model, integrated via the OpenAI API. Custom prompt engineering was employed to guide the model's responses, ensuring alignment with Buddhist principles and maintaining conversation coherence. Data management and privacy were prioritized in the development process, and SabaiJai keeps no record of any conversations with users. The user interface was crafted with simplicity and cultural appropriateness at its core. The design emphasizes clear navigation, concise instructions, and the use of multimedia elements to enhance engagement. The SabaiJai avatar image was created to be culturally appealing to Thai users, and to reflect a friendly and helpful attitude. Default communication of SabaiJai is in Thai. Rigorous testing was integral to the development process. This included unit testing of individual components, integration testing of API interactions, and testing by and demonstrating to some of the Buddhist scholar and mental health interviewees in order to collect continuous feedback. This feedback gathered from preliminary testing was systematically incorporated into iterative improvements of the system.

The development of SabaiJai represents a synthesis of cultural sensitivity, psychological insight, and technological innovation. By integrating Buddhist principles with contemporary stress management techniques and leveraging advanced AI capabilities, SabaiJai offers a unique, culturally attuned approach to fostering stress resilience among Thai users. The next phase of research will focus on evaluating its effectiveness and impact through comprehensive user testing.

Figure 4.2 SabaiJai Persona

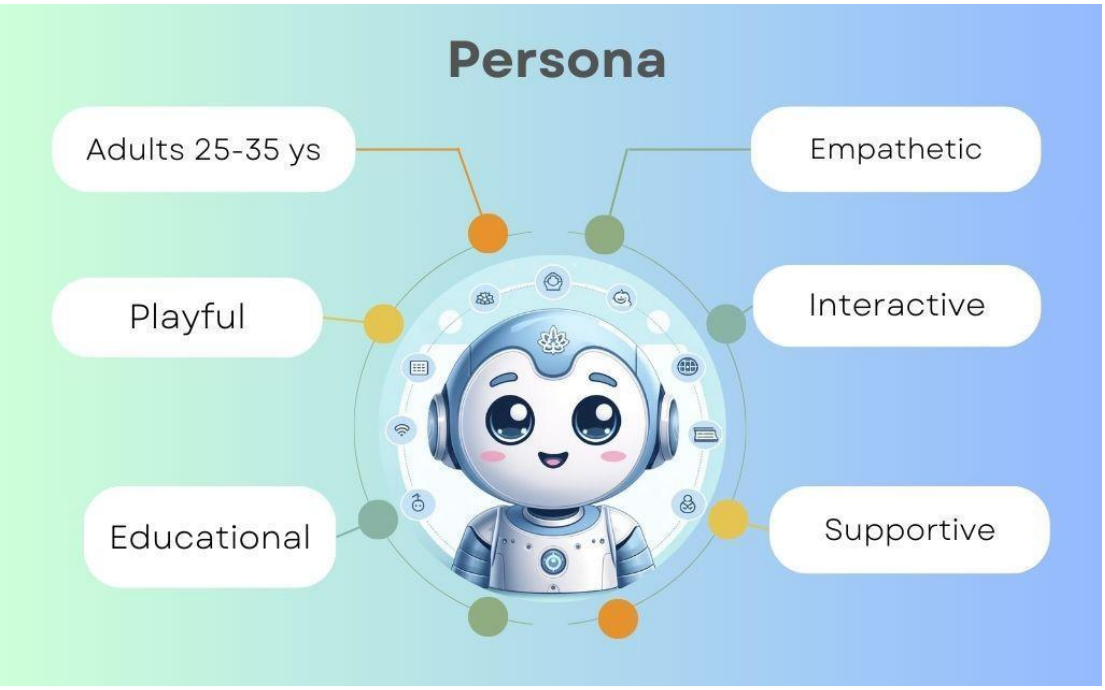


Figure 4.3 Features of SabaiJai Chatbot

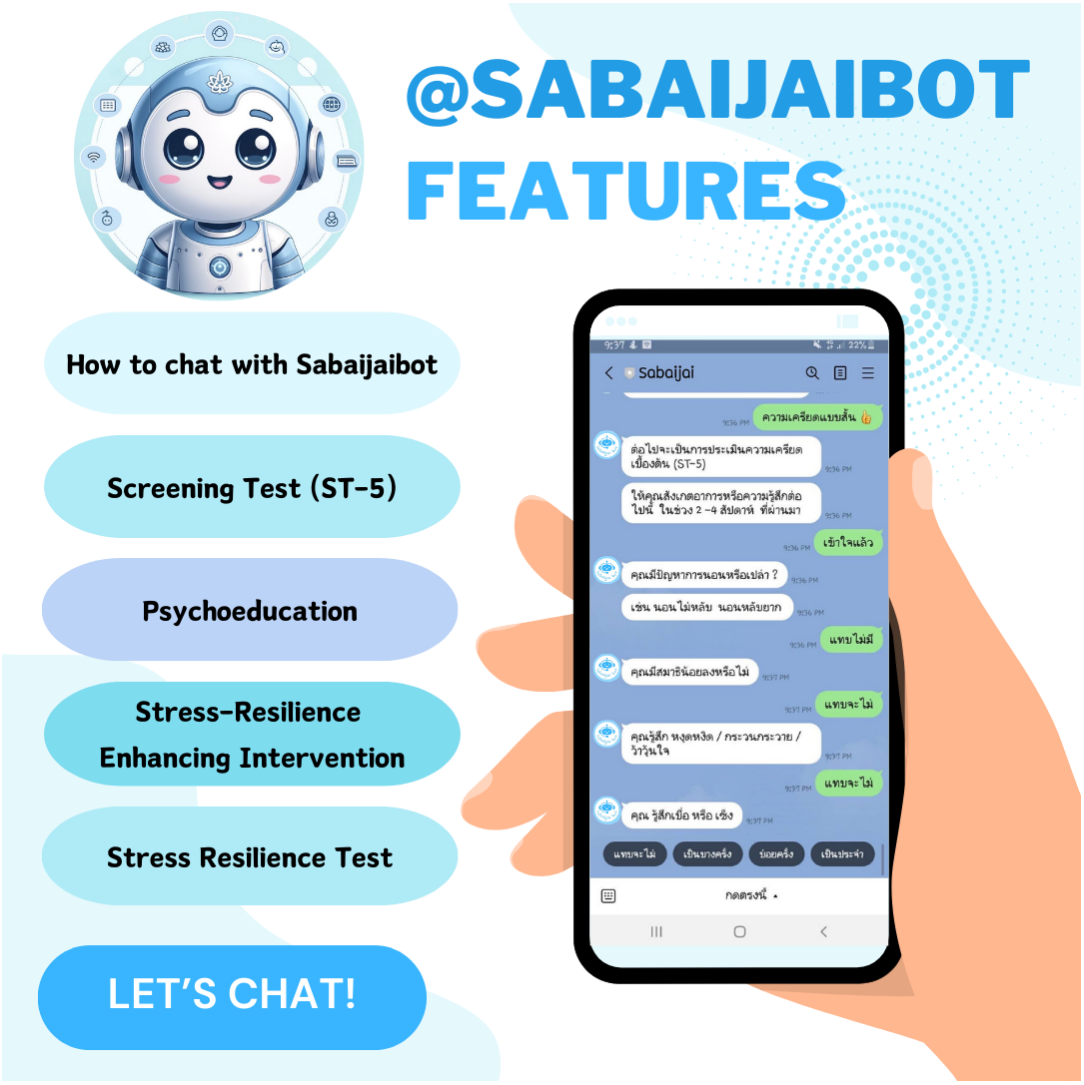
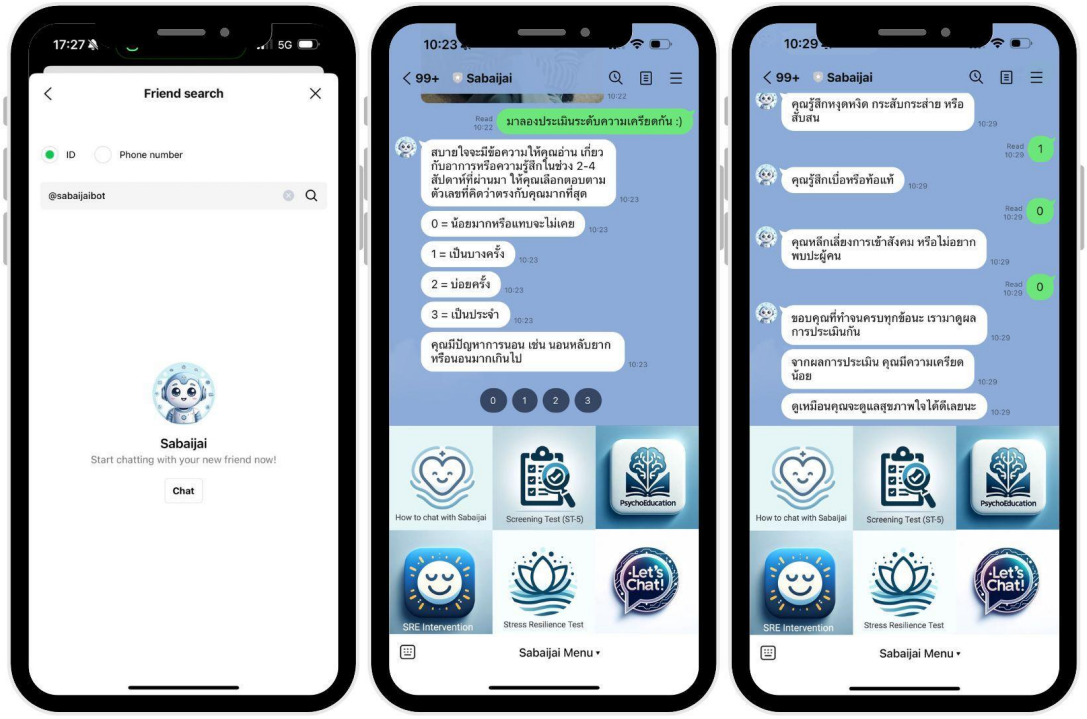
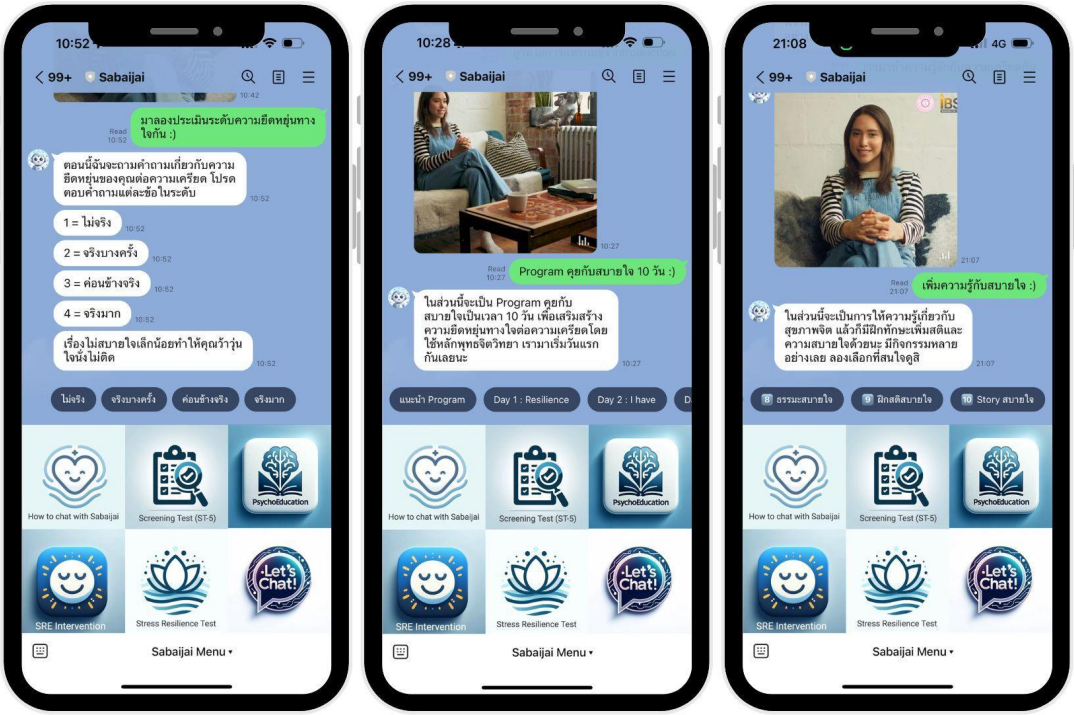


Figure 4.4 Avatar Image and User Interface of the SabaiJai Chatbot System in The LINE Messaging Application, with Features including Information about How To Use The System, Stress Screening Test, Psychoeducation, Stress Resilience-Enhancing Intervention, Stress Resilience Test, and A Free Chat Option



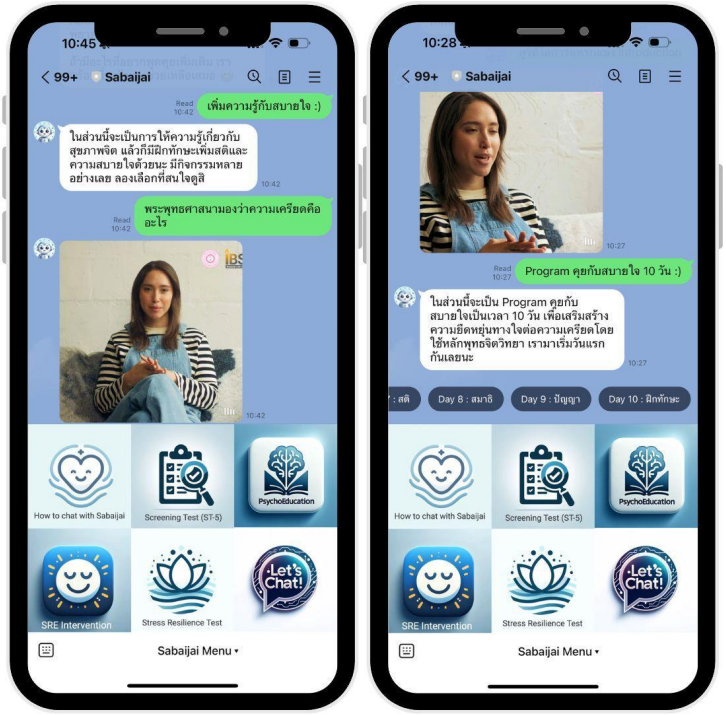
Menu & Features: Screening Test (ST-5) and the result interpretation by Department of Mental Health, Thailand

Figure 4.5 User Interface of A 10-day Structured Stress Resilience Intervention



Menu & Features: Resilience Level Test by Department of Mental Health, Thailand & A 10-day structured stress resilience intervention program

Figure 4.6 User Interface of Psychoeducation & Chit Chat Features



Menu & Features: Psychoeducation & Chit Chat with SabaiJai Features

The SabaiJai project has laid a solid foundation for an innovative, culturally-tailored digital mental health intervention. The chatbot's development represents a significant step forward in combining Buddhist principles, cultural sensitivity, psychological insight, and technological innovation to address stress resilience in the Thai context. The development of SabaiJai involved a multifaceted approach, integrating psychological principles, Buddhist teachings, and advanced technology to create a comprehensive stress resilience tool tailored for the Thai population. This chapter details the design, features, content development, and technical implementation of the chatbot.

Figure 4.7 SabaiJai YouTube Channel (www.youtube.com/@SabaijaiBot)

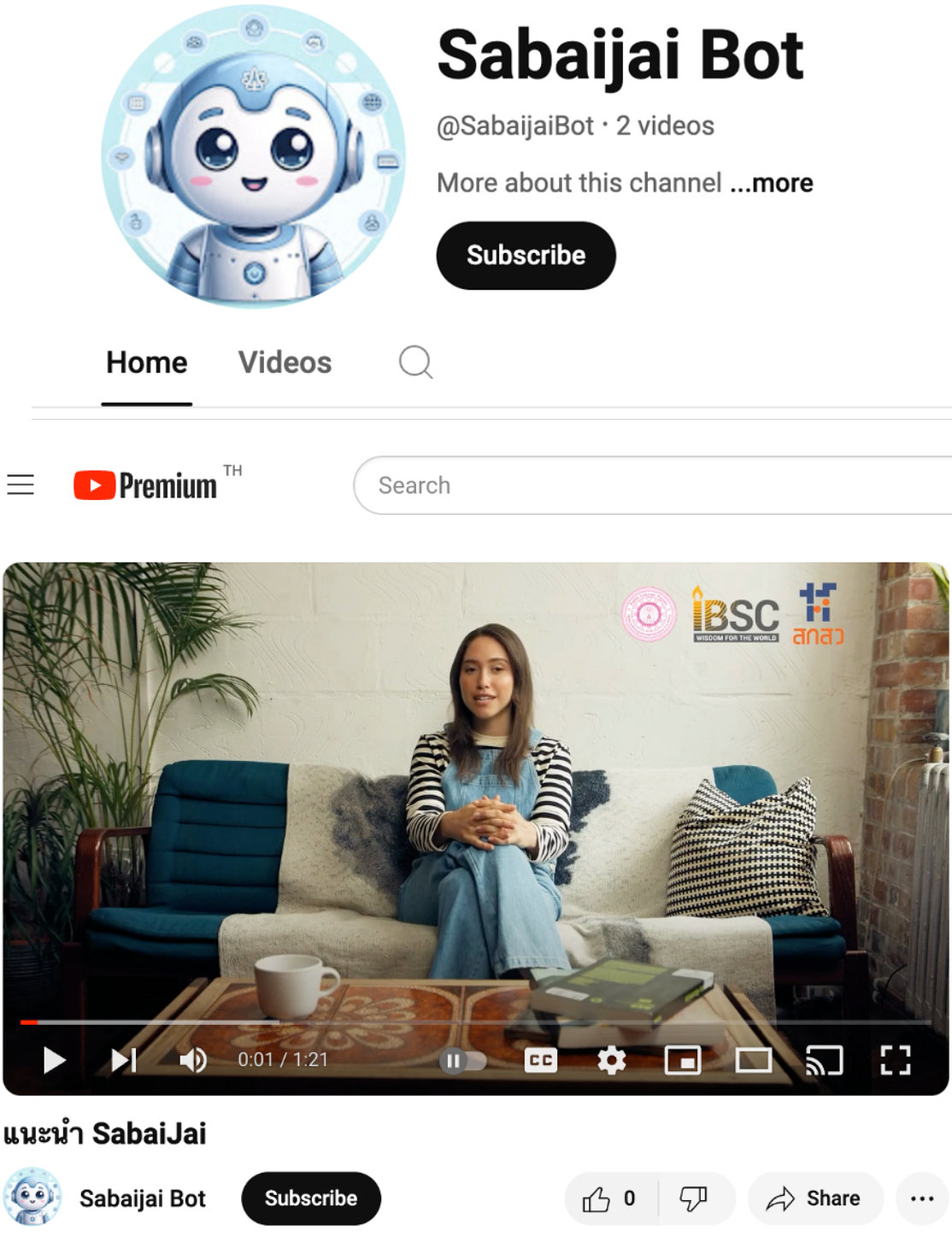
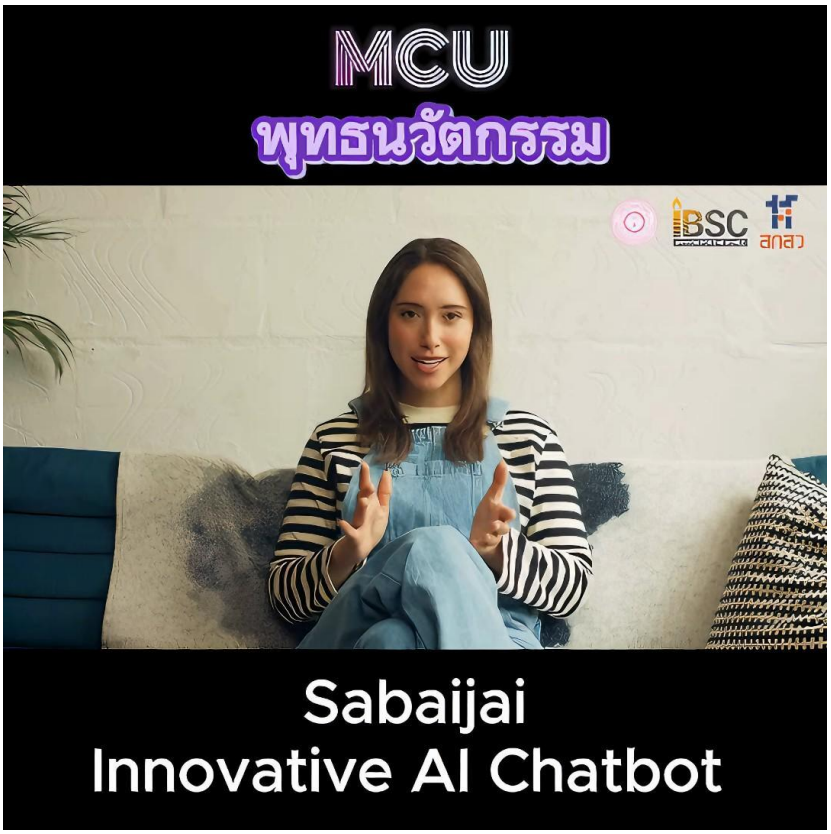


Figure 4.8 SabaiJai Research Introduction on Social Media



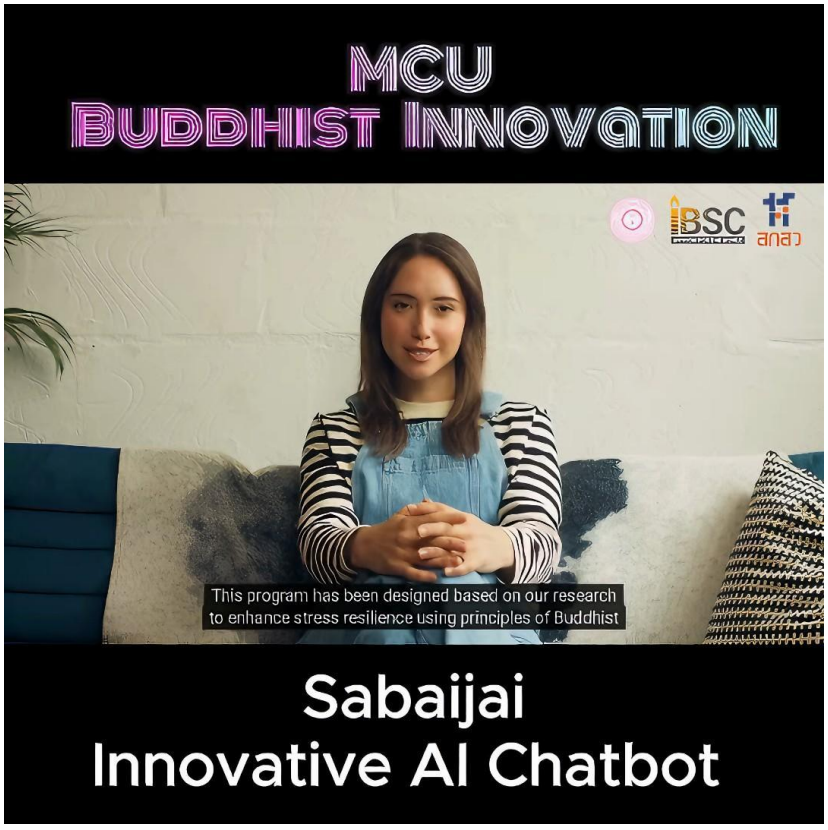
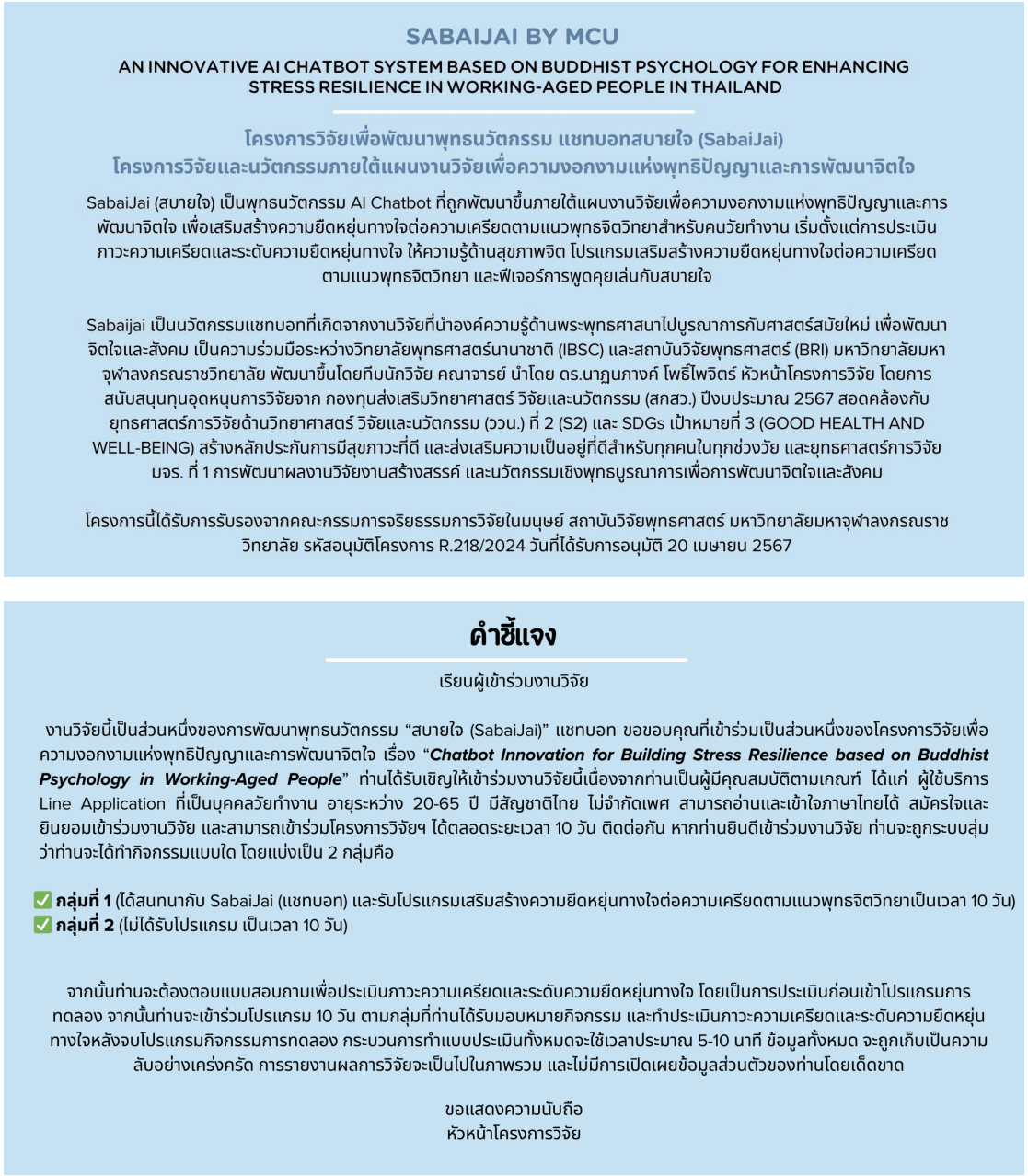


Figure 4.9 SabaiJai Disclaimer



SABAIJAI BY MCU

AN INNOVATIVE AI CHATBOT SYSTEM BASED ON BUDDHIST PSYCHOLOGY FOR ENHANCING STRESS RESILIENCE IN WORKING-AGED PEOPLE IN THAILAND

โครงการวิจัยเพื่อพัฒนาพุทธนวัตกรรม แชทบอทสบายใจ (SabaiJai)
โครงการวิจัยและนวัตกรรมภายใต้แผนงานวิจัยเพื่อความงอกงามแห่งพุทธิปัญญาและการพัฒนาจิตใจ

SabaiJai (สบายใจ) เป็นพุทธนวัตกรรม AI Chatbot ที่ถูกพัฒนาขึ้นภายใต้แผนงานวิจัยเพื่อความงอกงามแห่งพุทธิปัญญาและการพัฒนาจิตใจ เพื่อเสริมสร้างความยืดหยุ่นทางใจต่อความเครียดตามแนวพุทธจิตวิทยาสำหรับคนวัยทำงาน เริ่มตั้งแต่การประเมินภาวะความเครียดและระดับความยืดหยุ่นทางใจ ให้ความรู้ด้านสุขภาพจิต โปรแกรมเสริมสร้างความยืดหยุ่นทางใจต่อความเครียดตามแนวพุทธจิตวิทยา และฟีเจอร์การพูดคุยเล่นกับสบายใจ

Sabaijai เป็นนวัตกรรมแชทบอทที่เกิดจากงานวิจัยที่นำองค์ความรู้ด้านพระพุทธศาสนาไปบูรณาการกับศาสตร์สมัยใหม่ เพื่อพัฒนาจิตใจและสังคม เป็นความร่วมมือระหว่างวิทยาลัยพุทธศาสตร์นานาชาติ (IBSC) และสถาบันวิจัยพุทธศาสตร์ (BRI) มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย พัฒนาขึ้นโดยทีมนักวิจัย คณาจารย์ นำโดย ดร.นาฏนภางค์ โพธิ์ไพจิตร์ หัวหน้าโครงการวิจัย โดยการสนับสนุนทุนอุดหนุนการวิจัยจาก กองทุนส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (สกสว.) ปีงบประมาณ 2567 สอดคล้องกับยุทธศาสตร์การวิจัยด้านวิทยาศาสตร์ วิจัยและนวัตกรรม (ววน.) ที่ 2 (S2) และ SDGs เป้าหมายที่ 3 (GOOD HEALTH AND WELL-BEING) สร้างหลักประกันการมีสุขภาวะที่ดี และส่งเสริมความเป็นอยู่ที่ดีสำหรับทุกคนในทุกช่วงวัย และยุทธศาสตร์การวิจัย มจร. ที่ 1 การพัฒนาผลงานวิจัยงานสร้างสรรค์ และนวัตกรรมเชิงพุทธบูรณาการเพื่อการพัฒนาจิตใจและสังคม

โครงการนี้ได้รับการรับรองจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ สถาบันวิจัยพุทธศาสตร์ มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย รหัสอนุมัติโครงการ R.218/2024 วันที่ได้รับการอนุมัติ 20 เมษายน 2567

คำชี้แจง

เรียนผู้เข้าร่วมงานวิจัย

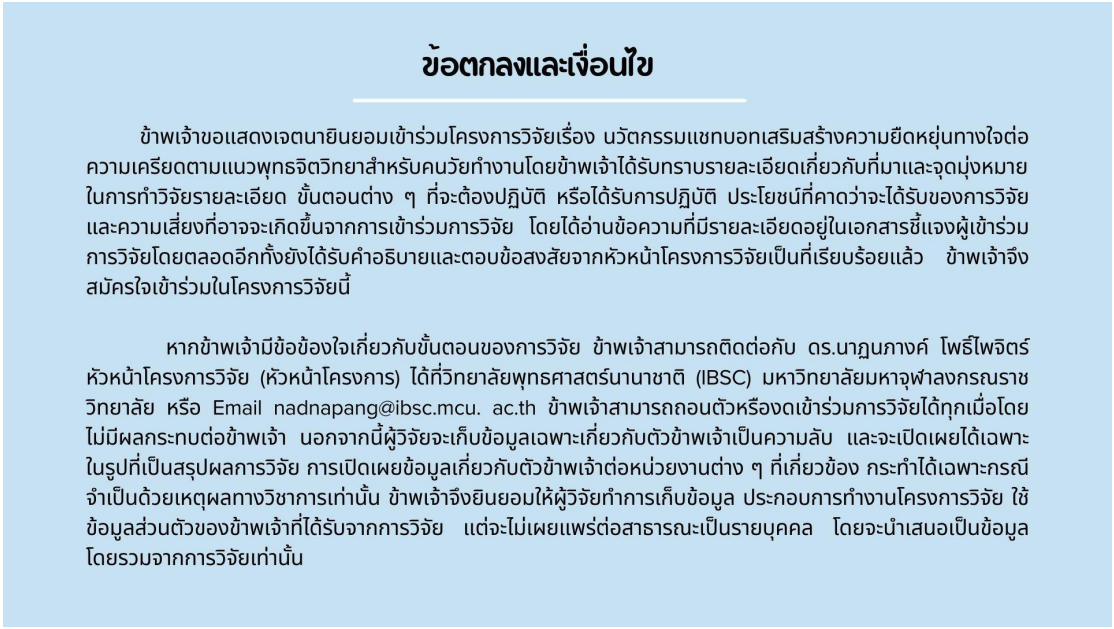
งานวิจัยนี้เป็นส่วนหนึ่งของการพัฒนาพุทธนวัตกรรม “สบายใจ (SabaiJai)” แชทบอท ขอขอบคุณที่เข้าร่วมเป็นส่วนหนึ่งของโครงการวิจัยเพื่อความงอกงามแห่งพุทธิปัญญาและการพัฒนาจิตใจ เรื่อง “***Chatbot Innovation for Building Stress Resilience based on Buddhist Psychology in Working-Aged People***” ท่านได้รับเชิญให้เข้าร่วมงานวิจัยนี้เนื่องจากท่านเป็นผู้มีคุณสมบัติตามเกณฑ์ ได้แก่ ผู้ใช้บริการ Line Application ที่เป็นบุคคลวัยทำงาน อายุระหว่าง 20-65 ปี มีสัญชาติไทย ไม่จำกัดเพศ สามารถอ่านและเข้าใจภาษาไทยได้ สมัครใจและยินยอมเข้าร่วมงานวิจัย และสามารถเข้าร่วมโครงการวิจัยฯ ได้ตลอดระยะเวลา 10 วัน ติดต่อกัน หากท่านยินดีเข้าร่วมงานวิจัย ท่านจะถูกระบบสุ่มว่าท่านจะได้ทำกิจกรรมแบบใด โดยแบ่งเป็น 2 กลุ่มคือ

✅ **กลุ่มที่ 1** (ได้สนทนากับ SabaiJai (แชทบอท) และรับโปรแกรมเสริมสร้างความยืดหยุ่นทางใจต่อความเครียดตามแนวพุทธจิตวิทยาเป็นเวลา 10 วัน)
✅ **กลุ่มที่ 2** (ไม่ได้รับโปรแกรม เป็นเวลา 10 วัน)

จากนั้นท่านจะต้องตอบแบบสอบถามเพื่อประเมินภาวะความเครียดและระดับความยืดหยุ่นทางใจ โดยเป็นการประเมินก่อนเข้าโปรแกรมการทดลอง จากนั้นท่านจะเข้าร่วมโปรแกรม 10 วัน ตามกลุ่มที่ท่านได้รับมอบหมายกิจกรรม และทำประเมินภาวะความเครียดและระดับความยืดหยุ่นทางใจหลังจบโปรแกรมกิจกรรมการทดลอง กระบวนการทำแบบประเมินทั้งหมดจะใช้เวลาประมาณ 5-10 นาที ข้อมูลทั้งหมด จะถูกเก็บเป็นความลับอย่างเคร่งครัด การรายงานผลการวิจัยจะเป็นไปในภาพรวม และไม่มีการเปิดเผยข้อมูลส่วนตัวของท่านโดยเด็ดขาด

ขอแสดงความนับถือ
หัวหน้าโครงการวิจัย

Figure 4.10 SabaiJai Consent to Participate in the Research



ข้อตกลงและเงื่อนไข

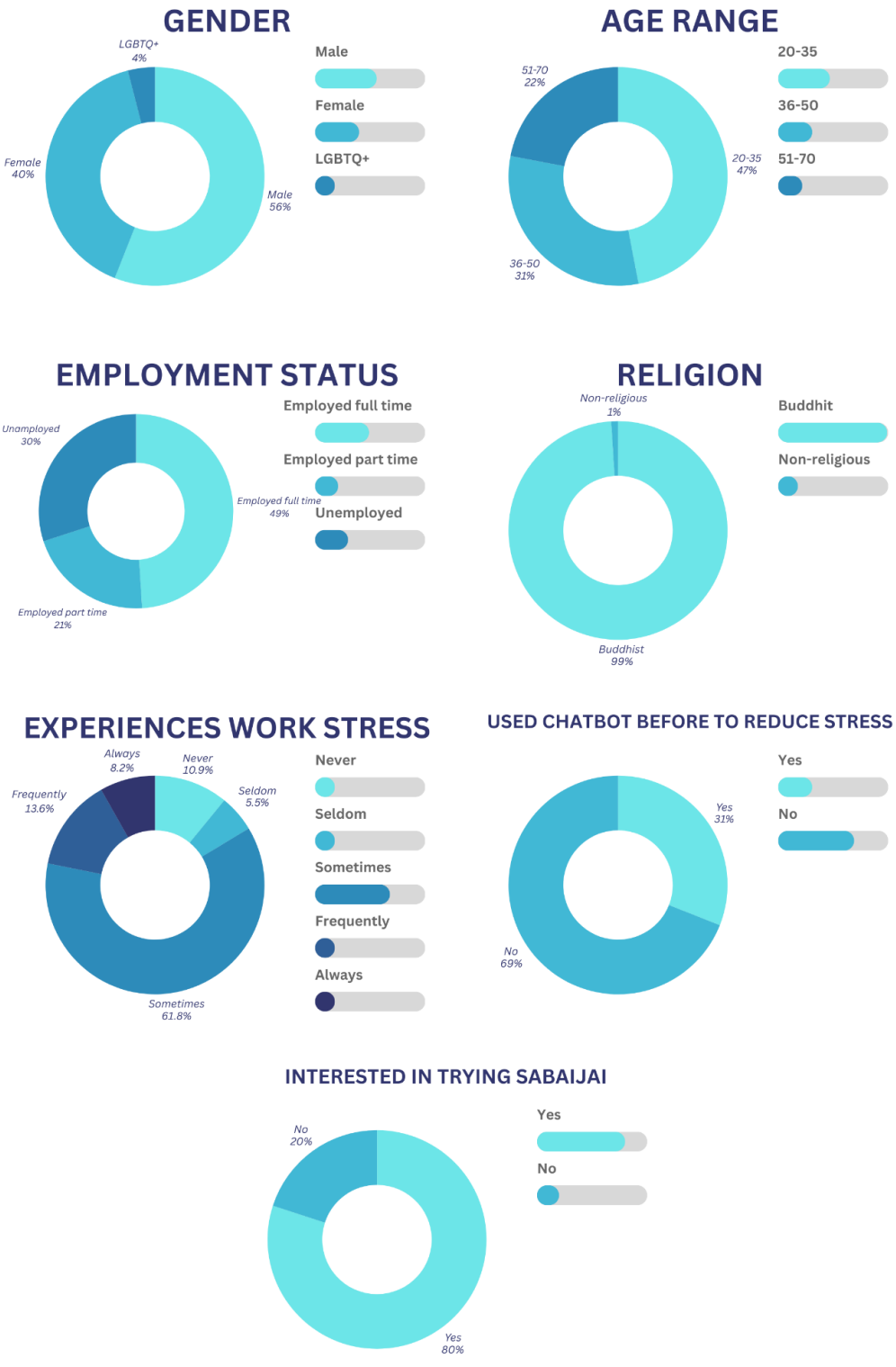
ข้าพเจ้าขอแสดงเจตนายินยอมเข้าร่วมโครงการวิจัยเรื่อง นวัตกรรมแชทบอทเสริมสร้างความยืดหยุ่นทางใจต่อความเครียดตามแนวพุทธจิตวิทยาสำหรับคนวัยทำงานโดยข้าพเจ้าได้รับทราบรายละเอียดเกี่ยวกับที่มาและจุดมุ่งหมายในการทำวิจัยรายละเอียด ขั้นตอนต่าง ๆ ที่จะต้องปฏิบัติ หรือได้รับการปฏิบัติ ประโยชน์ที่คาดว่าจะได้รับของการวิจัยและความเสี่ยงที่อาจจะเกิดขึ้นจากการเข้าร่วมการวิจัย โดยได้อ่านข้อความที่มีรายละเอียดอยู่ในเอกสารชี้แจงผู้เข้าร่วมการวิจัยโดยตลอดอีกทั้งยังได้รับคำอธิบายและตอบข้อสงสัยจากหัวหน้าโครงการวิจัยเป็นที่เรียบร้อยแล้ว ข้าพเจ้าจึงสมัครใจเข้าร่วมในโครงการวิจัยนี้

หากข้าพเจ้ามีข้อข้องใจเกี่ยวกับขั้นตอนของการวิจัย ข้าพเจ้าสามารถติดต่อกับ ดร.นาฏนภางค์ โพธิ์ไพจิตร์ หัวหน้าโครงการวิจัย (หัวหน้าโครงการ) ได้ที่วิทยาลัยพุทธศาสตร์นานาชาติ (IBSC) มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย หรือ Email nadnapang@ibsc.mcu. ac.th ข้าพเจ้าสามารถถอนตัวหรืองดเข้าร่วมการวิจัยได้ทุกเมื่อโดยไม่มีผลกระทบต่อข้าพเจ้า นอกจากนี้ผู้วิจัยจะเก็บข้อมูลเฉพาะเกี่ยวกับตัวข้าพเจ้าเป็นความลับ และจะเปิดเผยได้เฉพาะในรูปที่เป็นสรุปผลการวิจัย การเปิดเผยข้อมูลเกี่ยวกับตัวข้าพเจ้าต่อหน่วยงานต่าง ๆ ที่เกี่ยวข้อง กระทำได้เฉพาะกรณีจำเป็นด้วยเหตุผลทางวิชาการเท่านั้น ข้าพเจ้าจึงยินยอมให้ผู้วิจัยทำการเก็บข้อมูล ประกอบการทำงานโครงการวิจัย ใช้ข้อมูลส่วนตัวของข้าพเจ้าที่ได้รับจากการวิจัย แต่จะไม่เผยแพร่ต่อสาธารณะเป็นรายบุคคล โดยจะนำเสนอเป็นข้อมูลโดยรวมจากการวิจัยเท่านั้น

4.2 Analysis Results of Quantitative Research Method

The majority of respondents had experienced work-related stress, with the highest frequency indicating they experienced stress “sometimes.” A significant majority had not used chatbots before for stress management, however 31% of participants reported having used general AI models like ChatGPT and Google Gemini to reduce stress. A large majority expressed interest in trying SabaiJai and were interested in joining the next phase of the research project.

Figure 4.11 Demographic information of potential users (n = 100)



4.2.1 Key Insights from Potential User Assessments

Potential users expressed a diverse range of desired features and concerns. Key requests included ease of use, culturally relevant content incorporating Buddhist principles, personalization, and reliable, evidence-based information. Many users desired a free-form question-answering capability for stress-related queries, with one suggesting the experience should be like “having a Dhamma conversation with Siri”. Specific feature requests included meditation guidance, stress level tracking, short video interventions, and positive affirmations. Users emphasized the importance of privacy and data security.

Additional user feedback highlighted desires for a polite interface, interactive features like chat discussions and group activities for idea exchange, and multimedia content including pictures and videos. Some users expressed interest in breathing exercises and kind, supportive dialogue to help reduce stress. Practical suggestions included an easy-to-navigate menu bar with options like “Take a stress test” and continuous monitoring to provide timely assistance. Many respondents emphasized that meeting their needs would directly contribute to happiness and stress reduction.

Notably, while 31% of respondents reported using general AI models like ChatGPT for stress reduction, 80% expressed interest in trying SabaiJai, indicating a strong market need for specialized, culturally tailored digital mental health interventions that incorporate these user-requested features.

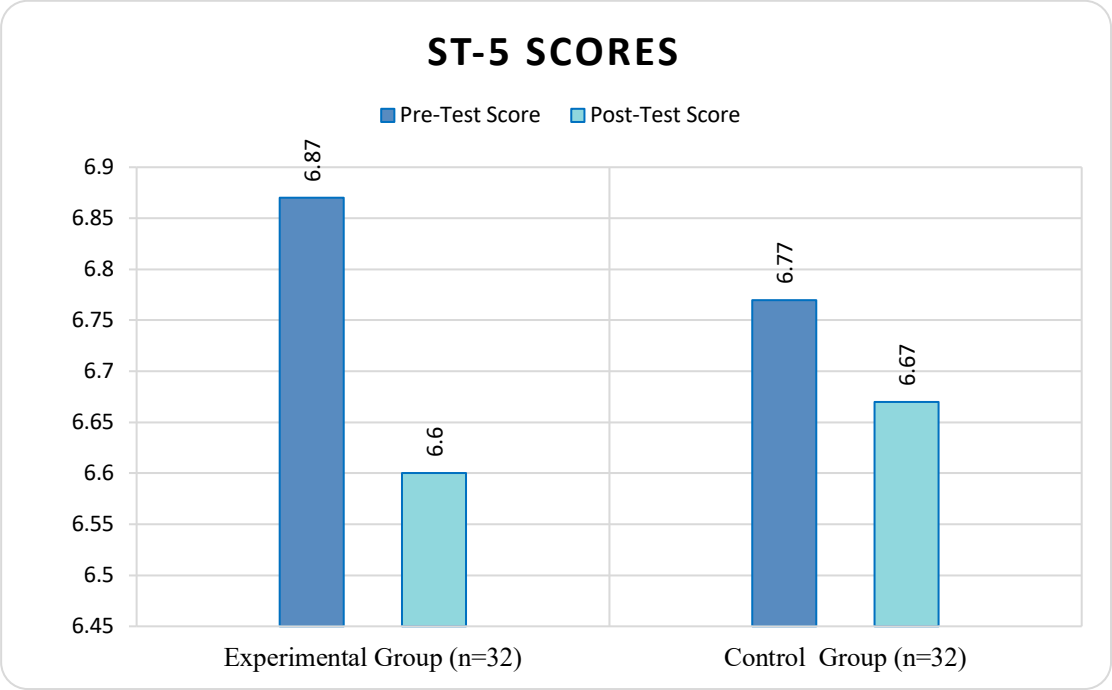
4.2.2 Results of the Chatbot Efficacy Testing

On the ST-5 questionnaire, the 32 participants who used the chatbot completed the survey at two time points (pre-test and post-test after the 10-day intervention). The mean pre-test score for this experimental group was 6.87, while the mean post-test score was 6.60, resulting in an average decrease of 0.27 points. A paired-samples t-test was conducted to determine whether this observed reduction was statistically significant. The analysis yielded (with a standard deviation of 0.77, which corresponds to a standard error of about 0.14) a p-value of 0.07. Although this p-value is below the 0.10 threshold—suggesting a statistical tendency toward improvement—it does not meet the conventional criterion of significance ($p < 0.05$). Therefore, the

null hypothesis cannot be rejected; the evidence is insufficient to conclude that the intervention resulted in a statistically significant reduction in stress levels.

The control group of 32 participants was also assessed using the ST-5 stress questionnaire with a 10-day gap to evaluate potential changes in stress levels over time. The pre-test responses yielded an average score of approximately 6.77, while the post-test responses averaged around 6.67. Although individual responses varied—with a handful of participants exhibiting a change of about one or two points—the overall mean difference between the pre-test and post-test scores was negligible. A paired-samples t-test was also conducted to determine whether this minor difference was statistically significant. The analysis produced (with an estimated standard deviation of about 0.40 and a standard error of 0.0735) a corresponding p-value of 0.18. This p-value exceeds the conventional significance threshold of 0.05, indicating that the null hypothesis—that there is no change in stress levels—cannot be rejected.

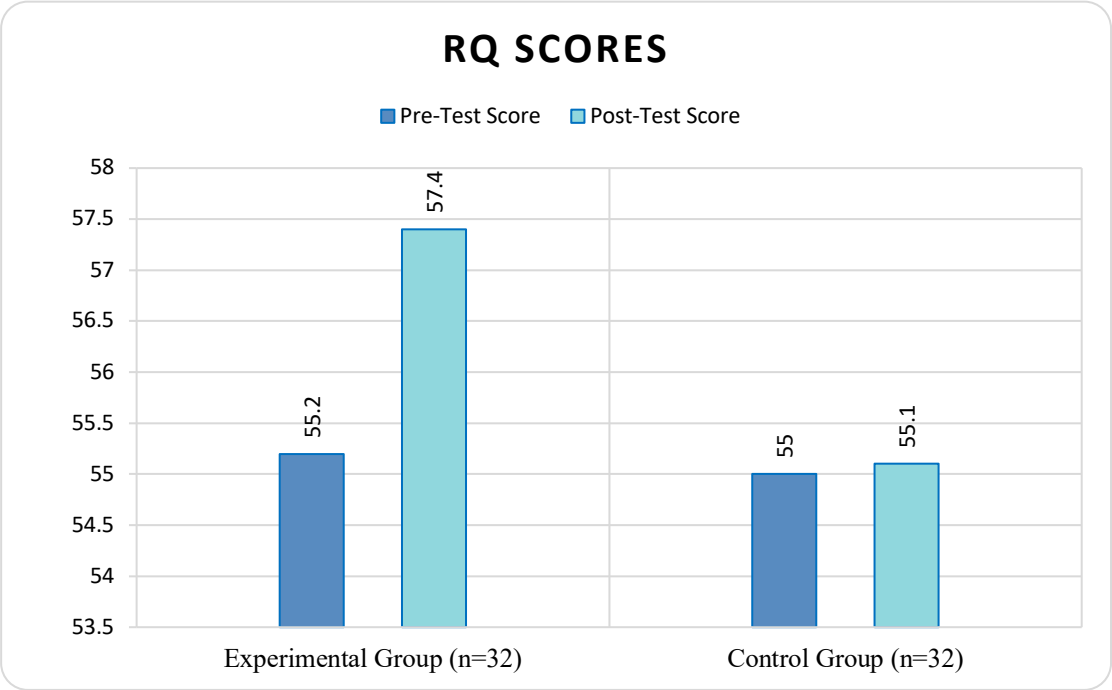
Figure 4.12 ST-5 Scores of Control (n=32) and Experimental (n=32) Groups



This study also aimed to assess changes in resilience levels among participants by completing the Resilience Quotient (RQ) questionnaire at two time points. In the Experimental Group, mean RQ scores increased from 55.2 (with a standard deviation of 5.7) to 57.4 (with a standard deviation of 5.5), yielding a mean difference of +2.2 points (p = 0.06). While this reflects a strong statistical tendency toward improvement, it narrowly fails to meet the conventional significance threshold ($p < 0.05$). The Control Group, however, exhibited no meaningful change, with pre-test and post-test scores averaging 55.0 and 55.1, respectively ($p = 0.88$), indicating that the minor fluctuations in resilience were likely due to random variability rather than any systematic effect.

These findings suggest that while the intervention likely had a positive impact on participant's perceived stress level and resilience as evidenced by the strong statistical tendency, the results were not yet statistically significant, and further research with a larger sample is needed to establish statistical significance and confirm the robustness of the observed effect. Also, further iterative improvement and refinement of the chatbot system is needed based on continuous user feedback, to potentially improve efficacy.

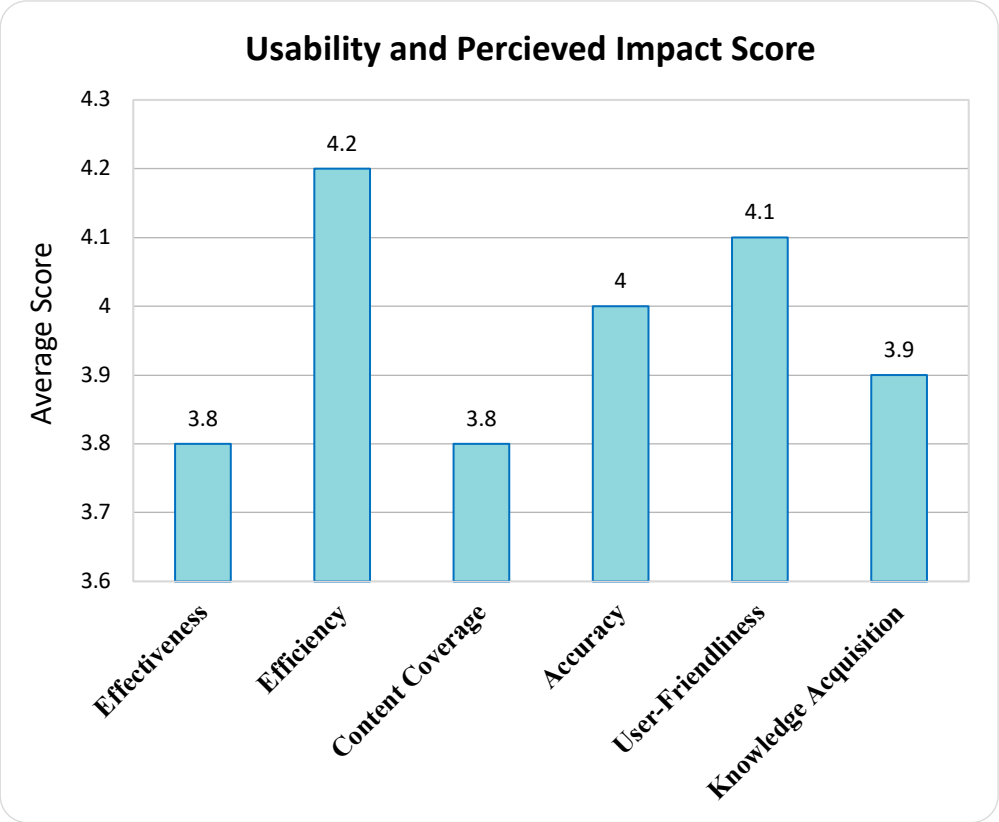
Figure 4.13 RQ Scores of Control (n=33) and Experimental (n=32) Groups



Analysis of the usability and perceived impact (based on a 5-point feedback questionnaire scale) showed overall positive responses. Effectiveness (Q1) and Content Coverage (Q3) both averaged around 3.8, with a standard deviation of 0.9, indicating that most participants felt the chatbot was reasonably effective and covered essential topics, though a few outliers rated these aspects lower. Efficiency (Q2) received the highest average rating (4.2, with a standard deviation of 0.8), suggesting that participants generally found the system to be fast and responsive. Similarly, Accuracy (Q4) and User-Friendliness (Q6) averaged 4.0 and 4.1 respectively (with a standard deviation = 0.8 for both items), reflecting favorable perceptions of the chatbot's reliability and ease of use. Knowledge Acquisition (Q5) also scored positively (with an average of 3.9 and standard deviation of 0.9), indicating that a majority of respondents felt they learned something beneficial about stress management.

Overall, the moderate standard deviations across items suggest a relatively consistent user experience, with only a few participants indicating markedly lower or higher satisfaction in specific areas. These results, while preliminary, provide useful insights into areas for further enhancement of the chatbot's content breadth, interactive features, and instructional components.

Figure 4.14 Results of User Feedback from Chatbot Users (n=32)



4.3 New Body of Knowledge from the Research

This study represents a significant step forward in the field of digital mental health interventions, particularly within the Thai context. By developing SabaiJai, we aim to provide an accessible and scalable solution for developing stress resilience, addressing the growing need for mental health support among working-aged Thai individuals. The study seeks to bridge the gap between the Buddha's teaching and approaches of modern psychology, creating a culturally appropriate intervention tool. Additionally, it aims to demonstrate the potential of AI-powered chatbots in delivering personalized mental health support, paving the way for future innovations in this field. The study contributes to the body of knowledge on stress resilience interventions, particularly those leveraging technology, religion and cultural context, and offer insights into the development process of mental health chatbots, which can inform future research and development efforts in this area.

Chapter 5

Discussions of the Research Results and Recommendations

The development of SabaiJai represents a novel approach to addressing stress resilience among working-aged Thai individuals, integrating Buddhist principles with modern psychological interventions through an AI-powered chatbot. This chapter discusses the key findings from the development phase, insights gained from expert and user interviews, and potential implications for both practice and research in the field of digital mental health.

5.1 Conclusion

The development of SabaiJai represents a significant advancement in digital mental health tools, merging Buddhist principles with modern psychological practices and AI technology. Key findings reveal that integrating the Five Spiritual Powers into a culturally relevant framework enhances the chatbot's effectiveness and user engagement. The use of the LINE platform and GPT-4o model showcases the potential for accessible, personalized mental health support. Insights from expert and user feedback underscore the importance of cultural sensitivity and technological precision in creating effective stress resilience interventions. This project lays a foundation for further research into the efficacy and adaptability of culturally tailored digital mental health tools.

5.1.1 Summary of Key Findings from Development Phase

The iterative development process of SabaiJai yielded several significant findings. Firstly, the integration of Buddhist principles with established psychological approaches proved to be a complex but rewarding endeavor. The Five Spiritual Powers (*pañcabala*) from Buddhist psychology provided a robust framework for structuring the intervention content, aligning well with contemporary stress resilience concepts. This integration highlighted the potential for culturally-rooted wisdom to enhance the efficacy and acceptability of mental health interventions.

Secondly, the technical implementation revealed both challenges and opportunities in creating an AI-powered mental health chatbot. The use of the LINE messaging platform facilitated easy access and familiarity for Thai users, while the integration of GPT-4o for the free-chat feature demonstrated the potential for more nuanced and personalized interactions. However, ensuring the AI's responses remained culturally appropriate and clinically sound required careful prompt engineering and ongoing refinement, particularly regarding the AI's system prompt. Thirdly, the development of concise, engaging psychoeducational content proved crucial. The creation of brief video clips and a structured 10-day program highlighted the importance of balancing information delivery with user engagement, particularly for a working-aged population with limited time resources.

5.1.2 Insights from Expert and User Interviews

Interviews with mental health professionals, Buddhist scholars, and potential users provided valuable insights that shaped the chatbot's development. Concerns raised about the chatbot's boundaries led to the consideration of implementing clear disclaimers and referral protocols within the chatbot system, while suggestions about screening and filtering out people with high level of stress led to the incorporation of the ST-5 screening test, as well as the implementation of a disclaimer message suggesting to seek professional help from human experts for people who experience a significant level of work related stress.

Buddhist scholars also contributed significantly to the authentic integration of Buddhist principles into the intervention. They highlighted the importance of presenting the Buddhist concepts in a manner that is both true to their origins and accessible to a modern audience. This guidance influenced the language and the chatbot's content, ensuring cultural resonance while maintaining practical applicability. Suggestions from experts also led to the implementation of an option where the user can choose a preferred gender style for the free-chat feature in order to feel more comfortable when talking to SabaiJai.

Potential users expressed a strong interest in the concept of a Buddhist-inspired stress management tool, indicating a market need for culturally-tailored digital

mental health interventions. Also, the majority of potential users (54.55%) reported experiencing work-related stress sometimes, which is in line with SabaiJai's aim of targeting a population of potential users who experience moderate level stress. The widespread use of general-purpose AI models like ChatGPT for stress reduction highlights the necessity of offering specialized solutions like SabaiJai. Without tailored options, users may rely on AI chatbots not designed specifically for stress management and resilience training, lacking the structured framework to ensure safety and mental well-being.

5.1.3 Potential Implications for Practice and Research

The development of SabaiJai has several implications for both practice and research in digital mental health. For practitioners, it demonstrates the potential of integrating cultural and spiritual elements into digital interventions, potentially increasing their relevance, effectiveness and appeal for specific populations. This approach could inspire similar culturally-tailored interventions in other contexts, promoting a more diverse and inclusive landscape of digital mental health tools. From a research perspective, SabaiJai opens up new avenues for investigating the efficacy of AI-assisted, culturally adapted mental health interventions.

The combination of structured content delivery and AI-powered free chat provides a unique model for studying user engagement and intervention effectiveness. Future studies could explore how different components of the chatbot (e.g., psychoeducation videos, daily exercises, AI interactions) contribute to outcomes, informing the design of future digital interventions. Moreover, the data generated through user interactions with SabaiJai could provide valuable insights into stress patterns, coping mechanisms, and language use related to mental health among Thai working-aged individuals.

This data, analyzed with appropriate ethical considerations, could contribute to our understanding of cultural variations in stress experiences and resilience-building processes, but would require very thorough safeguards in terms of personal data protection, research ethics and privacy. The development process also highlighted areas for future research, including the optimal balance between automated responses and

AI-generated content in mental health chatbots, the long-term efficacy of digital interventions for stress resilience, and the potential for AI to adapt interventions based on individual user characteristics and preferences. Future research is needed to confirm that the SabaiJai system is effective in building stress-resilience in working aged Thai individuals.

5.1.4 Conclusions

The development of SabaiJai represents a significant step forward in the field of digital mental health interventions, particularly in the context of culturally-tailored approaches for stress resilience. This project has successfully integrated Buddhist principles with modern psychological techniques, leveraging advanced AI technology to create an accessible and potentially effective tool for working-aged Thai individuals. The chatbot's design, rooted in the Five Spiritual Powers (*pañcabala*) of Buddhist psychology and incorporating Edith Grotberg's resilience framework, offers a unique approach to stress management that resonates with Thai cultural values.

By delivering a combination of structured psychoeducational content, daily exercises, and AI-powered free chat interactions, SabaiJai aims to provide comprehensive support for developing stress resilience in working-aged people. The development process yielded valuable insights into the challenges and opportunities of creating culturally-sensitive digital mental health tools. The iterative approach, informed by expert interviews and preliminary user feedback, highlighted the importance of balancing technological innovation with cultural authenticity. The use of the LINE messaging platform and the integration of GPT-4o for natural language processing demonstrate the potential for leveraging existing technologies to enhance accessibility and engagement in mental health interventions.

While the full efficacy of SabaiJai remains to be empirically validated through comprehensive user testing, its development lays the groundwork for future research in several key areas. These include the effectiveness of AI-assisted mental health interventions, the impact of culturally-tailored digital tools on user engagement and outcomes, and the potential for integrating spiritual or philosophical principles into psychological interventions. The project also raises important questions about the

future of digital mental health. As AI technology continues to advance, there is a need to carefully consider the ethical implications of its use in mental health support, particularly in terms of data privacy, the boundaries of AI-human interactions, and the role of cultural context in shaping these interventions. Looking ahead, the SabaiJai project opens up possibilities for adapting this model to other cultural contexts and exploring its application beyond stress management to other areas of mental health. It underscores the potential for digital interventions to bridge gaps in mental health care access, particularly in regions where traditional services may be limited or stigmatized.

In conclusion, while SabaiJai is still in its early stages, its development represents a promising direction in the evolution of digital mental health interventions. By combining cultural sensitivity, psychological insight, and technological innovation, it offers a model for creating more diverse, accessible, and potentially more effective mental health support tools. As we move forward, continued research, user engagement, and ethical consideration will be crucial in realizing the full potential of such interventions to improve mental health outcomes on a global scale.

5.2 Discussion of the Research Results

The results of the study provide valuable insights into the effectiveness and user experience of SabaiJai as a digital mental health intervention. While the chatbot demonstrated a positive trend in reducing stress and increasing resilience, the quantitative results did not reach conventional statistical significance. However, the findings still highlight the potential of culturally tailored, AI-assisted mental health interventions and suggest key areas for further refinement and research.

5.2.1 Effectiveness in Reducing Stress and Enhancing Resilience

The experimental group that used SabaiJai for the 10-day intervention showed a slight, but measurable decrease in stress levels, as measured by the ST-5 screening test, with an average reduction of 0.27 points. While the p-value of 0.07 did not meet the conventional significance threshold of $p < 0.05$, it suggests a strong statistical tendency toward improvement. Similarly, the Resilience Quotient (RQ) scores of the experimental group showed an increase of 2.2 points ($p = 0.06$), indicating a potential improvement in resilience. In contrast, the control group exhibited no

significant changes in either stress levels or resilience scores, supporting the possibility that the intervention had an impact. However, given the sample size, these results remain preliminary, and further studies with larger participant groups are necessary to validate the chatbot's effectiveness more conclusively.

5.2.2 User Experience and Acceptance

In addition to the measurable changes in stress and resilience scores, user feedback on SabaiJai was largely positive. Participants rated the chatbot highly in terms of efficiency (4.2), accuracy (4.0), user-friendliness (4.1), and overall effectiveness (3.8). The moderate standard deviations (approximately 0.8–0.9) suggest relatively consistent user satisfaction, with only a few outliers reporting less favorable experiences. These findings indicate that SabaiJai was generally well-received and suggest that AI-powered mental health tools can be both engaging and accessible for Thai users.

5.2.3 Implications for Accessibility and Cultural Relevance

One of SabaiJai's most notable strengths lies in its accessibility. As a chatbot integrated into the widely used LINE messaging application, it provides on-demand support without the geographic or financial barriers associated with traditional mental health services. This is particularly relevant for working-aged individuals who may struggle to seek professional help due to time constraints or stigma surrounding mental health.

Furthermore, the integration of Buddhist principles with psychological techniques is a unique appeal, which aims to make participants appreciate the chatbot's culturally familiar approach, reinforcing the importance of tailoring digital interventions to the specific cultural and spiritual contexts of their target users. We believe that SabaiJai's design could serve as a model for other culturally adapted AI-driven mental health interventions, particularly in Buddhist-majority regions.

5.2.4 Future Considerations and Refinements

While the preliminary results indicate promise, further development and testing are required to optimize SabaiJai's impact. The chatbot's content and engagement strategies may need to be refined to enhance its effectiveness in building stress resilience. Additionally, increasing the sample size may yield clearer evidence of its efficacy, given the specific statistical power chosen for this study. Although some might regard 50% power as underpowered by standard conventions, it remains a defensible choice given the exploratory aims and scope of this study. Our primary emphasis is on qualitative insights, usability data, and user adherence—core factors that help determine how we should evolve SabaiJai's prototype in the future, and provide evidence that a larger, confirmatory trial is warranted. In that sense, the moderate power acknowledges we could miss smaller effects, highlighting a limitation from a strictly statistical perspective.

However, this trade-off is perfectly reasonable given our resource constraints, the significant engineering needed to develop the chatbot, and the logistical challenge of securing participants who will reliably engage for the entire 10-day intervention. Ultimately, we belive the chosen statistical power is sufficient to achieve our goals of informing future research, generating the necessary pilot data for refining our intervention and guiding decisions about a more robust study design in the next phase of SabaiJai's lifecycle.

5.2.5 Conclusion

SabaiJai's initial result highlight important and promising trends suggesting that the chatbot has potential as a stress resilience tool. The findings support the feasibility and acceptability of AI-driven, culturally tailored mental health interventions while emphasizing the need for further refinements and larger-scale evaluations. Moving forward, SabaiJai can contribute to ongoing efforts in digital mental health, particularly in designing interventions that integrate psychological expertise, AI technology, and cultural sensitivity to provide accessible and meaningful support.

5.3 Recommendations

This study presents the development and preliminary testing of SabaiJai, a novel AI-powered chatbot designed to enhance stress resilience among working-aged Thai individuals. As such, it is important to acknowledge the limitations of the current study and outline future directions for research. This paper primarily focuses on the development process, theoretical framework, and preliminary testing of SabaiJai, as well as the qualitative research and feedback from potential users which grounded the development of the SabaiJai system. As such, it does not yet present empirical or statistical results from large-scale user testing.

The goal of this paper is its comprehensive documentation of the chatbot's conceptualization, design process, and integration of cultural elements with modern psychological approaches. This information can serve as a valuable resource in the field of digital mental health, which is rapidly being transformed by developments in AI, and aid researchers and developers working on similar culturally-tailored digital mental health interventions. Future research will involve a larger-scale randomized controlled trial (RCT) to rigorously evaluate the chatbot's efficacy. The protocol for this RCT has been developed and is ready for implementation in the next phase of the project.

The detailed description of the chatbot's features, theoretical underpinnings, and preliminary testing provides a solid foundation for future empirical validation. Therefore, further research is needed with a large sample to refine the intervention and assessment protocols, and a larger-scale RCT has to be conducted to evaluate the chatbot's efficacy in enhancing stress resilience. SabaiJai is specifically tailored to Thai culture and incorporates Buddhist principles, which may appear to limit its generalizability to other populations. However, this cultural specificity is a deliberate design choice, addressing a significant gap in culturally-appropriate digital mental health interventions. The approach taken in developing SabaiJai can serve as a model for creating culturally tailored interventions in other contexts.

Future research could explore adaptations of this model for different cultural and religious backgrounds, potentially leading to a family of culturally-specific chatbots for stress resilience. The integration of GPT-4o for the free-chat feature

represents cutting-edge AI technology in mental health interventions. However, it also presents challenges in ensuring consistent, clinically appropriate responses. Future iterations of SabaiJai will incorporate advances in AI technology and natural language processing to enhance the chatbot's capabilities and ensure its responses remain culturally sensitive and clinically sound. In conclusion, while this study has limitations inherent to its nature, it provides valuable insights into the development of culturally-tailored, AI-powered mental health interventions. The detailed documentation of SabaiJai's development process, theoretical foundations, and preliminary testing lays a solid foundation for future research and development in this critical area of digital mental health.

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Appendix

Appendix A
Research Ethics Certificates

Research Ethics Certificate for Research Proposal,

explanatory information document about research participants and the consent letters

R. 218/2024

This research proposal and the supporting documents listed below have been reviewed by the Research Ethics Committee, Mahachulalongkornrajavidyalaya University. The committee stated that this research proposal is aligned with the International Code of Ethics, national law and regulatory requirements, therefore it was appropriate to continue the research according to this proposal.

Title of Proposal:	Chatbot Innovation for Enhancing Stress Resilience Based on Buddhist Psychology in Working- Aged People
Research Proposal Code:	MCU RS 800767015
Institution:	International Buddhist Studies College, Mahachulalongkornrajavidyalaya University
Researcher:	Dr.Nadnapang Phophichit

List of documents that have been reviewed:

1.	Research Proposal	version March 29, 2024
2.	Explanatory document about research participation	version March 29, 2024
3.	Letter of consent to participate in the research	version March 29, 2024
4.	Data collection method	version March 29, 2024

Ven. Assoc. Prof. Dr. Phramaha Somboon Vuddhikaro
President of Research Ethics Committee
Mahachulalongkornrajavidyalaya University
April 20, 2024

Certification Number:	R. 218/2024
Certified Date:	April 20, 2024
Certificate Expiration Date:	April 20, 2025

มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย
๗๙ หมู่ ๑ ตำบลลำไทร อำเภอวังน้อย
จังหวัดพระนครศรีอยุธยา ๑๓๑๗๐
โทรศัพท์ ๐ ๓๕๒๔ ๘๐๐๐-๕ โทรสาร ๐ ๓๕๒๔ ๘๐๓๔
www.mcu.ac.th

Ref: MCU 8007/R.218

20th April 2023

Subject Certification of Research Ethics for Research Proposals

To Dr.Nadnapang Phophichit / Researcher of International Buddhist Studies College, Mahachulalongkornrajavidyalaya University

As you have requested a research ethics certificate for the thesis research on "Chatbot Innovation for Enhancing Stress Resilience Based on Buddhist Psychology in Working- Aged People" , at International Buddhist Studies College, Mahachulalongkornrajavidyalaya University.

The Research Ethics Committee stated that this research proposal is consistent with international codes of ethics, national laws and regulations, therefore it is expedient to continue this research without amendment.

Please be informed accordingly for further arrangement.

Regards,

(Ven. Assoc. Prof. Dr. Phramaha Somboon Vuddhikaro)
The Chair of Research Ethics Committee
Mahachulalongkornrajavidyalaya University

Appendix B

Permission Letters for Collecting Research Data

No. 001/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

18 April 2024

Police Major General Dr. Tamás Terdik
Chief of Police, Budapest Police Headquarters
Budapest Teve street 4.-6. 1139

Dear Police Major General Dr. Tamás Terdik
Subject: Request for research data collection
Enclosed: Interview form 1 copy

Referencing the earlier verbal indication of support for our project, I am reaching out to inform you about a research initiative from Mahachulalongkornrajavidyalaya University in Thailand, titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***" This project aims to develop an AI-based chatbot using psychological approaches to assist individuals in high-stress situations. Our primary objective is to assess the effectiveness of the support offered by this chatbot.

The development of the chatbot and its methodologies will be guided by expert discussions and interviews. In addition to Asian professionals, MCU is eager to include Western (European) psychologists who specialize in managing stress in professional environments. These psychologists would share their expertise with our Thai colleagues, enriching the project's scope.

Given the supportive framework established by the 2018 Act LXV between the Thai and Hungarian governments for MCU's scientific activities, and existing scientific collaborations, we are currently planning a visit to Hungary in May 2024. The purpose of this visit is to conduct face-to-face interviews with local experts who have significant knowledge or experience relevant to our research.

We believe that psychologists within the Human Resources Service of the Budapest Police Headquarters could provide invaluable insights for this study. Should the Budapest Police Headquarters be open to this collaboration, I kindly request your approval for a professional dialogue between the research lead and one or more psychologists of the Budapest Police Headquarters well-versed in this area. This session would require about an hour of personal participation in Hungary, conducted in English, tentatively scheduled between May 20 and May 31, 2024, at a mutually agreed time and location. Participation would be limited to this brief professional exchange without necessitating any further commitment from the Budapest Police Headquarters.

Enclosed with this letter is a brief outline of the research and the discussion topics, which I hope will provide a clearer picture of our objectives.

Should you approve the proposed professional discussions, I kindly ask that interested psychologists contact us via email at nadnapang@ibsc.mcu.ac.th to arrange the specifics of their involvement.

Should any further questions arise, please do not hesitate to contact me via the e-mail address specified above.

Sincerely,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 002/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

25 April 2024

Mr. Márton Lontai
General Director, Hungarian Institute for Forensic Sciences
Budapest, Mosonyi u. 9. 1187

Dear Mr. Márton Lontai
Subject: Request for research data collection
Enclosed: Interview form 1 copy

I am reaching out to inform you about a research initiative from Mahachulalongkorn-rajavidyalaya University (MCU) in Thailand, titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***" This project aims to develop an AI-based chatbot using psychological approaches to assist individuals in high-stress situations. Our primary research objective is to assess the effectiveness of the support offered by the chatbot.

The development of the chatbot and its methodologies will be guided by expert discussions and interviews conducted with modern psychologists and Buddhist scholars. In addition to Asian professionals, MCU is eager to include Western (European) psychologists who possess professional knowledge and experience that they are willing to share with our research team.

Given the supportive framework established by the 2018 Act LXV. between the Thai and Hungarian governments for MCU's scientific activities, and existing scientific collaborations, we are currently planning a visit to Hungary in May 2024. The purpose of this visit is to conduct face-to-face interviews with local experts who have significant knowledge or experience relevant to our research. We believe that psychologists within the Hungarian Institute for Forensic Sciences (HIFS) could provide invaluable insights for this study. Therefore, I kindly request your approval for a professional dialogue between the research lead and one or more psychologists of the HIFS who has knowledge about our research area.

This session would require about an hour of personal participation in Hungary, conducted in English, tentatively scheduled between May 8 - 29, 2024 at a mutually agreed time and location.

Participation would be limited to this brief professional exchange without necessitating any further commitment from the HIFS. Enclosed with this letter is a brief outline of the research and the discussion topics, which I hope will provide a clearer picture of our objectives.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Sincerely,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 003/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

25 April 2024

Gellért Fodor
Psychologist
Online Pszichológia Kft,
Budapest, Hungary

Dear Gellért Fodor
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above between May 8 - 29, 2024, at a mutually agreed time and place. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 007/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

6 May 2024

Székely József Csaba
Forensic Psychologist
Hungarian Institute for Forensic Sciences
Department of Forensic Medicine
Section of Forensic Psychiatry and Psychology
Budapest, Hungary

Dear Székely József Csaba
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above between May 20 - 29, 2024, at a mutually agreed time and place. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 006/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
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URL: www.mcu.ac.th

25 April 2024

Dr. Gábor Karsai
Rector
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Dr. Gábor Karsai
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you and 2-5 other lectures of Dharma Gate Buddhist College to collect data from your perspectives for research mentioned above between May 21-31, 2024, at a mutually agreed time and place. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 008/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

9 May 2024

Dr. Norbert NÉMETH
Assistant Professor
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Dr. Norbert NÉMETH
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above on May 24th (Friday), 2024 at 13:00-14:30 CEST at Dharma Gate Buddhist College. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 009/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
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Fax (6635) 248-034
URL: www.mcu.ac.th

9 May 2024

Zoltán CSER
Assistant Professor
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Zoltán CSER
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above on May 27th (Monday), 2024 at 14:30-16:00 CEST at Dharma Gate Buddhist College. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 010/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
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Fax (6635) 248-034
URL: www.mcu.ac.th

9 May 2024

Péter GYŐRI
Study Director
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Péter GYŐRI
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above on May 28th (Tuesday), 2024 at 10:30-12:00 CEST at Dharma Gate Buddhist College. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 011/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
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Ayutthaya 13170, Thailand
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Fax (6635) 248-034
URL: www.mcu.ac.th

9 May 2024

Ferenc BODÓ
Lecturer
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Ferenc BODÓ
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above on May 29th (Wednesday), 2024 at 10:30-12:00 CEST at Dharma Gate Buddhist College. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

No. 012/2024

MAHACHULALONGKORNRAJAVIDYALAYA UNIVERSITY
79 Group 1 Lamsai, Wang Noi,
Ayutthaya 13170, Thailand
Tel. (6635) 248-000-5
Fax (6635) 248-034
URL: www.mcu.ac.th

9 May 2024

Dr. Gábor KARSAI
Rector
Dharma Gate Buddhist College
Börzsöny street 11.
Budapest, Hungary 1098

Dear Dr. Gábor KARSAI
Subject: Kind request for research data collection
Enclosed: Interview form 1 copy

We hope this letter finds you well. I am Dr. Nadnapang Phophichit, Director of Master of Arts in Peace Studies Program (International Program) at International Buddhist Studies College, MCU. As the project head, along with my team, I am currently conducting research titled "***Chatbot Innovation for Enhancing Stress Resilience based on Buddhist Psychology in Working-Aged People.***"

We are eager to include your valuable insights in this research. I would like to schedule a face-to-face interview with you to collect data from your perspectives for research mentioned above on May 30th (Thursday), 2024 at 12:00-13:30 CEST at Dharma Gate Buddhist College. Enclosed with this letter are the interview details and the interview form. Your participation would be greatly appreciated, and we are hopeful that you can accommodate this request in your schedule.

Should you have any questions or require further information about the research, please do not hesitate to contact me via email at nadnapang@ibsc.mcu.ac.th or by Mobile at (+66) 655 199 556. I would be more than delighted to provide any additional details you may need.

Thank you very much for considering this request. Your expertise and time are highly valued, and I look forward to the possibility of conducting this interview with you.

Yours sincerely in the Dhamma,

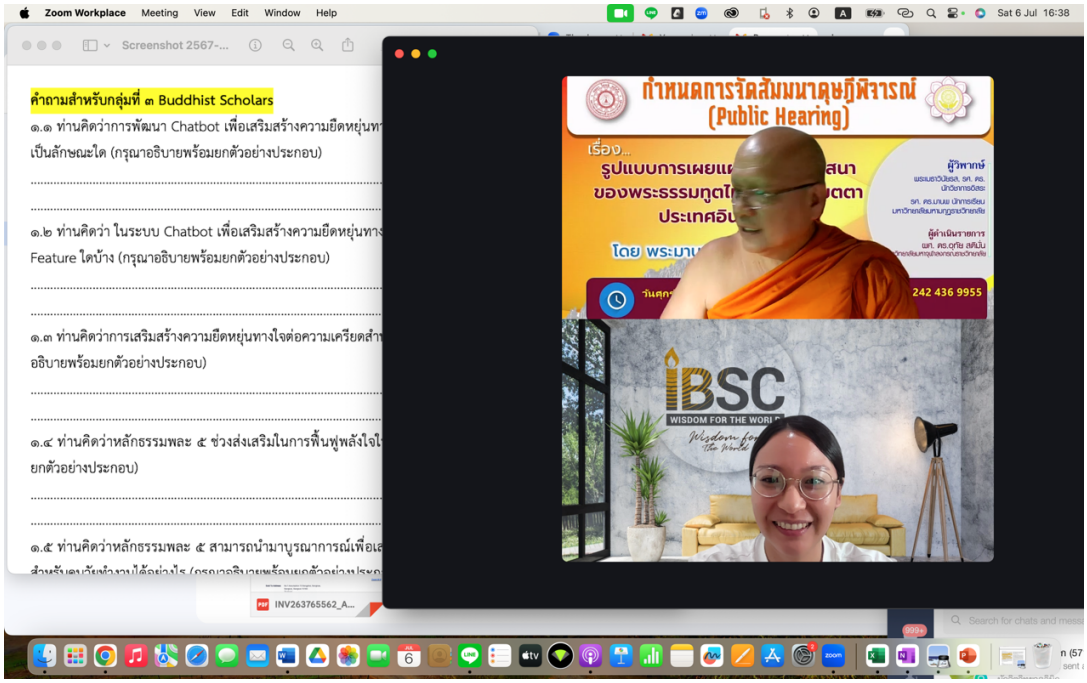
(Dr. Nadnapang Phophichit)

Director of Master of Arts in Peace Studies Program,
International Buddhist Studies College
Head of Research Project

Appendix C

Qualitative Data Collection (In-depth Interviews)

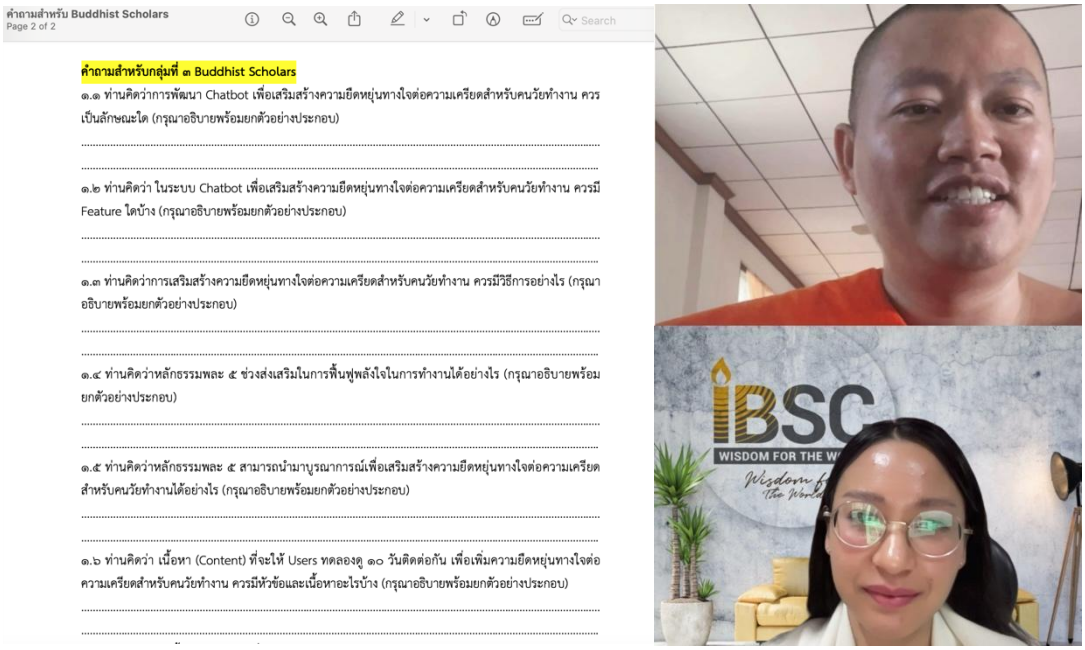
In-depth Interviews with Phrakru Bhavanasarapundit, Dr.
Director of Administrative Division Office of Buddhism Promotion and Social Services, Mahaculalongkornrajavidyalaya University



In-depth Interviews with

Buddhist Scholars, Phramedhavinaiyaros, Assoc. Prof. Dr., Lecturer,

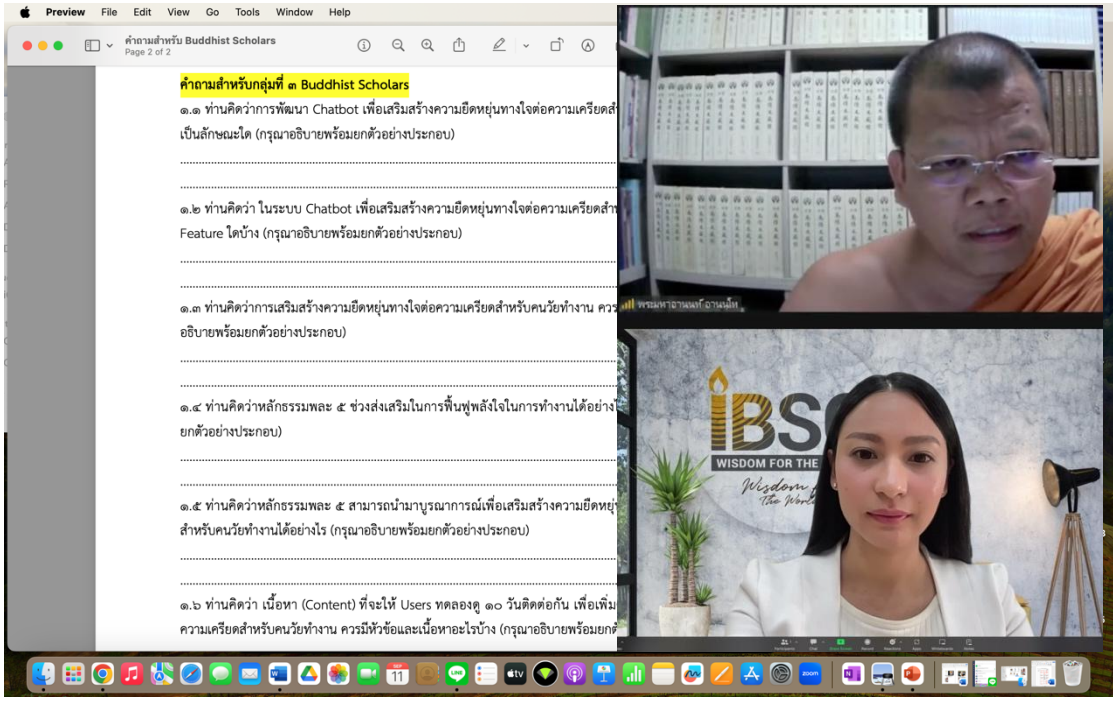
Mahamakut Buddhist University, Thailand



In-depth Interviews with

Buddhist Scholars, Phramaha Duangthip Pariyattidhari, Dr., Director of Doctoral of Philosophy in Peace Studies (International Program), IBSC

Mahaculalongkornrajavidyalaya University



In-depth Interviews with

Buddhist Scholars, Phramaha Anon Anando, Asst. Prof. Dr., Director of Master of Arts in Buddhist Studies (Chinese Program), IBSC

Mahaculalongkornrajavidyalaya University

In-depth Interviews with Buddhist Scholars

Dr. Gábor KARSAI, Rector, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Buddhist Scholars

Péter GYŐRI, Study Director, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Buddhist Scholars

Asst. Prof. Zoltán CSER, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Buddhist Scholars, Asst. Prof. Dr. Norbert NÉMETH, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Buddhist Scholars, Melinda FÖLDINÉ IRTL, Lecturer, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Buddhist Scholars, Ferenc BODÓ, Lecturer, Dharma Gate Buddhist College, Budapest, Hungary

In-depth Interviews with Psychologist and Expert in Stress Resilience, Gellért Fodor, Online Pszichológia Kft, Budapest, Hungary

In-depth Interviews with Psychologist and Expert in Stress Resilience, Székely József Csaba, Psychologist, Hungarian Institute for Forensic Sciences, Budapest, Hungary

In-depth Interviews with two Psychologist and Expert in Stress Resilience, Budapest Police Headquarters, Budapest, Hungary

(Note: Photos were not permitted during the interview session to protect the privacy of the key informants.)

Appendix D
Statistics Results

Table 1. Experimental Group (n=32) — ST-5 by Gender

Gender	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
Male	18	6.88	0.78	0.18	6.59	0.77	0.18
Female	14	6.85	0.76	0.2	6.61	0.74	0.2

Table 2. Experimental Group (n=32) — RQ by Gender

Gender	**N**	**Pre Mean**	**Pre SD**	**Pre SE**	**Post Mean**	**Post SD**	**Post SE**
Male	18	55.3	5.7	1.34	57.5	5.5	1.3
Female	14	55.1	5.6	1.5	57.3	5.5	1.47

Table 3. Control Group (n=32) — ST-5 by Gender

Gender	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
Male	18	6.78	0.7	0.17	6.68	0.71	0.17
Female	14	6.75	0.68	0.18	6.66	0.67	0.18

Table 4. Control Group (n=32) — RQ by Gender

Gender	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
Male	18	55	2.9	0.68	55.1	2.9	0.68
Female	14	55	2.6	0.7	55.2	2.7	0.72

Table 5. Experimental Group (n=32) — ST-5 by Age Group

Age Group	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
25–35	16	6.88	0.75	0.19	6.61	0.73	0.18
36–50	12	6.86	0.78	0.23	6.59	0.72	0.21
51–60	4	6.83	0.67	0.33	6.58	0.62	0.31

Table 6. Experimental Group (n=32) — RQ by Age Group

Age Group	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
25–35	16	55.2	5.8	1.45	57.4	5.6	1.4
36–50	12	55.1	5.6	1.62	57.3	5.4	1.56
51–60	4	55.2	5.5	2.75	57.3	5.3	2.65

Table 7. Control Group (n=32) — ST-5 by Age Group

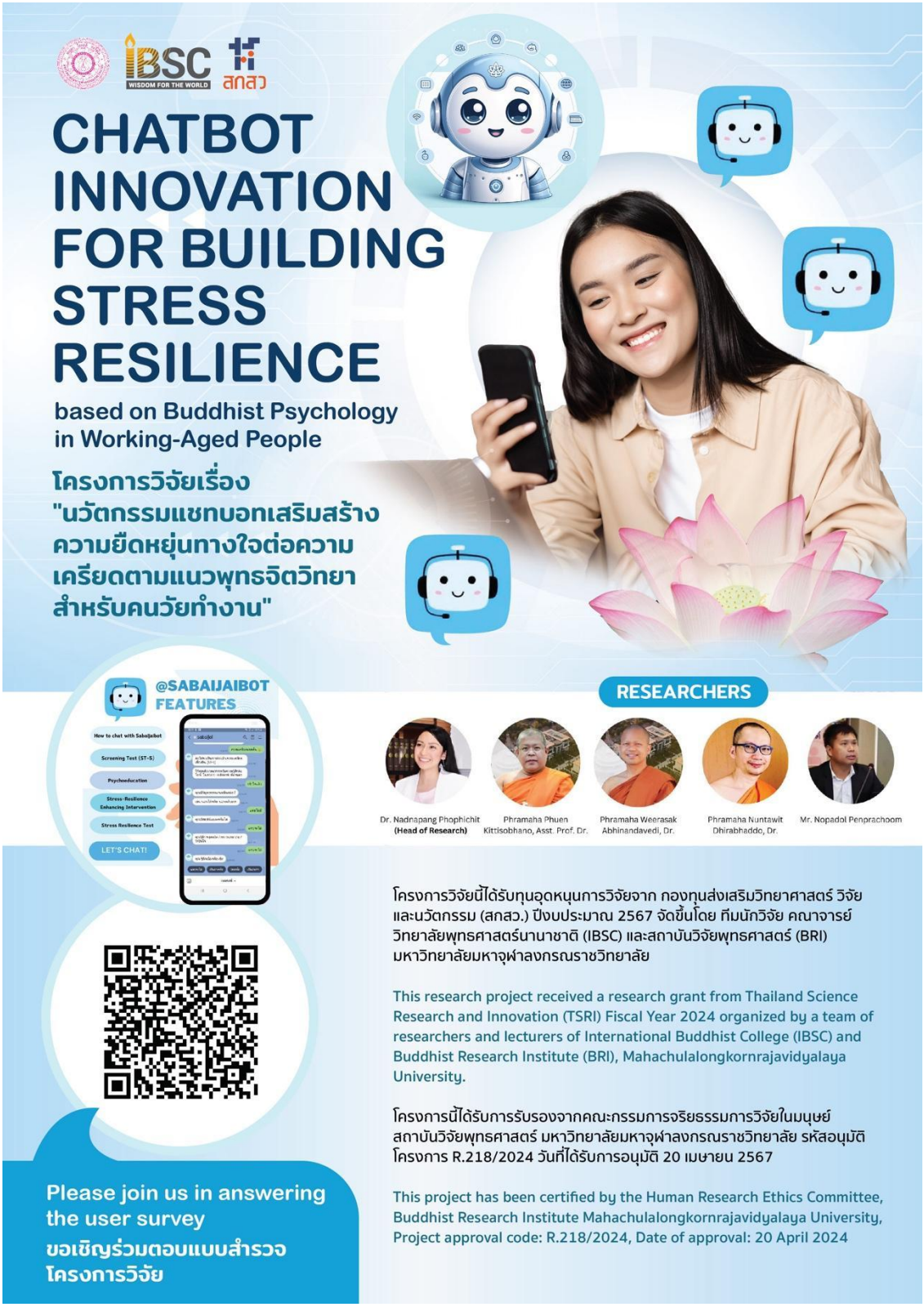
Age Group	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
25–35	16	6.78	0.7	0.17	6.68	0.71	0.18
36–50	12	6.77	0.69	0.2	6.67	0.7	0.2
51–60	4	6.75	0.65	0.33	6.64	0.6	0.3

Table 8. Control Group (n=32) — RQ by Age Group

Age Group	N	Pre Mean	Pre SD	Pre SE	Post Mean	Post SD	Post SE
25–35	16	55	2.9	0.72	55.1	2.9	0.72
36–50	12	55	2.6	0.75	55.1	2.7	0.78
51–60	4	55.1	2.8	1.4	55.2	3	1.5

Appendix E

Posters for the Research Projects



โครงการวิจัยนี้ได้รับทุนอุดหนุนการวิจัยจาก กองทุนส่งเสริมวิทยาศาสตร์ วิจัย และนวัตกรรม (สกสว.) ปีงบประมาณ 2567 จัดขึ้นโดย ทีมนักวิจัย คณาจารย์ วิทยาลัยพุทธศาสตร์นานาชาติ (IBSC) และสถาบันวิจัยพุทธศาสตร์ (BRI) มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย

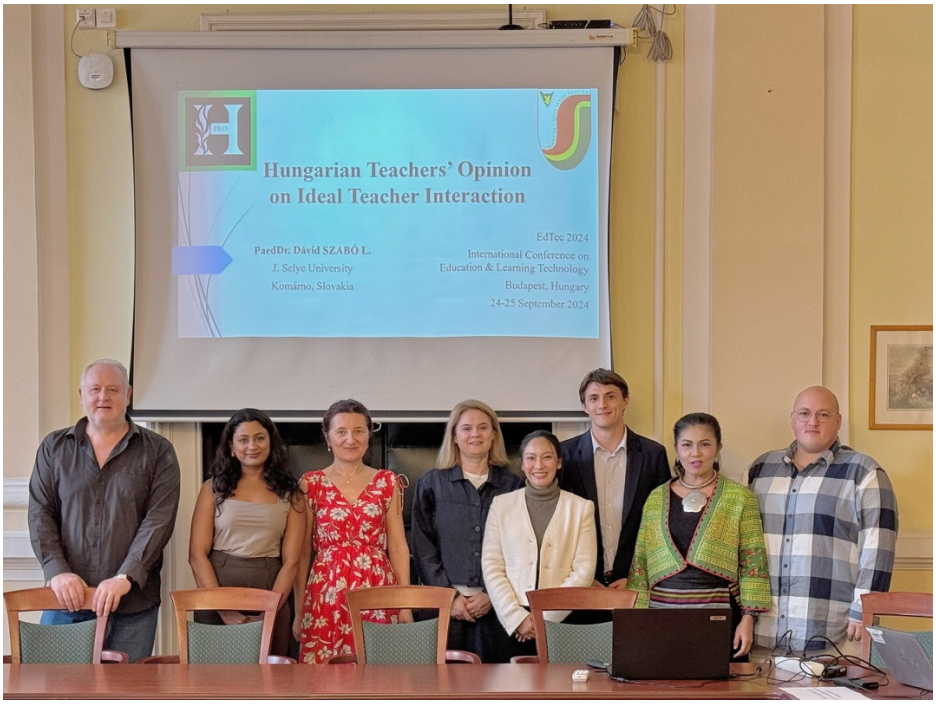
This research project received a research grant from Thailand Science Research and Innovation (TSRI) Fiscal Year 2024 organized by a team of researchers and lecturers of International Buddhist College (IBSC) and Buddhist Research Institute (BRI), Mahachulalongkornrajavidyalaya University.

โครงการนี้ได้รับการรับรองจากคณะกรรมการจริยธรรมการวิจัยในมนุษย์ สถาบันวิจัยพุทธศาสตร์ มหาวิทยาลัยมหาจุฬาลงกรณราชวิทยาลัย รหัสอนุมัติโครงการ R.218/2024 วันที่ได้รับการอนุมัติ 20 เมษายน 2567

This project has been certified by the Human Research Ethics Committee, Buddhist Research Institute Mahachulalongkornrajavidyalaya University, Project approval code: R.218/2024, Date of approval: 20 April 2024

Appendix F

Research Contribution at the International Conference, Óbuda University, Budapest, Hungary



The research study was presented at the PsyCon Budapest – International Conference on PsycOology & Psychiatry, held on 25-26 September 2024 at Óbuda University, Budapest, Hungary This conference, organized by the Healthcare and Biological Sciences Research Association (HBSRA), provided an international platform to share insights and innovations from the research with a global audience.

Registration ID: ERCICRLSH2420055

Eurasia Research

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Certificate of Honour

This certificate of honour is awarded to

Nadnapang Phophichit

of

International Buddhist Studies College, Mahaculalongkornrajavidyalaya University, Ayuttaya, Thailand

for

Introducing Sabaijai: An Innovative AI chatbot System Based on Buddhist Psychology for Enhancing Stress Resilience in Working-Aged People in Thailand

as

Oral Presenter

in technical presentation and research contributions to

PsyCon Budapest–International Conference on Psychology & Psychiatry, 25-26 September 2024

held at

Óbuda University, Budapest, Hungary

Organized By: Healthcare and Biological Sciences Research Association (HBSRA)

Eurasia Research Conference Secretariat

"Collaborate to Co-create"

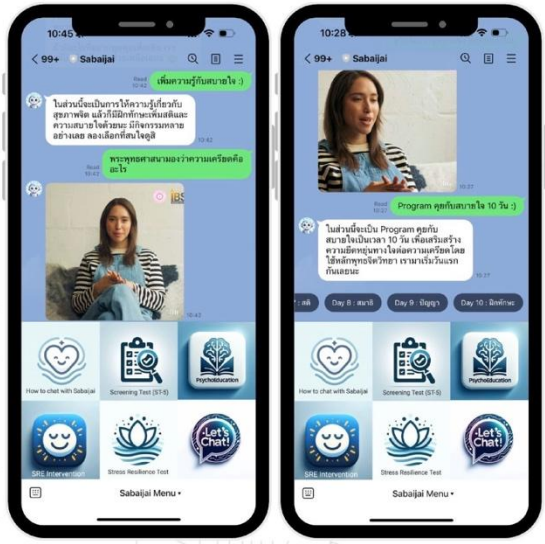
25-26 September 2024

The Certificate of Honour for the oral presenter in technical presentation and research contribution to the PsyCon Budapest – International Conference on PsycOology & Psychiatry, held on 25-26 September 2024 at Óbuda University, Budapest, Hungary This conference, organized by the Healthcare and Biological Sciences Research Association (HBSRA), provided an international platform to share insights and innovations from the research with a global audience.

Appendix G
Research Paper Publication in
Scopus-Index Journal (Q2)

3 GOOD HEALTH AND WELL-BEING

Scopus Q2



First Author

Dr. Nadnapang Phophichit

Director of the Certificate in Mindfulness Master Program (International Program)

Head of Research Project
Lecturer at International Buddhist Studies College (IBSC), MCU, Thailand

Research Team

1. Dr. Nadnapang Phophichit
2. Phramaha Phuen Kittisobhano, Asst. Prof. Dr.
3. Phramaha Weerasak Abhinandavedi, Dr.
4. Phramaha Nuntawit Dhirabhaddo, Dr.
5. Mr. Nopadol Penprachoom

Journal:

Thammasat Review (Scopus Q2)

Research Project Funded

By **Thailand Science Research and Innovation (TSRI)**

Appendix H

Certificate of Recognition for Outstanding Contributions in Research, Creative Work, and Academic Achievements

IBSC
WISDOM FOR THE WORLD

CERTIFICATE OF RECOGNITION

This certificate is awarded to

Dr. Nadnapang Phophichit

In recognition of your outstanding contributions in research, creative work, and academic achievements for the year 2025, particularly for your published work in a *Scopus-indexed journal (Q2)*.

Your dedication to advancing the field of Buddhist studies and mindfulness is greatly appreciated.

Given on 13th February 2025

Phra Medhivajarapundit, Prof. Dr.
Director of International Buddhist Studies College

Biography

1. Head of the Research Project: Dr. Nadnapang Phophichit

(1) Name-Surname Dr. Nadnapang Phophichit

(2) ID Card No. 110200145xxxx

(3) Educational Background

Abbhidhamma Studies, Chula Abbhidhamika Tri

Ph.D. in Buddhist Studies (International Program)

M.A. in Buddhist Psychology

B.Sc. in Clinical and Community Psychology

B.A. in Tourism Industry (International Program)

(4) Position Director of Certificate Program in Mindfulness Master (International Program),

International Buddhist Studies College (IBSC),

Mahachulalongkornrajavidyalaya University (MCU)

Lecturer, IBSC, MCU

(5) Address International Buddhist Studies College (IBSC) Mahachulalongkornrajavidyalaya University (MCU) 79 Moo1, Lamsai, Wang-noi Phra Nakorn Si Ayutthaya 13170, Thailand Tel. 035-248-000

E-mail: Nadnapang@ibsc.mcu.ac.th

(6) Research Experience

(6.1) Research

1. Effects of Four Foundations of Mindfulness-Based Intervention (FFMBI) on Salivary Cortisol Levels, Body Composition, Blood Pressure and Pulse Rate, and Brain Waves of Practitioners, 2024, Research funded by Mahachulalongkorn-rajavidyalaya University, Thailand. (Head of Research Project)

2. A Model of Vipassana Meditation Practice for Psychological Well-being Empowerment in Elderly Women, 2024, Research funded by International Buddhist

Studies College, Mahachulalongkornrajavidyalaya University, Thailand. (Co-Researcher)

3. The Model of Mindfulness Practice on Well-Being of Students in International Buddhist Studies College, Mahachulalongkornrajavidyalaya University, 2024, Research funded by International Buddhist Studies College, Mahachulalongkornrajavidyalaya University, Thailand. (Co-Researcher)

4. New Generation Back to Hometown: Creating a Network of Local Innovators for Local Hometown Community Development, 2024, Research funded by Thailand Science Research and Innovation (TSRI). (Co-Researcher)

5. A Model of the 'Khok Nong Na' Buddhist Agriculture Development by Peace Studies Model for Sustainable Development: A Case Study of Sisaket Province, 2022, Research funded by Mahachulalongkorn-rajavidyalaya University, Thailand. (Co-Researcher)

6. Motivation and Practical Guidance for People towards the Royal Cremation Ceremony of the Late King Bhumibol Adulyadej (Rama IX), 2018, A Research funded by BPCPG Public Company Limited. (Co-Researcher)

7. Creating Buddhist Ecological Balance and Maintaining Natural Capital of the Community Forest Networks in the Northeast of Thailand, 2018, A Research funded by Mahachulalongkornrajavidyalaya University, Thailand. (Co-Researcher)

(6.2) Research Findings/Publication/Application of Research

Publication of Academic Articles

Phrakhupalhad Adisak Vajirapañño, Phramaha Hansa Dhammahaso, Sakchai Sakabucha, Nadnaphang Phophichit, "Concept of 'Khok Nong Na Model' for Sustainable Development", Journal of Arts Management, Vol 6, No. 1 (January-March 2022): 419-434.

Publication of Research Articles

1. Nadnapang et al., "Effects of Four Foundations of Mindfulness-Based Intervention (FFMBI) on Salivary Cortisol Levels, Body Composition, Blood Pressure

and Pulse Rate, and Brain Waves of Practitioners", Spirituality Studies, Vol.11, No.1 (Spring, 2025): 19-39.

2. Patcharee Boonin, Phra Debvajracarya Thiab Siriñāṇo, Phramaha Adidej Sativaro, Nadnaphang Phophichit, Banjob Bannaruji, "The Study of the Principle of Cultivating Loving Kindness in Metta Sutta", Journal of MCU Buddhist Review, Vol 6, No. 1 (January-April 2022): 127-141.

3. Phrakhupalhad Adisak Vajirapañño, Phramaha Hansa Dhammahaso, Sakchai Sakabucha, Nadnaphang Phophichit, "A Model of the 'Khok Nong Na' Buddhist Agriculture Development by Peace Studies Model for Sustainable Development: A Case Study of Sisaket Province", Journal of MCU Peace studies, Vol 10, No. 1 (January-February 2022): 48-64.

4. Phramaha Phuen Kittisobhano, Sakchai Sakabucha, Phrakhrusang kharakekapatra Apihichando, Nadnaphang Phophichit, "The Causal Model of Family Strength in Thai Society", Journal of MCU Peace Studies, Vol 10. No. 1 (January-February 2022): 351-364.

5. K, Boonpen, P. Kowitwarangkul, P. Ninpetch, N. Phophichit, P. Chuchuay, T. Threrujirapapong, S. Otarawanna, "Numerical Study of Influence of Casting Speed on Fluid Flow Characteristics in the Four Strand Tundish", Materials Today: Proceedings (2021): 1-7. DOI: 10.1016/j.matpr. 2021.03.465.

6. S. Lakkum, P. Ninpetch, N. Phophichit, P. Kowitwarangkul, A. Tawai, S. Otarawanna, "Numerical and Physical Investigation of the Mixing Process in Gas Stirred Ladle System", Applied Science and Engineering Progress (2020): 1-13. DOI:10.14416/j.asep.2020.07.001.

7. Phramaha Yothin Yodhiko, Thaksina Krairach, Ruedee Saengduenchay, Nadnaphang Phophichit, "Creating Buddhist Ecological Balance and Maintaining Natural Capital of the Community Forest Networks in the Northeast of Thailand", Journal of Social Science and Buddhistic Anthropology, Vol. 5 No. 12 (December 2020): 30-43.

8. Phra N. Udomphol, K. Khaw-ngern, S. Techapalokul, N. Phophichit, C. Changcharoen, “Motivation of Volunteers towards Monk Ordination Ceremony for Dedicating a Merit to the Late King in the Royal Cremation Ceremony”, Journal of SaenKhomKham Buddhist Studies, Vol. 4 No. 1 (January-June 2019): 30-41.

9. N. Phophichit, “The Effects of Buddhist Psychological Factors on the Resilience of Adolescents in Bangkok”, Journal of International Association of Buddhist Universities, Vol. 12 No. 1 (January-June 2019): 353-368.

10. N. Phophichit, “Buddhism and Human Development: Buddhist Influenced Factors Enable Resilience in Adolescents”, Journal of International Association of Buddhist Universities, Edition on the 15th United Nations Day of Vesak (May 2018): 154-164.

2. Co-Researcher: Phramaha Phuen Kittisobhano, Asst. Prof. Dr.

(1) Name-Surname Phramaha Phuen Kittisobhano, Asst. Prof. Dr.

(2) ID Card No. 367050069xxx

(3) Educational Background

Pāli VII, Ph.D. (Psychology)
M.A. (Counseling),
B.A. (Psychology),

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(6) Research Experience

(6.1) Research

1. The Buddhist Selective Factors Influencing toward The Elderly's Psychological Well-Being, 2015, Research funded by Mahachulalongkorn-rajavidyalaya University, Thailand.

2. The Model of Family Relationship to Intellectual Well – Being of Adolescence, 2016, Research funded by Mahachulalongkorn-rajavidyalaya University, Thailand.

3. An Analysis of Causal Relation Structure of Factors Effected to Moral Courage of Adolescents, 2017, Research funded by Mahachulalongkorn-rajavidyalaya University, Thailand.

(6.2) Research Findings/Publication/Application of Research

Publication of Research Articles

1. Phramaha Phuen Kittisobhano, Phrakrusangrak Ekkapat Abhichandho, Phra Pramote Vadakovito,Kachaporn Kumsonta, The Buddhist Selective Factors Influencing toward The Elderly's Psychological Well-Being, Journal of MCU Peace Studies, Vol. 7 No. 3 (2019): (May - June): 351-364.753-765.

2. Thananchai Pattanasing, Phramaha Phuen Kittisobhano, Phragrupipit pariyattikit and Lampong Klomkul, The Model of Family Relationship to Intellectual Well – Being of Adolescence, Journal of MCU Peace Studies, Vol.6, Special Issue: 406-417.

3. Phramaha Phuen Kittisobhano, Sakchai Sakabucha, Phrakhrusang kharakekapatra Apihichando, Nadnaphang Phophichit, The Causal Model of Family Strength in Thai Society, Journal of MCU Peace Studies, Vol 10. No. 1 (January-February 2022): 351-364.

4. Tiptida NaNakorn,Kamalas Phoowachanathipong, Phramaha Phuen Kittisobhano, and Amnaj Buasiri, The Development of Resilience Quotient Indicators Based on Buddhist Psychology for Adult, Journal of MCU Ubol Review, Vol.6 No.3(November-December, 2021): 391-404.

5. Thatchathon Attarung, Phramaha Phuen Kittisophano, Prayoon Suyajai, The Development of Indicators and Measurement of Buddhist Spiritual Growth, Journal of MCU Social Development, Vol 8. No. 2 (May-August 2023): 129-142.

6. Varithta Charuchinda, Prayoon Suyajai, Phramaha Phuen Kittisobhano, Buddhist Psychology for the Development Model Enhancing Bodhi Panya of Registered Nurse, Journal of MCU Peace Studies, Vol. 10 No. 6 (2022): September – October: 2361-2373.

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(6) Research Experience

(6.1) Research

1. The Application of Sufficiency Economy Philosophy for Developing the Monasteries and Communities in Khonkaen Province, Research Project Funded by Buddhist Research Institute of Mahachulalongkornrajavidyalaya University, 2018. (Co-Researcher)

2. The Characteristics of Local Leaders Resulting in the Enhancement of Peace in the Communities, Research Project Funded by Buddhist Research Institute of Mahachulalongkornrajavidyalaya University, 2020. (Co-Researcher)

(6.2) Research Findings/Publication/Application of Research

Publication of Academic Articles

1. Phramaha Weerasak Abhinandavedi (Sangpong). (2566). Perspectives to Karma in Buddhists in Thai Society, Journal of MCU Peace Studies, Year 11, Issue 1 (January-February): 391-400. (TCI 1)

2. Suwannee Ho-Saengchai, Phra Pramote Watthakawito, and Phramaha Weerasak Abhinandavedi (Sangpong). (2563), Philosophical Perspectives and Acceptance of Changes in Buddhist Meditation, Journal of Arts and Management, Year 4, Issue 1 (January-April): 180-192. (TCI 2)

3. Phra Pramote Watthakawito (Panthaphat), Phra Maha Dawngdern Titayanano (Tunin), Phramaha Weerasak Abhinandavedi (Sangpong)., and Suwannee Ho-Saengchai. (2562). Humanity and Peace, and Buddhist Meditation, Journal of Chulalongkorn University, Year 6, Issue 10 (December): 4698-4710. (TCI 2)

Publication of Research Articles

1. N. Sanannaree, Phramaha W. Abhinandavedi, R. Tavachalee, Ch. Boonpiyo, J. Leeka and M. Sa-waingam, The Application of Sufficiency Economy Philosophy for Developing the Monasteries and Communities in Khonkaen Province, Journal of MCU Peace Studies, Vol. 8 Issue 2 (March – April 2020): 388 – 404.

2. P. Vatagovito (Pantapat)., P. Thitayano (Tunin), P. Abhinandavedi (Sangphong), S. Horsaengchai, Human on Peace and Buddhist Peaceful Means, Journal of MCU Nakhondhat Vol.6 No.10 (December 2019): 4697–4710. S. Horsaengchai, P. Vatagovito (Pantapat)., P. Abhinandavedi (Sangphong), The Perspective of Education as Philosophy Changing Acceptation as Buddhist Peaceful Means, Journal of Arts Management Vol.4 No.1 (January - April 2020): 180-192

3. S. Suwanvecho, K. Pongpirul, P.W. Abhinandavedi, K. Wattanapradith. Mindfulness And Buddhist Practices Among Buddhist Cancer Patients, Annalsofoncology.org, Volume 31, Supplement 4, S937-S938, September 01. 2020.(1522P)

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(6) Research Experience

(6.1) Research

1. Model urban lifestyle of happiness: Extracting lessons for the development of a cultural metropolis of happiness, 2022. (Head of Research)

2. Taxi Virtue: Creating networks to develop the quality of taxi drivers in the Bangkok Metropolitan Area in terms of service-mindedness, 2021. (Co-Researcher)

3. Development of prototype peaceful villages (Buddhist, Christian, Muslim) based on religious teachings, 2020. (Co-Researcher)

4. Development of indicators of power and lifestyle wisdom of retired civil servants, 2018. (Co-Researcher)

5. Management of indigenous weaving for distinctive identity in ASEAN, 2018. (Co-Researcher)

6. Educational management for equality of ethnic groups in Thailand and Laos, 2017. (Head of Research)

7. Enhancing ethics for prisoners in the Bangkok Metropolitan Area, 2016. (Head of Research)

8. Prototype village development promoting a good quality of life in line with the sufficiency economy philosophy, 2016. (Head of Research)

9. Sustainable quality of life development model for communities following Buddhist principles, 2015. (Head of Research)

10. Buddhist Social Welfare: Models and community empowerment, 2014. (Head of Research)

11. Synthesizing research work at the Buddhist Research Institute, 2013. (Head of Research)

12. Developing and improving the happiness measurement model of the population according to the principles of Buddhism, 2009. (Co-Researcher)

(6.2) Research Findings/Publication/Application of Research

Publication of Research Articles

1. Development Model of Prototype Villages Promoting a Good Quality of Life According to the Sufficiency Economy Philosophy, Journal of Peace Education and Research TCI, Year 6, Issue 4 (2018): October - December 2018.

2. Buddhist Social Welfare: Models and Community Empowerment, Journal of Peace Education and Research TCI, Year 6, Issue 2 (2018): April - June 2021.

3. Development Model of Prototype Villages Promoting a Good Quality of Life According to the Sufficiency Economy Philosophy, Journal of Social Sciences and Humanities TCI, Year 5, Issue 6 (2020): June 2023.

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