

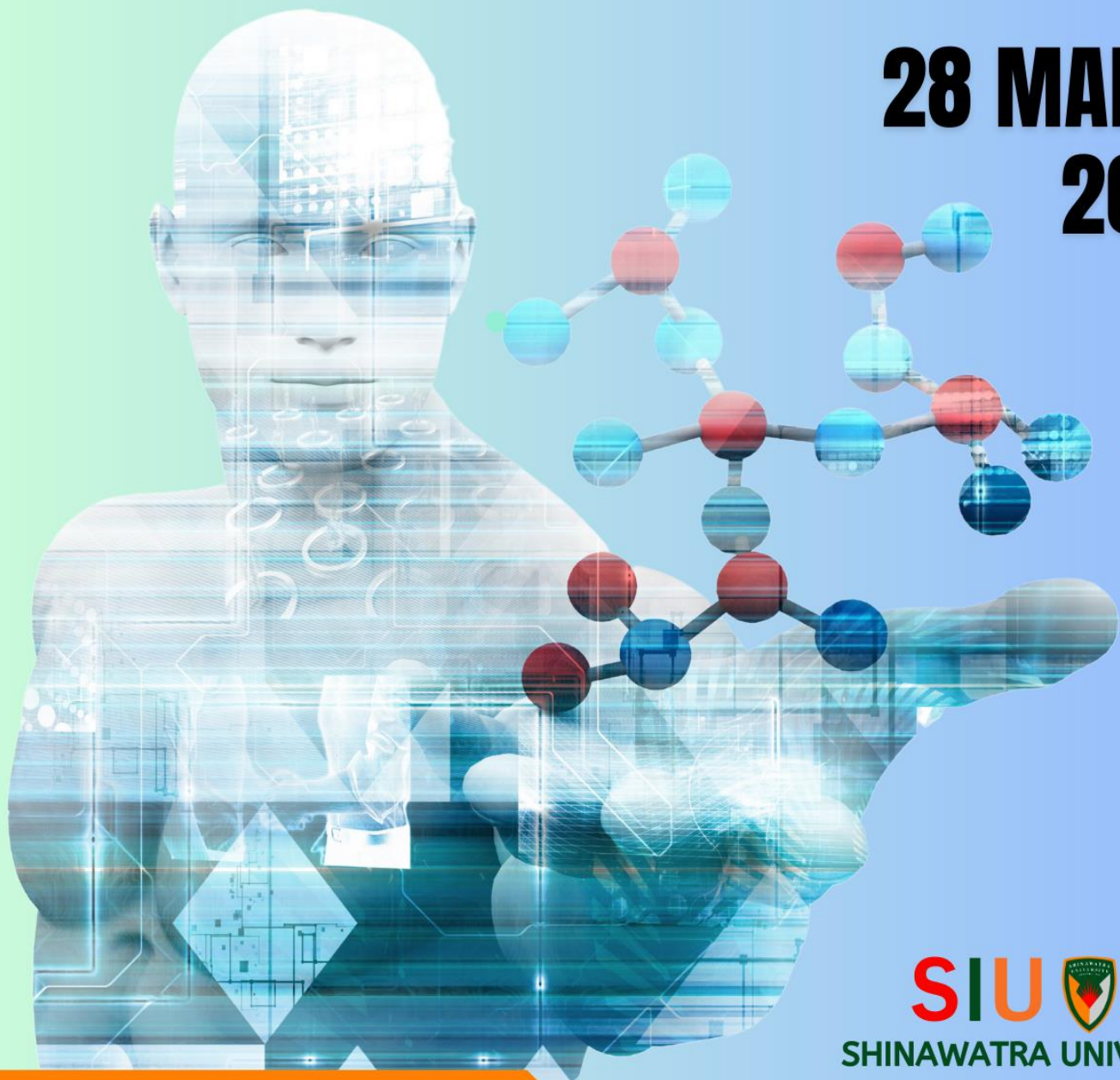
ICMR 2025



Proceedings of the 3rd International Conference on Multidisciplinary Research : ICMR

"Global Synergies in Health, Technology, and Sustainability: A Multidisciplinary Approach"

**28 MARCH
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Proceedings of the 3rd International Conference on
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"Global Synergies in Health, Technology, and Sustainability:
A Multidisciplinary Approach"

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Schedule
The 3rd International Conference on Multidisciplinary Research 2025
28 March 2025, Online Conference (ICMR)
Via Internet (Zoom meeting)

09.00 a.m.-09.10 a.m. Opening Ceremony of the International Conference

By President of Shinawatra University
Associate Professor Zhou Fei

09.10 a.m.-11.00 a.m. (Keynote Speakers):

- Nikhil Kassetty
- Dr. Danty James
- Dr. K J Vargheese

(Guest Speakers):

- Rajesh Daruvuri
- Srinivas Chippagiri
- Lakshman Kumar Jamili
- Ramakrishna Garine
- Venkata Vijay Krishna Paruchuru
- Arpita Soni
- Harish Kumar Mogulluri
- Ranga Premsai
- Dr. Mounica Yenugula
- Arjun Jaggi
- Puneet Agrawal
- Mukund Kulkarni
- Gopi Desaboyina

11.00 a.m.-11.05 a.m. Group Photo Session

13.00a.m.-16.30 a.m. Research Presentations

(maximum 15 minutes per/ presentation, including 5 minutes for
Q&A)

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Preface

The 3rd International Conference on Multidisciplinary Research on Sustainable Development was organized to serve as a global platform for knowledge sharing and dissemination of cutting-edge research on sustainable development - a crucial issue requiring worldwide collaboration.

This conference has brought together researchers, academics, and experts from diverse disciplines to present their latest research findings, novel concepts, and exchange experiences in driving sustainable development across economic, social, and environmental dimensions.

We hope that this conference will foster international academic collaborations and pave the way for advanced research addressing sustainable development challenges in the future. It is also expected to inspire innovations for the betterment of humanity.

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THE ANALYSIS OF THAI-ENGLISH CODE-SWITCHING
THROUGH PODCAST TEACHING IN THAILAND

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ABSTRACT

This study aimed to analyze the types of code switching and identify the reasons for using code switching through English podcast teaching in Thailand. The analysis identify and classify based upon the classification frameworks of Poplack (1980), for The three classified types of code-switching, which are intra-sentential switching, inter-sentential switching and tag-switching, and based on Hoffman's classification framework for the seven reasons of code-switching performance, which are 1) talking about particular topics, 2) quoting someone else, 3) expressing solidarity, 4) interjection (inserting sentence fillers or sentence connectors), 5) repetition used for clarification, 6) intention of clarifying the speech content for interlocutor, and 7) expressing group identity. The approach of this study was qualitative. The data was collected from recording the selected episodes of KND (kum nee dee) Thai-English teaching podcast in Thailand. The data was investigated and analyzed strategically based on Poplack's (1980) frameworks.

The "Intrasentential switching" was the most frequent type of code switching employed by the host in the program. The findings of study indicated the reasons of code-switching performance, similar to what was classified by Hoffman, except for the intention of clarifying the speech content for interlocutor, which the researcher did not find in this study.

Keywords: Thai-English Code switching, Types of Code switching, Reasons for code switching

1. Introduction

As global economy has more influence on Thailand, English language programs has been growing extensively both in the formal educational system and through online private platforms (Foley, 2005). The government in Thailand has prioritized English language learning into the curriculum of Thai students as they recognize its value in enhancing Thailand's ability to compete within the global era (Darasawang, 2007). Thai people's English language proficient is the poorest in Asian countries (Khamkhien, 2010). The using of Thai-English code switching is found in variety in Thailand as a method to assist English learning (Kachru, 1986 as cited in Kannaovakun & Gunther, 2003). Podcasts are one of the means that are actually very innovative and easily accessible for learners to explore the English language. The usage of code-switching to help with comprehension and cultural relevance is still pretty much underexplored (Lee, 2020).

This study aimed to analyze the types of code switching and also identify the frequency for using code switching through KND (kam nee dee) Thai-English podcast teaching in Thailand by Thai host "BickBoon" Khun Phumchai Boonsinsuk, Executive Director for Podcast of The Standard, Thai online news reporters. The selection of KND podcast episodes were on random basis to mitigate bias and two objectives for the study: 1) to identify the code-switching types used in Thai-English Teaching in the podcast and 2) to analyze the frequency of code-switching found in Thai-English Teaching in the podcast. The researcher used 2 research questions in this study: 1) what are the types of code-switching used in Thai-English Teaching through podcast and 2) how often do code-switching happen in Thai-English Teaching through podcast.

Significance of the study provides the understanding of Thai-English code switching appearing in podcast teaching. In "KND" podcast, the hosts frequently employ code-switching during teaching to explain words', phrases', clauses', and sentences' meanings and how they are used. Teaching by using Thai language to begin with, allows listeners/learners to understand what are being taught connecting to the English word's meaning and usage in sentence or context. The classification of the types of code-switching in this study is also clarified as a reference for further study. The code-switching types found in this study implied the behavior in the teaching and learning English podcast in Thailand.

2. Literature Reviews

Literature review focuses on definitions of code switching as defined by scholars, the concepts and theoretical frameworks related to code switching, classification and reasons of code-switching.

Code-switching is characterized by the changing between two or more languages or dialects within a single conversation or discourse (Myers-Scotton, 1993; Poplack, 2000), depending on the social context or conversational setting.

There are three code switching characteristics: situational, metaphorical and conversational switching. First, situational Switching is related to situation changing where the same speaker may switch to a different language due to the change of situation, although the language spoken in that particular situation does not vary. Next, Metaphorical switching is influenced by the topics of the conversation referring to the tendency in a bilingual or multilingual community to

switch codes (language or language variety) in conversation to discuss a topic that would normally fall into another conversational domain. Lastly conversational switching is equally produced combination of situational and metaphorical switching under the circumstances of no topic change (metaphorical switching), and no situation change (situational switching).

Types of code-switching and reasons of code switching can be classified into two classifications: grammatical and contextual classification. Grammatical classification is based on the different code positions found in speech or sentences while contextual classification is based on the reasons why people tend to switch their code. There are three kinds of code-switching: tag switching, intra-sentential switching, and inter-sentential switching. For intra-sentential code-switching, it occurs when there is one foreign language sentence structure between the first two sentences. This situation may also include a switch from a whole sentence, or more than one sentence produced entirely in one language and it is seen most often in fluent bilingual speakers. As for inter-sentential code-switching occurs when a word or phrase or clause in a foreign language is located within a sentence in the first language. This form often occurs when the conversation changes the topic Intra-sentential switching occurs within a clause or sentence boundary. Last but not the least, tag code-switching occurs when a bilingual enters a short phrase from a different language at the end of their utterance. The examples can be seen from a conversation, “Thank you, lah”.

Reason for using Code-Switching is different from one another. Code-switching has been suggested including solidarity, accommodation to listeners, and choice of topic. (Wardhaugh, 2006). Also, there are seven reasons indications for doing code-switching: 1) talking about a particular topic, 2) quoting someone else, 3) being emphatic about something (express solidarity), 4) interjection (inserting sentence fillers or sentence connectors), 5) repetition used for clarification, 6) intention of clarifying the speech content for the interlocutor and 7) expressing group identity.

The researcher reviewed previous code-switching studies under educational context in Thailand, Malaysia and Luxembourg and the findings reflected framework presented by scholars, for example Myers-Scotton, 1993; Poplack, 2000. Based on study “Code-Switching English and Thai Used by Intensive English Program Primary School Student” by Kiaowanich et al, it can be claimed that code switching frequently occurred because of their ability to speak multiple languages and accuracy in communicating with their interlocutors. (Kiaowanich et al, 2023). The result of this

study has confirmed Thai-English code-switching is helpful for Thai students to understand on particular topics especially under cultural context while teacher could ensure key messages are well received and get respond accordingly from the students.

According to Independent Study on “TEACHER’S CODE SWITCHING AND ITS PERCEPTION AMONG THAI TEACHERS AND THAI STUDENTS IN AN INTENSIVE ENGLISH PROGRAM” by Namthip Sangprem, the teacher code-switched, both inter-sentential and intra-sentential, for 17.4% of the teaching time.

From the study, the teacher code-switched for 1) to call upon the students, 2) to give instructions to students and make sure the instructions were clear, 3) to explain the grammar points of the Present Continuous Tense, 4) to encourage responses from the students and 5) to create relaxed atmosphere. Based on the result of this study, it has proved that code-switching was used

when talking about a particular topic and calling for intention of clarifying the speech content for the interlocutor (Wardhaugh, 2006). Furthermore, the teacher showed examples of her code-switching and how it helped to earn respect and create a more serious interest e.g. “Ngieb” when the teacher would like to request quiet. (Namthip, 2016). Hence, the word “Ngieb” emphasized the Functions of Teachers’ Code Switching on Directive Functions which is used in a situation where a speaker wants to get the listeners’ attention. (Hymes, 1962)

While reviewing Exposure Journal 174 on “CODE-SWITCHING BETWEEN THE TEACHERS AND THE STUDENTS OF THE CONVERSATION” by Hamid S, code switching was practiced by the English teacher was the alternating use of English and Bahasa Indonesia within English classes by the teachers in order to build intimate interpersonal relationships among English teacher and students in English conversation in the classroom. The result of this journal confirmed intention of clarifying the speech content for the interlocutor (Wardhaugh, 2006). As a result of the study, there were six reasons for code switching: 1) to make questions, 2) unpleasant feeling, 3) to strengthen request or command, 4) repetition used for clarification reiteration of a message, 5) to give advice, 6) to create humor, it confirmed the similar findings of those from Wardhaugh e.g. talking about a particular topic, repetition used for clarification etc.

Based on study on Language Attitudes and Code-switching Behaviour in a Multilingual Educational Context: The Case of Luxembourg by Redinger, the analysis focusing on instances of French transfer fulfilling a ‘written text or terminology’ function demonstrates how teachers simply embed French lexical items or expressions in their Luxembourgish when they are faced with a need to refer to the written text or a lack of subject matter-related terminology. Therefore, the result of this study has proved that code-switching is necessary when talking about a particular topic (Wardhaugh, 2006) and repetition used for clarification reiteration of a message (Hamid, 2016).

To summary, code-switching is a situation in which a speaker switches from one language into another in a conversation. Bloom and Gumperz (1972) introduced situational switching, metaphorical switching and conversational switching while Hammink (2000) categorized it as inter-sentential code-switching and intra-sentential code-switching. Many related studies included in this study review code-switching behavior according to the functions of code-switching in conversation within English teaching podcasts.

In the educational context, the related studies mentioned in the above have proved that code-switching from local language to English language is indeed beneficial when teachers would like to emphasize particular topic, make request or clarify the message. When reviewing previous studies and findings of researcher, the researcher summarized in below table on pros and cons of code-switching in educational context.

Pros	Cons
It is easier for student to understand on particular topics especially culture for example.	Students might not be able to understand English fully under different contexts.
It could build rapport between teachers and students.	Students might not be able to speak full sentence in English.
It creates relaxing atmosphere in classroom.	Students might not need to attempt or practice English terms.
It clarifies messages to ensure right messaging received.	
Code-switching could substitute vocab where there is no proper local language.	
Teacher could strengthen request/call out attention.	

3. Methodology

In the first part of this chapter, research contact design will be explained, the second part, sample, and the research tool that will be used within the study will be stated and in the last part the analysis and statistical procedures will be explained.

Research context is KND “Kam Nee Dee”, an Thai-English teaching podcast, from “The Standard” podcast on YouTube. The host used both Thai and English languages to help the audience comprehend English language better which in this case, code-switching between Thai-English could be seen frequently.

In this study, the researcher used Qualitative research approach to reveal the code-switching functions, hidden motivations as well as their impacts by using thematic analysis of podcast transcripts, interviews with content creators, and focus groups with learners (Braun & Clarke, 2006). It provided a deep understanding of the pedagogical and sociolinguistic dynamics at play. This is done by apprehending both the perspectives of the learners and educators as well as apprehending subjective experiences gained from the qualitative methods which might not be revealed if quantitative methods were used (Merriam & Tisdell, 2015). This knowledge is highly valuable in order to create intended strategies to advance practices in teaching language and amplify English teaching podcast’s effectiveness in Thailand’s modern day multilingual environment (Miles, Huberman, & Saldaña, 2014). The research is also able to develop a variation of research questions and methods due to its flexible nature. The questions and methods will be adaptable along the way as new themes and patterns appear. This is crucial to investigate code-switching as it has a deep, complex and context-dependent nature. Overall paving the path for a more in-depth educational involvement with more impact. This adaptability is crucial for exploring the complex, context-dependent nature of code-switching, ultimately leading to more informed and impactful educational interventions.

Population and sample of this research is the examination of code-switching between Thai and English language in the Thai-English teaching podcasts of “KND” (kam nee dee). This show focused on teaching English that learners would use in their daily lives. Most of the viewers are Thai people who want to improve their English skills.

Research Instruments is observational analysis of random podcast episodes in contents and observations of the language systems involved with the primary research instruments used for this study concerning Thai-English code-switching in podcasts teaching the English language in Thailand. A detailed framework will be utilized to categorize and identify code-switching while context, frequency and its functions of alteration of language will be focused on. (Gumperz, 1982; Myers-Scotton, 1993). The researcher is able to identify when and how code-switching occurs by deciphering random podcast episodes. The focus on observational analysis ensures consistent examination of code-switching in the podcasts which enables a true understanding on how code-switching operates in real-time and how it impacts the process of language learning.

In term of data collection procedures, it will be including systematic steps to ensure the understanding and the accuracy of the data that is gathered in following phases:

1. Random podcast episode selection to ensure non-bias selection then listening and reviewing episode descriptions, and notes.
2. Detailed Transcript of random episodes will be transcribed, capturing both English and Thai language.
3. Literature Review is a framework on code switching (Gumperz, 1982; Myers-Scotton, 1993): tag-switching, intra-sentential, inter-sentential, and situational versus metaphorical code-switching.

Data Analysis will be done by Qualitative approach on Thai– English code–switching with an English teaching podcast. The analysis framework is developed from the literature on code-switching (Gumperz, 1982; Myers-Scotton, 1993) For research ethics, confidentiality is crucial in research as such. Therefore, all the information obtained for the purpose of this research which has been collected from participants will be kept confidential. Participants who participate and take part in this research will remain anonymous and none of their information will be exposed to the public.

4. Results

The study results of code-switching types, intra-sentential, inter-sentential, and tag-switching and functions will be interpreted according to the theoretical frameworks of Poplack’s (1980) and Hoffman’s (1991) which detailed out in chapter two Based on the random podcast episodes in this studied, types of code-switching is as follows:

Episode of Kam Nee Dee podcast	Type of code-switching & # of code-switching		
	Intra-sentential switching	Tag-switching	Inter-sentential switching
EP 87: Worst feelings in the world ความรู้สึกยอดแย่	7	22	1
EP 376 สิ่งที่คุณควรทำในยามที่คุณไม่รู้ว่าควรทำอะไร	11	3	3
EP 576: เก่งอังกฤษแบบ RM แห่ง BTS ต้องฝึกยังไง	4	2	2
EP 681: ความล้มเหลว 4 แบบที่เราควรโอบกอด Failures We Have all Experienced and Will Again	7	4	1
EP 999 ยกระดับจากอ่านศัพท์ภาษาอังกฤษโดดๆ เป็นประโยคยาวๆ	0	0	0
EP 1105: 5 ประโยคอังกฤษในชีวิตประจำวัน ขอเปียร์สักแก้วครับ อังกฤษ 3 ระดับ Part 3	4	0	5
Total	33	31	12

Based on the random podcast episodes in this studied, the frequency of code-switching is as follows:

No .	Type of Code-Switching	Frequency	Percentage
1	Intra-sentential switching	33	43.42%
2	Tag switching	31	40.79%
3	Inter-sentential switching	12	15.79%
	Total	78	100%

The examples are provided in each linguistic pattern, intra-sentential, inter-sentential, and tag-switching, as follows:

Examples of intra-sentential switching

<p>KND EP 1105: 5 ประโยคอังกฤษในชีวิตประจำวัน ขอเปียร์สักแก้วครับ อังกฤษ 3 ระดับ Part 3</p> <p>Excerpt 1: เฮ้ย ถ้ามจริง ไข่หรือวะ sense ประมาณนี้</p> <p>KND EP 681: ความล้มเหลว 4 แบบที่เราควรโอบกอด Failures We Have all Experienced and Will Again</p> <p>Excerpt 2: บางครั้งเราต้องพูดอะไรออกมาบ้าง เราจะได้ embrace มัน</p>
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From the above examples, the host performed the intra-sentential switching by embedding the words into the sentences in different positions as follows:

Excerpt 1. The host performed the expression in Thai-code “เฮ้ย ถามจริง ใช่หรือวะ” then switched to insert English-code in words, “sense”, in the context then the host finished the expression in Thai-code “ประมาณนี้” again. (BT: Hey really? For real?)

KND EP 681: ความล้มเหลว 4 แบบที่เราควรเฝ้าระวัง | Failures We Have all Experienced and Will Again

Excerpt 2: The host began with Thai-code “บางครั้งเราต้องพูดอะไรออกมาบ้าง เราจะได้” then English-code “embrace” then finished by Thai-code “มัน” (BT: You have to say something so you could embrace it)

Examples of tag-switching

KND EP 681: ความล้มเหลว 4 แบบที่เราควรเฝ้าระวัง | Failures We Have all Experienced and Will Again

Excerpt 5: Cannot change anything anymore เสียตายจัง

KND EP 576: เก่งอังกฤษแบบ RM แห่ง BTS ต้องฝึกยังไง

Excerpt 6: เราทำอะไรสักอย่าง for fun แปลว่า

From the above examples, the host performed the tag-switching by blending terms from different languages within the same context as follows:

KND EP 681: ความล้มเหลว 4 แบบที่เราควรเฝ้าระวัง | Failures We Have all Experienced and Will Again

Excerpt 5: The host utilized the English tag of short phrase, “Cannot change anything anymore” then switched to Thai-code to emphasize the opportunity “เสียตายจัง” (BT: Cannot change anything anymore so it is a pity)

KND EP 576: เก่งอังกฤษแบบ RM แห่ง BTS ต้องฝึกยังไง

Excerpt 5: the host began with Thai-code “เราทำอะไรสักอย่าง” then switched to English-code “for fun” then ended in Thai-code “แปลว่า” (BT: what does it mean when we do something for fun?)

Examples of inter-sentential switching

KND EP 1105: 5 ประโยคอังกฤษในชีวิตประจำวัน ขอเปียร์สักแก้วครับ อังกฤษ 3 ระดับ Part 3

Excerpt 3: No way แบบเป็นไปไม่ได้หรอก ไม่จริงอะ ไม่มีทาง มีอีกคำก็คือ no shot ซึ่ง shot ในที่นี้คือไม่มีโอกาสจะเกิดขึ้น ไม่น่าจะใช่ ไม่จริง ผมอาจจะพูดว่า For real? ก็คือจริงหรือประมาณนี้นะครับ ถ้าเป็นแบบฝรั่งก็อาจจะมี Meh อันนี้สำคัญคือต้องพูดด้วย attitude ยังไง คืออารมณ์เหมือน whatever ข้างมัน ฝรั่งก็จะพูดแบบ Yeah, more or less ก็คือแบบใกล้เคียง อาจจะมากกว่านิดนึง น้อยกว่านิดนึง หรือใกล้เคียง อาจจะมากกว่านิดนึง น้อยกว่านิดนึง หรือ Yeah, I guess. ก็คงใช่มั้ง หรือ Are you serious? ก็คือจริงจังปะเนี่ย นี่พูดจริงปะเนี่ย ไม่ได้พูดเล่นใช่มั้ง ก็คือ You are not joking ก็คือตรงข้ามกัน You’ve got to be kidding me อันนี้คือแบบพูดเล่นปะเนี่ย หรือว่า Are you kidding me? Are you joking? หรือ Are you pulling my leg? Are you messing with me?/Are you playing with me? ก็อารมณ์เดียวกัน คือล้อเล่นกันปะเนี่ย

KND EP 681: ความล้มเหลว 4 แบบที่เราควรเฝ้าระวัง | Failures We Have all Experienced and Will Again

Excerpt 4: Go ahead and fail, fail fast, fail forward เพราะมันเป็นไปไม่ได้อยู่แล้วที่เราจะไม่ล้มเหลวเลย

From the above examples, the host performed the inter-sentential-switching by embedding the words into the sentences in different positions as follows:

Excerpt 3. The host began the switching in English-code “No way”, switched to Thai-code “แบบเป็นไปไม่ได้หรอก ไม่จริงอะ ไม่มีทาง มีอีกคำก็คือ”, then switched to English-code “no shot” and Thai-code “ซึ่ง” then English-code “shot”, Thai-code “ในที่นี้คือไม่มีโอกาสจะเกิดขึ้น ไม่น่าจะใช่ ไม่จริง ผมอาจจะพูดว่า”, switched to English-

code “For real?” back to Thai-code “ก็จริงหรือประมาณนั้นนะครับ

ถ้าเป็นแบบฝรั่งก็อาจจะม่”, then to English-code “Meh”, back to Thai-code “อันนี้สำคัญคือ ต้องพูดด้วย”, back to English-code “attitude”, to Thai-code “ยังไงคืออารมณ์เหมือน” then to English-code “whatever” back to Thai-code “ช่างมันฝรั่งก็จะพูดแบบ”, switched to English-code “Yeah, more or less”, back to Thai-code “ก็คือแบบใกล้เคียง อาจจะมากกว่านิดนึง น้อยกว่านิดนึง หรือใกล้เคียง อาจจะมากกว่านิดนึง

น้อยกว่านิดนึง หรือ” then to English-code “Yeah, I guess”, switched to Thai-code “ก็คงใช่ั้ง หรือ” then to English-code “Are you serious?”, back to Thai-code “ก็คือจริงจังปะเนี่ย นี่พูดจริงปะเนี่ย ไม่ได้พูดเล่นไข่ม้อย ก็คือ”, back to English-code “You are

not joking” then to Thai-code “ก็คือตรงข้ามกัน” then to English-code “You’ve got to be kidding me” and back to Thai-code “อันนี้คือแบบพูดเล่นปะเนี่ย หรือว่า” then to English-code “Are you kidding me? Are you joking?” then to Thai-code “หรือ” and back to English-code “Are you pulling my leg? Are you messing with me?/Are you playing with me?” and finished with Thai-code “ก็อารมณ์เดียวกัน คือล้อเล่นกันปะเนี่ย” The host wanted to share different ways of saying for real so Thai people could choose to say it in different context.

KND EP 681 ความล้มเหลว 4 แบบที่เราควรโอบกอด | Failures We Have all Experienced and Will Again

Excerpt 4: The host began in English-code “Go ahead and fail, fail fast fail forward ” and switched to Thai-code “เพราะมันเป็นไปไม่ได้อยู่แล้วที่เราจะไม่ล้มเหลวเลย” The host wanted to emphasize that it is impossible that we would not fail.

5. Conclusion and Recommendation

This chapter presents 1) a summary of the study, 2) a summary of the findings, 3) conclusions, and 4) recommendations for further research.

Objectives of the study was to identify and analyze the classification of code switching performed by the host of KND (kum nee dee) Thai-English teaching podcast and find out the frequency of code-switching employed the host in teaching podcast.

In term of the host, instruments and procedure of the data collection from KND episodes, they were purposively random based upon the frequency performance of all types of code-switching, analyzed then classified into three linguistic patterns based on Poplack’s (1980) classification framework. The reasons

of code-switching utilization were examined and presented based on Hoffman’s (1991) in seven categories.

The result of the study could be summarized based on two questions: what types of code-switching? and how frequent of the code-switching? The key finding showed that the host performed all three types of code-switching from Thai to English: intra-sentential, inter-sentential and tag-switching where the most frequently at the intra-sentential level at 43.42%, tag switching at 40.79% and inter-sentential switching at 15.79%. The host used code-switching when talking about particular topics, being emphatic about something, inserting sentence fillers or sentence

connectors, repeating for clarification, and intention of clarifying the speech content for interlocutor. Moreover, the results from the study emphasized that, the code-switching was employed to allow the audience's comprehension because they are all levels of English proficiency listeners listen to the teaching podcast, commercial reason, and lack of proper Thai word, clause or sentence.

In term of limitation of the study, the analysis of Thai-English code-switching through podcast teaching in Thailand was investigated based on only one Thai-English teaching podcast, KND which the results could be restricted and not applicable to other podcasts or other digital media. This study could not clarify the factor or the reasons behind the use of code-switching by host because the researcher has no access to get permission to interview the hosts regarding the usage of code-switching. At present time, people tend to employ code-switching in their daily lives. Code-switching could be found most frequently in all types of media contexts, social media, face book, Instagram, Tik Tok, TV, radio broadcast, news, advertisements, magazines and songs. Many code-switching related to research studies have been conducted by many scholars worldwide in different context, in order to study the phenomenon in individuals. The further research in the scope of factors contributing to code-switching as well as attitude towards code-switching in other type of media for example other podcast program, movies or live talk show is recommended.

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BRIDGING ACADEMIA AND INDUSTRY: A COMPETENCY DEVELOPMENT FRAMEWORK FOR
FUTURE PHARMACISTS AT CDSGA

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ABSTRACT

The pharmaceutical industry at present times demands more equipped pharmacists in various fields. This study investigates the needed competencies of pharmacy practitioners from the industries that will fill the gap between academia and industry. This study utilized the qualitative method of research and gathered insights from five pharmacy industry practitioners in various fields, such as community, hospital, and manufacturing pharmacy. The thematic analysis identified five core competencies that are necessary for well-equipped pharmacy professionals, namely, laboratory skills, clinical and pharmacological knowledge, analytical and problem-solving skills, technological proficiency, and good communication skills.

The findings indicate that there is a need to strengthen laboratory activities and critical thinking activities, enhance the foundation in pharmaceutical principles, and structure a well-versed curriculum that is aligned to the industry needs. Based on the result of the study, a competency development framework was formulated for the Colegio de San Gabriel Arcangel Pharmacy Department to fill the gap between the school and the industry. This framework focused on practical training, real-world case activities, and mentorship programs to prepare CDSGA Pharmacy students to be well-equipped for future pharmacy professionals. The study recommends curriculum enhancement, increased laboratory activities, competency-based evaluation, faculty industry immersion, and professional development activities. Implementing these recommendations, CDSGA assures to produce more competent and well-equipped pharmacy professionals.

Keywords: Pharmacy education, Competency development, Industry-aligned curriculum, Pharmaceutical skills, Academia-industry gap

1. Introduction

Pharmacists are important health care professionals who deliver safe and effective medicines in the community. The healthcare demands nowadays become more technical since a lot of factors are needed to consider to provide quality and effective drugs. Pharmacy education must be adaptive to these changing trends and must assure the production of highly competent pharmacy graduates who can provide the health care needs of our community. The alignment between the actual education training in pharmacy and the competencies needed by the industry is very important to take into consideration. There are misalignments and discrepancies that occur if these two do not meet.

This study seeks to determine the needed competencies of the industry for the pharmacy students of Colegio de San Gabriel Arcangel. From the insights of the pharmacy industry experts, this study would determine the gaps that are crucial in producing quality pharmacy graduates, ensuring that the graduates of pharmacy of CDSGA would acquire the needed competencies for the students to be well prepared and have the confidence to work in the industry. Bachelor students who are equipped with the industry-based competencies have a potentially increased confidence level after graduation. (Jackson, 2025).

By understanding the result of this study, CDSGA will strengthen its pharmacy education and will ensure that pharmacy graduates are well prepared to meet the needs of the pharmacy industries that they will practice.

2. Literature Reviews

The pharmacy profession plays an important role in the healthcare services; pharmacists must possess the professional competencies, technical skills, and good human relations. Schools that offer pharmacy education must prepare the students well in order for them to be ready in the real-world practice. There is various literature that gives importance to the fact that schools must focus on the industry-based competencies, highlighting the need for a competency development framework.

Clinical Pharmacist Competencies

Based on Saseen et al. (2017), knowledge, skills, and attitudes are very important for the clinical pharmacist to acquire. These are crucial, especially in the delivery of direct patient care in a clinical setting. Knowledge here pertains to the cognitive and problem-solving skills that a clinical pharmacist must be an expert in. An example of this is knowledge of the condition of the patient and the correct medicine to be taken as prescribed by the physician. Clinical pharmacy skills are about the actual action of the pharmacist, like proper handling of medicines. And the attitude of the pharmacists in relating to patients and other members of the health care team.

Scope of Contemporary Pharmacy Practice

Paolini et al. (2010) stated that the healthcare industry has significantly evolved at the present time. There are many opportunities nowadays that a pharmacist can practice. Before, the pharmacy profession only dealt with limited tasks like the production and dispensing of medicines.

Nowadays, pharmacy practice improved because of the need to provide more demanding health care and quality health services. One of these is the practice of clinical pharmacy, where a pharmacist is dealing with patients.

The International Pharmaceutical Global Competency Framework

According to Alfaifi et al. (2022), competencies and behaviors are the most relevant to acquire by the practicing pharmacists. Competencies are what the students acquire during their training in the school of pharmacy. Behaviors are also learned basically from the family and enhanced in the school. These two aspects are the basic foundation for pharmacy professionals to succeed in their field of practice.

Pharmacy Competency Framework

Suwannaprom et al. (2020) stipulated that the upcoming pharmaceutical services demand a higher standard of practice. Pharmacists must be skillful in the field of practice, and the most important one is that they have the ability to apply knowledge into practice. This is the critical thinking skill that a pharmacist must possess. In the field of education, students are usually taught how to understand and learn the principles. But one of the most important things is how they will apply their knowledge in a real-life world setting.

Research Gap at CDSGA

There are a lot of studies about the industry needs in the pharmacy profession; however, there are no studies that focus on the insights of the pharmaceutical industries in Colegio de San Gabriel Arcangel. Specifically, there are no existing studies that have been conducted on the industry's insights on the competencies of pharmacy graduates. The aim of this study is to fill the gap on the expectations of the industry and develop specifically a competency development framework tailored fit for Colegio de San Gabriel Arcangel. By addressing these insights, CDSGA may enhance the curriculum for pharmacy and improve more the quality of pharmacy graduates.

Conclusion

The literature focused on the importance of industry-aligned competency. However, research available does not necessarily answer the needs of CDSGA Pharmacy industry expectations. This study will contribute to bridging the gap between the industry expectations from the BS Pharmacy students of Colegio de San Gabriel Arcangel and produce a competency development framework.

3. Methodology

Research Design

This study utilized the qualitative research method to determine the essential competencies required by the pharmaceutical industry. A qualitative approach was used to determine the in-depth insights from the industry practitioner respondents. These focused on the necessary competencies that are essential for a pharmacy graduate in the pharmacy practice.

Participants

In this study, five participants were chosen as the respondents of the study. They represent the various fields of pharmacy practices, such as community, hospital, and manufacturing pharmacy. Four respondents are from the Philippines and one from Canada. They are all practicing pharmacists who are working in the industry they all represent.

Data Collection

The researcher used a questionnaire to collect the data, which led to eliciting responses on:

- The competencies that the CDSGA students should acquire to meet the pharmacy industry demands.
- The recommendations from the pharmacy industries to the CDSGA Pharmacy Curriculum to prepare the students.

The questionnaire was sent to the participants via an online platform for convenience since they are coming from various places. The responses were gathered to analyze the insights and themes.

Data Analysis

To analyze the data, a thematic analysis approach was utilized through qualitative methods. The responses of the participants were examined to identify insights that are required in the industry pharmacy practices. The findings gathered were compared to the literature on how it is aligned and to develop a competency development framework.

Through this method, the researcher analyzed the gap between the needs of the industry practitioners and the school of pharmacy.

4. Results

The responses gathered from the participants from various fields of pharmacy, such as community, hospital, and manufacturing, revealed essential competencies that the students of pharmacy need to acquire. The insights from the participants were categorized into themes that focused on the knowledge and skills of pharmacy students.

1. Laboratory and Formulation Skills

In the manufacturing pharmacy, pharmacy students must be well prepared in laboratory practice and formulation skills. It emphasized the need for the students to focus more on the pharmacy laboratory skills so that it will be easy for them once they are already working in the manufacturing pharmacy. Strengthening also the formulation skills of the students will prepare them to troubleshoot when they deal with pharmaceutical products.

2. Clinical and Pharmacological Knowledge

A pharmacist working in the hospital setting must be knowledgeable in drug dosage forms, indications, contraindications of medicines, and storage requirements of drugs. Pharmacists must also be well knowledgeable in-patient counseling, specifically on antibiotics, maintenance medications, and common over-the-counter drugs. This will ensure that pharmacists working in the hospital setting use the proper medication.

3. Problem-Solving and Analytical Thinking

Analytical skills and problem-solving skills must be developed in the pharmacy students in all pharmacy fields. Pharmacists must know how to handle complex situations and troubleshoot common problems and concerns. This is very important in the formulation of drugs for manufacturing, patient counseling in the community, and patient care in the clinical setting.

4. Technological Proficiency

One participant from the industry stressed the importance of the knowledge and skills in technology because technology is a growing field that has a big impact on the pharmaceutical industry. One effect of this in the manufacturing field is the operation of high-tech machines in the production of drugs, the devices and applications in the inventory of drugs in the warehouse, and the electronic prescribing of physicians in the community pharmacy.

5. Communication and Patient Care

Participants stressed the importance of good communication skills for pharmacists. This skill is essential in all fields of pharmacy practice, be it in colleagues in the workplace or patient interaction. Future pharmacists must be very good in communication so that they will be well understood, and this is the basic foundation of a good human relation.

Suggestions for Improving Pharmacy Education at CDSGA

Participant respondents provided recommendations to the CDSGA Department of Pharmacy to further enhance and strengthen its Pharmacy Curriculum.

1. Enhance Hands-On Training in Laboratories

Invest in improving the Pharmacy Laboratories and Program at CDSGA, where the students conduct their hands-on training.

Increase hands-on time of laboratory exposure of students during the pharmacy laboratory procedures.

2. Develop Critical Thinking Skills

Provide more critical thinking activities for the pharmacy students that include actual or real-life scenarios that usually happen. Faculty members may coordinate with the help of industry practitioners in pharmacy. Also provide more case study-based activities aside from traditional written examinations for the pharmacy students.

3. Strengthen the Science Foundation

Build a stronger foundation in the basic concepts of pharmacy principles and practices. Ensure that the students will grasp these concepts highly because they will use them in all pharmacy fields.

4. Ensure a Well-Structured Curriculum

Develop a structured curriculum that will balance the theoretical knowledge and laboratory practical skills for the pharmacy students. This will provide a more student-friendly curriculum to eliminate anxiety and pressure for the students.

By implementing the suggestions from the participants, CDSGA can bridge the gap between the school and industry and to prepare a well-versed competent Pharmacy Professionals.

5. Conclusion and Recommendation

Conclusion

This study identified the competencies as suggested by the pharmacy industry practitioners and provided insight to the CDSGA Pharmacy Department on how to better prepare competent pharmacy professionals. The findings revealed a broad range of competencies, such as enhancement of pharmacy laboratory skills, clinical and pharmacologic knowledge, problem-solving abilities, technological proficiency, and good communication skills.

Moreover, industry practitioners suggested insights on how to improve pharmacy education at CDSGA, and these include enhancing hands-on training in laboratories, developing critical thinking skills, strengthening a good pharmacy foundation, and ensuring a well-structured curriculum. Addressing the suggestions of the industry practitioners, it will surely enhance and assure that the graduates of pharmacy at CDSGA are well-equipped and have the high confidence to work in the industry.

Recommendations

Based on the findings of the study, the following are the recommendations to the CDSGA Pharmacy Department:

1. Curriculum Enhancement

Enhance the curriculum by providing more practical training, case studies, and laboratory work that are aligned with the industry standards.

2. Strengthening Laboratory and Hands-On Experience

Provide more extensive training to pharmacy students and analytical techniques to improve laboratory procedures.

3. Implementation of Practical Assessments

Conduct competency-based evaluation to assess the actual competency of the students aligned with the industry standards.

4. Faculty Development and Industry Collaboration

Encourage pharmacy faculty to have their immersion in the industry for them to be updated on the current trends and technologies in the industry.

5. Fostering Lifelong Learning and Professional Development

Provide seminars, workshops, and training for both faculty and students from the industry practitioners. CDSGA may also develop a mentorship program that will let the pharmacy students be mentored by the pharmacy industry practitioners.

Through these recommendations, the researcher formulated a competency development framework that will fill the gap between the school and the industry and will provide more competent future pharmacy professionals.

Competency Development Framework for Future Pharmacists at CDSGA

Competency Domain	Key Skills and Knowledge Areas	Proposed Educational Strategies
Laboratory & Formulation Skills	Hands-on lab training, formulation troubleshooting	Enhanced lab protocols, industry partnerships
Clinical & Pharmacological Knowledge	Drug indications, contraindications, dosage knowledge	Case studies, real-world hospital scenarios

Analytical & Problem-Solving Skills	Critical thinking, troubleshooting, decision-making	Practical assessments, problem-based learning
Technological Proficiency	Use of digital tools in pharmaceutical practice	Tech-integrated curriculum, software training
Communication & Patient Care	Patient counseling, interdisciplinary collaboration	Simulation exercises, communication workshops
Industry Readiness	Exposure to real-world pharmacy operations	Internships, mentorship programs

This Competency Development Framework for future pharmacists at CDSGA will fill the gap between the school and the industry and will provide more competent, skilled, and knowledgeable pharmacy professionals in the future.

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The success of this study will not be possible without the efforts and contributions of the individuals who wholeheartedly help the researcher finish the study.

First and foremost, the industry participants who responded to the questions of the researchers. Their honest answers and feedback provided significant results that were the basis of this study in filling the gap of the school and industry in terms of the competencies expected by the industries.

The research would like to extend his heartfelt thanks to the CDSGA management who supported him in conducting this study. Their commitment to quality and affordable education made this study into a reality.

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To the CDSGA Pharmacy students, who will be the main beneficiaries once the study is fully implemented. They will be the living proof if they will apply all the principles learned from this study effectively if they are already working in the pharmaceutical industry.

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THE ADVANTAGE OF THE NIPPON COLOR AND DESIGN COLOR SYSTEM IN INTERIOR DESIGN

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ABSTRACT

With an emphasis on their applicability to interior design, the goal is to examine the development histories, application domains, and relative benefits of the four main color systems—Munsell, Ostwald, Natural Color System, and Nippon color design (NCD). The study identifies the NCD color system as the best framework for improving interior designers' color application skills after carefully analyzing its historical background, real-world applications, and systemic advantages and disadvantages. By combining psychological concepts, emotional semantics, and data-driven color coordination, the NCD approach provides better tools for both functional and aesthetically pleasing color planning, meeting the needs of contemporary interior design.

The NCD system is characterized by its two-dimensional arrangement of colors and shades, based on the Munsell model, and its novel use of emotional semantics analysis. In contrast to conventional systems that emphasize technical standardization, NCD incorporates warm-cool image coordinates and color feeling color bars, allowing designers to systematically correlate psychological responses with specific color schemes. This paradigm connects subjective human perception with objective color science. NCD's Hue & Tone system, consisting of 130 colors, facilitates dynamic adaptation to cultural and contextual design needs, overcoming the constraints of static industrial norms. By integrating environmental psychology and user-centered principles into color planning, NCD enables designers to craft environments that balance aesthetic allure with functional comfort, establishing it as a transformative model in contemporary interior design education and practice.

Keywords: NCD Color System, Contemporary Interior design, color application skills

1. Introduction

According to Fairchild (2013), a color system is a framework for scientifically and methodically categorizing and characterizing colors. It ensures color constancy and repeatability by assisting designers and color workers in comprehending and applying colors more precisely. A color system is a framework or model that uses specific guidelines and precepts to categorize, arrange, and depict colors. It is widely utilized in art design, printing, digital media, industrial production, and other sectors with the goal of making colors easier for people to understand, explain, and apply. The significance of the Nippon Color and Design (NCD) color system in assisting interior designers to refine their color application skills. They must comprehend fundamental color theory, enhance practical sessions, and incorporate tools such as the warm-cool image coordinates of the NCD color system. The aim of the study is to propose the most advantage of color system in interior design.

2. Literature Reviews

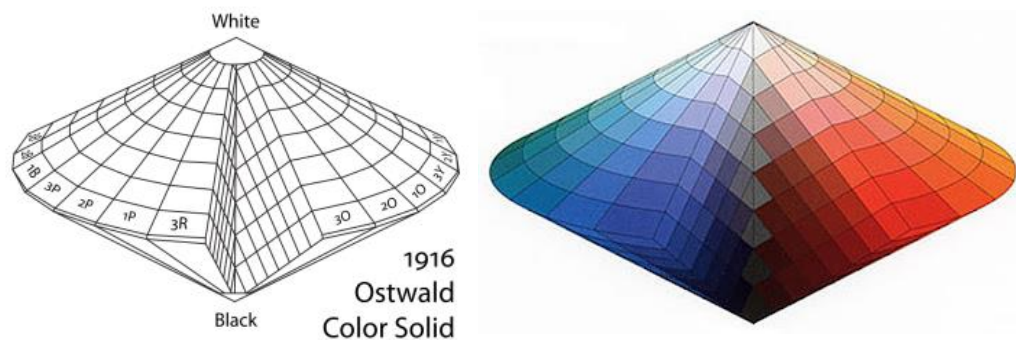
The functions of color systems encompass: Unified Communication and the assurance of precise color transmission throughout design and production. Standardization, enabling color measurement, reproduction, and control. Creative Direction, Aiding artists in attaining harmonious color coordination, contrast, and equilibrium. Technical Support, facilitating color calibration, digital encoding (e.g., RGB), and print color correspondence. Educational Utility, offering organized instructional templates to improve users' color application skills. Type of color can support this.

When addressing color application proficiency, it is essential to comprehend the prevailing color theory and pedagogical approaches within the realm of color education. Color theory is typically categorized into two divisions: one pertains to the color system derived from Newton's light reflection, known as color (Newton, 1704). It is primarily characterized by pigment hue and was predominantly established in the early 20th century. The classic color system encompasses the Munsell color system (Munsell, 1905), the Ostwald natural color system (Ostwald, 1916), and the NCD system from the Japan Color Research Institute, among other color systems. These systems are founded on the notion of three primary colors, utilizing color, value, and hue as the fundamental foundation. They are globally utilized color communication systems. The significance of these color theories and systems resides in their ability to precisely describe and define colors, hence facilitating efficient processes in color selection, communication, production, and control. The alternative category is the digital color system denoted by computer-generated color. The fundamental premise is the computer color system based on emitted light. It is termed light color. The notion of digital color was established by the International Commission on Illumination in 1931. The CIE1931-XYZ system and chromatic diagram standards, developed in 1931, have formed the basis for contemporary calorimetry. The term "digital color" possesses a twofold significance in its use of the word "digital." The electromagnetic waves that constitute color can be digitally manipulated by computers. Secondly, electromagnetic waves imperceptible to the human eye can be transformed into RGB color mode signals, and by subsequently stimulating various regions of the brain, digital outcomes of color sensory perception can be achieved. The mental representation of an image and the emotional response to color can be examined through digital

analysis, ultimately enabling the development of color images by digital processing, which enhances the precision of color matching. The emphasis in the color system selection is on the choice of objects. The context of Oswald color system, Munsell color system, Natural Color System (NCS), and Nippon Color and Design (NCD) are as follow:

Oswald color system

The Oswald color system was introduced by German scientist Wilhelm Ostwald in 1916. It constitutes a standardized color solid predicated on the three dimensions of hue, value, and Chroma. This technique is more methodical and empirical in the categorization and utilization of colors, and is extensively employed in industrial design and color management. They provided a coordinated and balanced approach to color matching. Nevertheless, it fails to satisfy the aesthetic criteria of interior design following color coordination (Ostwald, 1916), as illustrated in Figure 1.



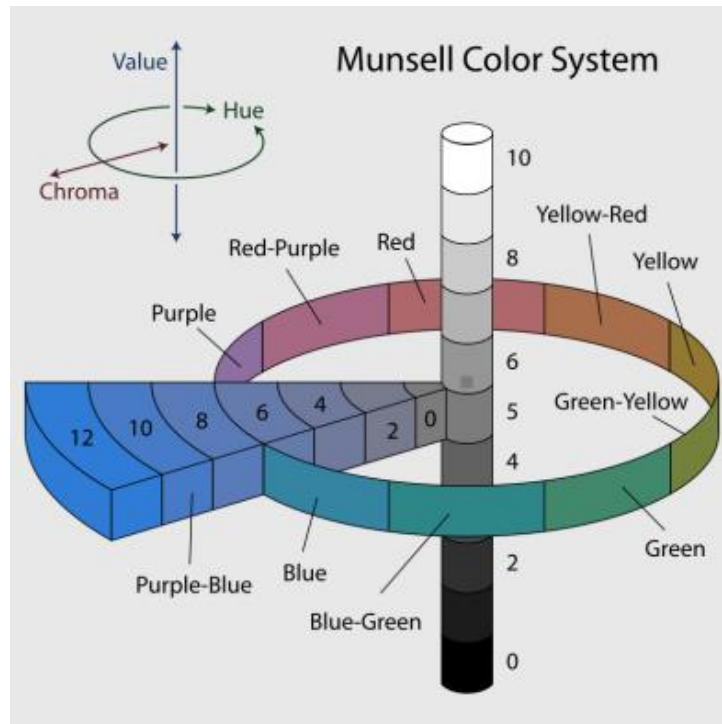


Figure 2: Munsell color system

Source: <https://commons.wikimedia.org/w/index.php?curid=1955750>

Natural Color System (NCS)

The NCS color system is a globally recognized color specification embraced by Sweden, Norway, Spain, and several other nations. It is extensively utilized across various domains like design, research, education, architecture, industry, corporate branding, software, and commerce. The fundamental colors of the NCS color system are exclusively yellow, green, blue, red, black, and white. Various colors are achieved by adjusting the proportions of multiple hues. There are about 2,000 NCS colors with established formulations. The NCS color system has established itself as the benchmark for color matching and application in industrial design. In the interior design sector, NCD employs a fundamental color coding system that converts colors into 4-digit numerical representations. The color matching underscores the rationale of aligning colors with identical multi-digit numbers, although it fails to assess the environmental color perception post-application in real scenarios (Hard & Sivik, 1981), as illustrated in Figure 3.

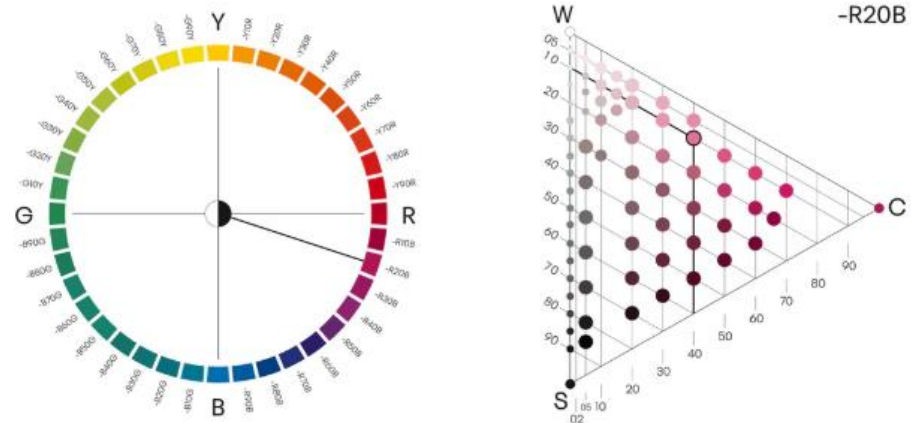


Figure 3: Natural Color System
 Source: <https://ncscolour.com/enint/pages/thesystem?srsltid>

Nippon Color and Design (NCD)

The NCD color system is a color framework established by the Japan Color Design Institute. It categorizes and arranges colors on a two-dimensional plane according to hue and value, utilizing the Munsell color system. There exist two primary systems: a fundamental system categorizing the color spectrum into 130 colors and an applied Hue & Tone system with 1,093 colors. The NCD color system facilitates color planning and communication, while also simplifying color surveys and statistical analysis. Alongside the fundamental color coding, the NCD color system additionally incorporates color feeling color bars. Transforming individuals' sentiments regarding the surroundings into entries can enhance interior designers' color matching proficiency and augment their capacity to apply colors through warm and cool image coordinates, as seen in Figure 4.

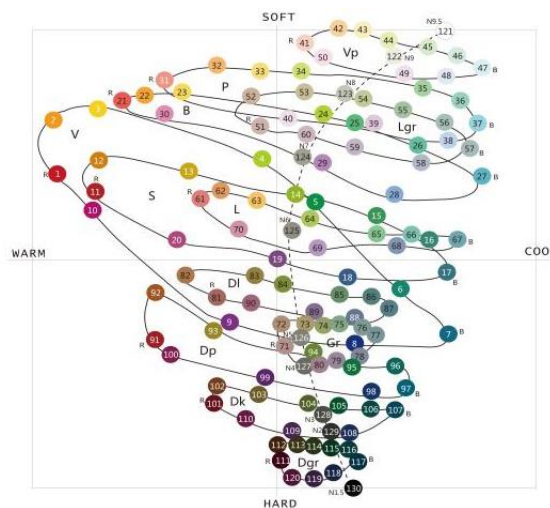


Figure 4: The 130-color in Warm and cold image coordinates of NCD color system
 Source: Nippon color & design research institute Inc. (1981)

From figure 4 bring the benefit of application in NCD color system in interior design many way such as:

Color planning and communication: Provide a set of standardized color languages to facilitate communication between designers and customers and suppliers, reducing misunderstandings and communication costs.

Color survey and statistics: The standardized and digitized features of the NCD color system make color survey and statistical processing easier, helping designers better grasp market color trends.

Color matching and design: Provide a wealth of color choices and matching suggestions to help designers create harmonious and beautiful interior spaces.

Color psychology and emotional expression: In-depth research on the impact of color on people's psychology and emotions helps designers convey specific emotions and atmosphere through color to meet the psychological needs of users.

3. Methodology

For the qualitative study, by the comparative study of the important color systems for interior designer, the process start by review the related literature from the experience in using color for interior design. Analyze under the indicators on the advantages and the limitations of system. Propose the most advantage of the color system in interior design.

4. Results

The comparison of the developmental dates and interrelations among Munsell's Color System, Ostwald, NCS, and NCD is illustrated in Figure 5.

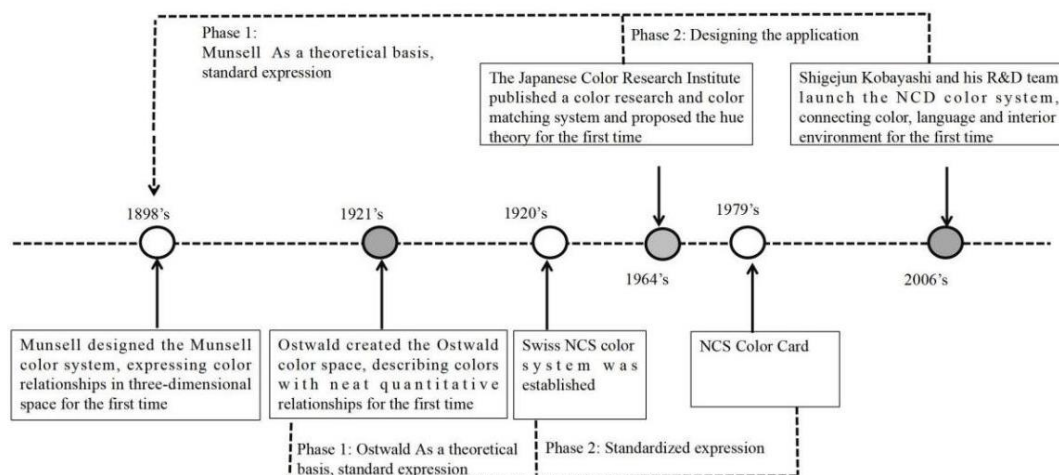


Figure 5: Schematic diagram of the development of important color systems

Source: Researchers

Schematic diagram of the development of important color systems in Figure 5 depicts the sequential development of color schemes. The Munsell system (1905) introduced three-dimensional color modeling, prioritizing perceptual precision. Ostwald's approach (1916) presented a systematic color solid but was deficient in accommodating human aesthetics. The NCS system (1980s) standardized color communication by perceptual alignment, whereas the NCD system (1981) transformed the integration of color psychology. The timeline highlights NCD's evolution from industrial standardization (Munsell) to human-centered design (NCD), indicating a transition towards emotive and contextual color usage in interior environments. The Compare the practical utility of the four systems: System Application Areas, Application Status, and Interior Design Applications of 'The Color System' in detail for Munsell, Ostwald, NCS, and NCD as presented in Table 1.

Table 1: Comparison of color system application areas

Color system	Application Areas	Application Status	Interior design application
Munsell System	Color analysis, industrial manufacturing	Color management, defining color relationships	Color Quantization and Transmission
Ostwald System	Rarely used today	Few options for practical use	Rarely used
NCS System	Color education, product design	Color matching and color analysis design	Color analysis and color application
NCD System	Color design, color marketing, color education	Emotional semantics, style analysis and color matching design	

Source: Researchers

Munsell's proficiency in industrial color management is hindered by its complexity, restricting its use in interior design. Ostwald's approach is predominantly outdated due to inadequate visual alignment. NCS promotes knowledge and product design but is deficient in emotional profundity. NCD prevails in interior design by emphasizing psychological influence, emotional semantics, and user experience. The 1093-color Hue & Tone system and warm-cool coordinates facilitate accurate, data-informed color planning, consistent with sustainable and human-centered design principles. Color system chosen according to the interior designer's proficiency in color application.

The selection of a color system is essential for realizing design objectives in interior space design. This article examines two primary color systems utilized by interior designers, namely the NCS (Natural Color System) and NCD (Natural Color Design). It analyzes their theoretical foundations, educational curricula, design practices, and distinctions in application areas and design implementations. The objective is to identify a color system that better serves interior designers

and to enhance designers' color application skills through structured instruction which is analyzed and classified into the following issues:

Differences in theoretical basis: The NCS system, which originated in Switzerland, is characterized by its standardization and systematic approach. The color model is grounded in human visual perception, offering a scientific foundation for the accurate definition and categorization of colors. Establishing a consistent color standard guarantees color consistency across various contexts and materials, offering designers dependable tools for color matching and adjustment. The NCD method was developed by Japanese color psychologist Shigejun Kobayashi to aid designers in the scientific selection and application of colors for creating spatial environments that fulfill human perceptual requirements. The system emphasizes both the visual expressiveness of color and its psychological and emotional effects, aiming to enhance the comfort and functionality of the space.

Differences in use areas and design applications: The NCS system prioritizes color standardization for consistency across various applications, whereas the NCD system concentrates on the psychological and emotional impacts of color to foster a more comfortable environment. The NCS system is primarily utilized for industrial and commercial color matching, particularly in contexts with stringent standardization requirements; conversely, the NCD system is better suited for spatial design that considers the user's psychological experience, such as in commercial and residential interiors.

Differences between teaching courses and design practice: NCD and NCS possess well-developed courses in color application abilities. NCS courses target industrial design majors and focus on the precise identification and selection of product colors in industrial design products (Hard & Sivik, 1981). NCD courses target interior design majors and explore the psychological and physiological responses to space following decoration (Kobayashi, 1990).

The comparative analysis of the NCS and NCD color systems elucidates the advantages and limitations inherent in various color systems, thereby facilitating informed decisions in enhancing designers' color application skills through structured education. Choosing a color system requires consideration of the color application capabilities of interior designers. The NCD color system is well-suited for interior designers due to its systematic and data-driven methodology. This aids in the precise planning and communication of colors, thereby enhancing both the aesthetic value and user experience of the design. The NCD color system was selected to improve the color application competencies of beginner interior designers. This study aims to offer scientific and ethical guidance for the application of color in future interior space design. The advantages of the system, along with the insufficiencies and distinctions of 'The Color System' as detailed in Munsell, Ostwald, NCS, and NCD, are presented in Table 2.

Table 2: The Color system comparison

Color system	System advantages	Insufficient system	Differences
Munsell System	Simple marking method	Color data is inflated and difficult to analyze	International common system
Ostwald System	Color blending method is simple and easy to understand	The color expression is not detailed enough. The brightness and chroma distribution do not conform to the visual characteristics of the human eye.	—
NCS System	Simple and practical structure	Unable to give the color matching space artistic conception	Analysis and positioning of color attributes
NCD System	Connecting color, language, and context	The color image positioning standard is relatively vague	Analysis and positioning of color image

Source: Researchers

Table 2 illustrates the significant systemic trade-offs. The universal acceptance of Munsell is counterbalanced by the complexity of the data. Ostwald's simplicity does not adequately account for the complexities of human visual perception. NCS provides a practical approach to color analysis; however, it does not allow for artistic flexibility. NCD addresses these gaps by integrating color science with psychological insights, although its subjective image coordinates may necessitate additional standardization. NCD's strengths - emotional expressiveness, user comfort, and trend adaptability—significantly surpass its minor limitations for interior designers.

5. Conclusion and Recommendation

From the comparison of the advantage in four main color systems—Munsell, Ostwald, Natural Color System, and Nippon color design (NCD), found that the Nippon Color and Design (NCD) system represents the most effective option for interior design, owing to its comprehensive incorporation of scientific principles, psychological insights, and artistic elements. The NCD system integrates objective color measurement with human-centric emotional requirements, contrasting with traditional systems like Munsell, which emphasizes technical precision, and NCS, which is restricted to perceptual standardization. The primary factors are as follows:

- 1) Psychological resonance is achieved through tools such as warm-cool image coordinates, which allow designers to convert abstract emotions into practical color schemes, thereby improving user comfort and emotional engagement.

2) The 1093-color Hue & Tone system and standardized tools, such as LC Color Cards, employed by NCD eliminate subjective guesswork through systematic frameworks, thereby ensuring consistency and adaptability in various design contexts. The system prioritizes eco-friendly color selections and physiological comfort, such as low-Chroma palettes, in response to contemporary requirements for sustainable and health-oriented interiors.

3) Structured training modules enhance the ability of novice designers to cultivate data-informed creativity, thereby diminishing dependence on intuition.

Although systems such as Munsell and NCS are effective for industrial standardization, they do not possess the flexibility necessary to accommodate the psychological intricacies and contextual adaptability needed in contemporary interior environments. The NCD system's capacity to integrate technical precision with emotional meaning establishes it as a future standard for human-centered design.

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**The Evolution of the Music Industry in the AI Era: Challenges and Opportunities
for Business Administration**

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing the music industry by transforming traditional business models, production techniques, and consumer engagement. This study examines the impact of AI on the music industry's business administration, focusing on AI's influence on revenue models, marketing strategies, and intellectual property management. The research employs a qualitative approach through in-depth interviews with 17 key informants, including industry executives, independent artists, AI technology providers, and music marketers.

Findings indicate that AI plays a significant role in music production, facilitating automated composition and sound enhancement. However, AI-generated music has raised concerns over creativity, authenticity, and intellectual property rights despite its benefits. Interviewees emphasized the need for updated legal frameworks to regulate ownership of AI-generated compositions and ensure fair compensation for artists. AI-driven recommendation algorithms and marketing tools have also reshaped consumer engagement, optimizing audience targeting and streaming personalization. Nevertheless, challenges such as algorithmic biases and ethical issues related to AI-generated voice replication remain unresolved. The study suggests three key strategies for sustainable AI adoption in the music industry: (1) the development of clear legal frameworks for AI-generated music to address copyright and revenue distribution concerns, (2) the promotion of ethical AI adoption by establishing transparency in algorithmic processes and preventing unauthorized deepfake voice replication, and (3) the integration of a hybrid AI-human collaboration model that enhances productivity while maintaining artistic integrity.

This research contributes to the ongoing discourse on AI's role in the creative economy by providing insights into how businesses can leverage AI-driven innovations while mitigating associated risks. Future studies should further investigate the long-term implications of AI on artist employment and audience perception. The music industry can maximize AI's potential by fostering responsible AI implementation while preserving its core artistic and cultural values.

Keywords AI in Music, Business Administration, Digital Transformation, Intellectual Property, Revenue Models, Consumer Engagement

1. Introduction

Integrating artificial intelligence (AI) in the music industry reshapes traditional business models, influencing music production, distribution, and consumer interaction. AI-driven technologies, such as machine learning algorithms, deep neural networks, and natural language processing, are increasingly utilized in music composition, recommendation systems, and artist management (West, Kraut, & Chew, 2019). The advent of AI-generated music, as demonstrated by OpenAI's Jukebox and Sony's Flow Machines, raises critical questions about the role of human creativity, intellectual property rights, and sustainable business strategies (Chude-Sokei, 2021).

The music industry has undergone significant transformations in recent decades, transitioning from physical sales to digital streaming platforms and AI-assisted content creation (Morris, 2020). The proliferation of streaming services such as Spotify, Apple Music, and YouTube Music has shifted the revenue model from album sales to subscription-based and ad-supported frameworks (Mulligan, 2022). AI has further revolutionized this landscape by curating personalized playlists, analyzing listener behavior, and optimizing revenue generation through data-driven insights (Ferraro et al., 2021).

However, the rise of AI in music production and business administration also presents challenges. Intellectual property concerns regarding AI-generated compositions remain unresolved, as copyright laws traditionally protect human-created works (Samuelson, 2020). Additionally, AI-powered automation may disrupt traditional roles within the industry, including sound engineers, producers, and even musicians, leading to debates on employment sustainability (Pasquale, 2021). The ethical implications of AI's ability to replicate and manipulate an artist's voice without consent further complicate the discourse (Bode, 2023).

From a business administration perspective, AI's influence extends beyond production to marketing and audience engagement. Machine learning algorithms enable companies to analyze market trends, optimize promotional campaigns, and enhance customer relationship management (CRM) through AI-powered chatbots and targeted advertising (Kotler, Kartajaya, & Setiawan, 2021). The question remains: How can businesses adapt their strategies to ensure sustainable growth while leveraging AI-driven efficiencies?

This study seeks to address these challenges and opportunities by examining the role of AI in reshaping business administration in the music industry. Specifically, it will analyze AI's impact on revenue models, marketing strategies, and intellectual property management. By doing so, this study aims to provide insights into how businesses can navigate the evolving digital landscape while maintaining artistic integrity and financial sustainability.

Research Objectives

1. **To examine the impact of AI on business models in the music industry:** This includes analyzing changes in revenue generation, cost structures, and competitive strategies resulting from AI-driven innovations.

2. **To explore the role of AI in music marketing and consumer engagement:** Investigating how AI-powered recommendation systems, targeted advertising, and personalized experiences influence consumer behavior.
3. **To assess the challenges of intellectual property and ethical concerns in AI-generated music:** Addressing legal implications, copyright concerns, and ethical dilemmas associated with AI-driven compositions.
4. **To evaluate the sustainability of AI-driven strategies in music industry business administration:** Analyzing whether AI-powered transformations are economically viable and beneficial for long-term industry growth.
5. **To provide strategic recommendations for business administrators and policymakers:** Offering guidelines on how businesses can leverage AI while mitigating risks associated with automation and legal issues.

2. Literature Review

AI and Digital Transformation in the Music Industry

Artificial intelligence has become a driving force in the digital transformation of the music industry, affecting various aspects of production, distribution, and consumption (Morris, 2020). AI-driven tools such as music composition software, predictive analytics, and personalized recommendation algorithms have changed how artists create music and how audiences engage with it (West, Kraut, & Chew, 2019). Research indicates that AI-based platforms enable efficient content creation, allowing artists and producers to generate music with minimal human intervention (Chude-Sokei, 2021).

AI in Music Marketing and Consumer Engagement

The use of AI in marketing strategies has significantly improved audience engagement and music consumption trends. AI-powered recommendation engines, such as those used by Spotify and Apple Music, analyze user preferences to create customized playlists and recommendations, enhancing listener experience and retention (Ferraro et al., 2021). Studies show that machine learning algorithms predict consumer behavior by analyzing listening habits, purchase history, and social media interactions, helping companies optimize promotional campaigns (Kotler, Kartajaya, & Setiawan, 2021).

The Business Model Shift in the AI Era

The emergence of AI-driven platforms has led to significant shifts in the music industry's business models. Traditional revenue models relying on album sales and live performances are increasingly replaced by AI-powered subscription and ad-supported streaming services (Mulligan, 2022). The digital economy has expanded monetization avenues, such as dynamic pricing strategies, AI-generated content licensing, and virtual concerts, which require new business strategies (Pasquale, 2021).

Intellectual Property and Ethical Considerations

Intellectual property rights are among the most debated topics in AI-driven music production. Legal scholars argue that copyright laws have not evolved sufficiently to address the ownership of AI-generated music (Samuelson, 2020). AI-created compositions pose challenges regarding attribution and revenue distribution, raising concerns among artists, record labels, and policymakers (Bode, 2023). Ethical concerns also arise regarding AI's potential to manipulate or clone artists' voices without consent, leading to discussions on regulatory frameworks (Chude-Sokei, 2021).

Sustainability and the Future of AI in Music Business Administration

The sustainability of AI-driven business models in the music industry depends on balancing innovation with economic viability. While AI enhances efficiency and scalability, it also disrupts traditional employment structures, necessitating workforce adaptation strategies (Ferraro et al., 2021). Research suggests that businesses must adopt hybrid models integrating human creativity with AI-generated content to maintain authenticity and audience trust (West, Kraut, & Chew, 2019). Future studies should focus on the long-term impact of AI on music industry stakeholders and the effectiveness of proposed regulatory measures.

3. Research Methodology

This study employs a **qualitative research design**, utilizing in-depth interviews with key informants to analyze the impact of AI on business administration in the music industry.

1. In-depth Interviews:

- A total of **17 key informants** from different levels of the music industry, including executives from record labels, independent artists, AI technology providers, and music marketers, were interviewed.
- The interviews aimed to explore the participants' perspectives on AI-driven transformations, challenges, and opportunities within the industry.

2. Sampling Technique:

- **Purposive sampling** was used to ensure a diverse representation of stakeholders with direct experience with AI applications in music business administration.

3. Data Collection and Analysis:

- Semi-structured interview guides were developed to facilitate discussions covering AI's impact on revenue models, consumer engagement, and intellectual property concerns.
- Interviews were transcribed and analyzed using **thematic analysis** to identify patterns and key insights related to AI-driven changes in the music industry.

4. Ethical Considerations:

- Informed consent was obtained from all participants, ensuring confidentiality and voluntary participation.

- Participants were assured that the data would be used strictly for academic purposes and that their identities would remain anonymous.

By utilizing this qualitative research approach, the study provides an in-depth understanding of how AI is transforming the music industry's business administration from the professionals' perspectives.

4. Results

The findings from the in-depth interviews with 17 key informants revealed several key insights regarding the integration of AI in the music industry:

1. AI's Role in Music Creation:

- Respondents highlighted AI as a **complementary tool rather than a replacement for human creativity**.
- AI-generated music is primarily used for **background scores, gaming, advertisements, and streaming platforms** but lacks widespread acceptance in mainstream music production.
- Many industry professionals remain **skeptical about AI's ability to replicate emotional depth and originality in music composition fully**.

2. Impact on Revenue Models:

- AI-enabled automation has **significantly reduced production costs**, allowing independent artists to produce high-quality content with fewer resources.
- Streaming platforms utilize AI for **hyper-personalized recommendations**, leading to increased user engagement and subscription retention.
- Some respondents expressed concerns over **algorithmic biases**, where AI-driven platforms favor trending artists over emerging musicians, potentially impacting revenue distribution.

3. Challenges in Intellectual Property and Ethics:

- A significant concern among respondents was the **lack of clear legal frameworks** for AI-generated compositions, making copyright enforcement ambiguous.
- The growing trend of **deepfake technology** in voice replication raised ethical concerns regarding artists' control over their voices and music.
- Participants suggested that **music industry regulations must evolve to address authorship, royalties, and consent issues** in AI-driven compositions.

4. Adoption of AI in Business Strategies:

- Several major record labels are already experimenting with **AI-assisted marketing campaigns**, leveraging data analytics to predict music trends and optimize promotions.
- AI-powered **customer engagement tools** like chatbots and AI-curated playlists enhance user experience and brand loyalty.
- Industry professionals emphasized the need for a **hybrid approach**, where AI augments creativity rather than replaces human involvement.

5. Future Industry Perspectives:

- Respondents believe that **AI will continue to evolve**, and businesses that strategically integrate AI while maintaining authenticity will have a competitive edge.
- Concerns were raised regarding the **long-term impact on employment**, as automation may reduce the demand for traditional roles in production and marketing.
- Ethical considerations will be key in shaping **public perception and regulatory policies**, making transparency and fairness crucial for sustainable AI integration.

5. Conclusion

Integrating AI in the music industry has brought opportunities and challenges, reshaped traditional business models, and influenced how music is created, marketed, and consumed. Based on in-depth interviews with 17 key informants from various levels of the music industry, this study highlights AI as a transformative yet complex tool that requires careful integration into existing industry practices.

Key findings suggest that AI enhances efficiency in music production and marketing but cannot fully replace human creativity and emotional depth in music composition. AI-driven cost reductions, personalized streaming services, and enhanced audience engagement impact revenue models. However, concerns regarding intellectual property rights, algorithmic biases, and ethical considerations remain unresolved. The uncertainty surrounding copyright regulations for AI-generated compositions underscores the need for updated legal frameworks to ensure fair compensation and ownership rights for artists and producers.

From a business administration perspective, AI is valuable in optimizing promotional strategies and audience engagement. Nevertheless, industry professionals advocate for a balanced approach integrating AI-driven insights while preserving human artistic contributions. Adopting hybrid business models, where AI is a supporting tool rather than a replacement, is crucial for maintaining authenticity and sustainability in the evolving music landscape. Moving forward, industry stakeholders must collaborate to establish regulatory guidelines that address ethical concerns, copyright issues, and fair AI implementation. Future research should explore the long-term implications of AI in the music industry, particularly its effects on employment, artist development, and consumer behavior. By fostering a responsible and transparent AI adoption strategy, the music industry can maximize AI's benefits while mitigating risks, ensuring a future that balances technological advancement with artistic integrity.

Discussion

The findings of this study align with existing literature that highlights AI's transformative potential in the music industry (Morris, 2020). AI has reshaped music production and business administration by enhancing efficiency and consumer engagement, yet it also introduces new challenges related to intellectual property rights and ethical concerns (Samuelson, 2020). One significant issue that emerged from the interviews is the evolving role of AI in music creation. While

AI has allowed artists to experiment with innovative sound generation, industry experts emphasize that AI cannot fully replace human creativity (Chude-Sokei, 2021). This aligns with previous research indicating that AI should be used as a complementary tool rather than a substitute for human artistry (West, Kraut, & Chew, 2019). Another key discussion point revolves around revenue models. AI-powered streaming services have personalized music consumption, increasing engagement and raising concerns about fair compensation for artists (Ferraro et al., 2021). Algorithmic biases in music recommendation engines tend to favor established artists over independent musicians, leading to disparities in financial earnings (Pasquale, 2021). This finding echoes previous studies highlighting the need for equitable revenue distribution models in AI-driven platforms (Mulligan, 2022).

Furthermore, the interviews revealed a strong demand for regulatory frameworks to address intellectual property concerns in AI-generated music. The lack of clear ownership rights for AI compositions creates legal ambiguities (Samuelson, 2020). This is consistent with legal scholars' arguments that existing copyright laws must evolve to accommodate AI's growing role in content creation (Bode, 2023). Without proper regulations, artists and producers may struggle to assert their rights over AI-generated works. The ethical implications of AI in the music industry were also widely discussed. Interviewees expressed concerns regarding AI-driven voice replication, which can be misused to clone an artist's voice without consent (Bode, 2023). Previous research supports these concerns, emphasizing the need for stricter ethical guidelines to prevent unauthorized AI-generated voice manipulation (Chude-Sokei, 2021). Therefore, while AI offers numerous benefits for business administration in the music industry, intellectual property, revenue distribution, and ethics challenges require urgent attention. Industry stakeholders must collaborate to create policies ensuring AI integration transparency and fairness. Future research should explore how emerging AI regulations impact artist rights and business sustainability in the evolving digital music ecosystem.

Suggestions

1. Develop Clear Legal Frameworks for AI-Generated Music

- Policymakers and industry regulators should establish comprehensive guidelines addressing intellectual property rights for AI-generated music. Given ownership ambiguity, copyright laws should be updated to define the roles of AI and human contributors in music creation (Samuelson, 2020). Implementing royalty-sharing models for AI-assisted compositions can ensure fair compensation for artists and developers (Bode, 2023).

2. Encourage Ethical AI Adoption and Transparency

- AI applications in the music industry must adhere to ethical principles, particularly regarding deepfake technology and voice replication. Industry leaders should establish ethical AI standards to prevent misuse, such as illegally cloning artists' voices (Chude-Sokei, 2021). Transparency in AI algorithms used in streaming platforms and recommendation systems is crucial to avoid bias favoring popular artists over emerging talents (Ferraro et al., 2021).

3. Adopt a Hybrid AI-Human Collaboration Model

- o Rather than replacing human creativity, AI should be a supportive tool in music production and business administration. AI can assist in predictive trend analysis, automated marketing strategies, and content personalization while preserving the artistic integrity of human musicians (West, Kraut, & Chew, 2019). Encouraging collaborations between AI developers and musicians can enhance creativity and promote innovation in the industry (Morris, 2020).

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FROM PHILOSOPHY TO PRACTICE: IMPLEMENTING Tiantai Buddhist Doctrine in China's
Ecological Preservation Initiatives

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ABSTRACT

This study aims to investigate the important philosophical idea of sentientless entities (wuqing you xing 无情有性) in Tiantai Buddhism and its effect on people's psychological well-being and ecological preservation awareness. This study employs qualitative methods to understand better. Semi-structured interviews were conducted with seven experts, including academics, senior monks, and writers specializing in Tiantai Buddhism and environmental philosophy in Guangzhou, China. This study used phenomenological techniques for its data analysis. Understanding these variations provides insight into the complexities of Buddhist doctrine and philosophy in multicultural societies. This study has found that Buddhist doctrine and philosophy play an important role as a source of people's views and actions on environmental preservation initiatives and environmental volunteers. Hence, this result provides insight to the government and organizations about maintaining environmental issues, which are rapidly growing globally. This study is one of the few that highlights the Chinese people's Buddhist views. Hence, the government must improve the alignment between religion and people's awareness and a long-term strategy to combat climate change.

Keywords: Tiantai Buddhism, *Wuqing Youxing*, Doctrinal Application, Ecological Preservation, China,

1. Introduction

Environmental awareness has grown significantly due to scientific research, media coverage, and international agreements (Baiardi & Marana, 2021; Boermans et al., 2024). Initiatives such as the Paris Agreement (2015) and the United Nations' Sustainable Development Goals (SDGs) promote global cooperation in tackling climate change and protecting natural resources. Countries are adopting renewable energy, reducing carbon emissions, and implementing conservation programs to combat deforestation and protect biodiversity (Abbas et al., 2022; Ofori-Sasu et al., 2023). The rise of digital platforms and social media has further amplified environmental consciousness, enabled real-time dissemination of climate-related issues, and mobilized global movements (Mehra et al., 2025; Shang et al., 2022). Educational institutions worldwide have integrated environmental studies into their curricula, fostering an informed generation equipped to address sustainability challenges. In addition, businesses are increasingly held accountable for their environmental impact, with many adopting corporate sustainability initiatives and adhering to environmental, social, and governance (ESG) standards. Innovations in clean technology, such as carbon capture and storage, biodegradable materials, and smart grids, have also contributed to global conservation efforts (Altin, 2024; Silva, 2023).

As the world's most populous country and a major industrial power, China has faced significant environmental challenges, including air and water pollution, deforestation, and greenhouse gas emissions (Huo & Peng, 2023; Raihan & Mainul Bari, 2024). The Chinese government has intensified efforts to promote environmental conservation and sustainable development (Li et al., 2020; Yang et al., 2024). Public awareness campaigns, environmental education, and the rise of green technology have also significantly fostered sustainable practices. Companies increasingly adopt eco-friendly business models, and consumers are more conscious of their environmental footprint. Rapid industrialization and urbanization continue to strain natural resources, leading to issues such as soil degradation and water scarcity (Liu & Waqas, 2024). In addition, enforcing environmental policies at all levels of government needs more effort, as local economic interests sometimes conflict with national sustainability goals.

One of the primary tensions in China's environmental policy is the need to balance continued economic development with environmental sustainability (Chen et al., 2023; Feng et al., 2024). China's rapid industrialization has contributed to environmental degradation on an unprecedented scale. While the government has made considerable progress in reversing some of this damage, the pressure to sustain economic growth often compromises environmental policy enforcement (Li, 2022; Winter et al., 2021). Doctrine is instrumental in mobilizing government agencies, industries, and communities in policy implementation. The government enforces strict environmental laws and regulations by integrating them into its broader ideological framework, ensuring compliance at all levels (Hernández Guzmán et al., 2023; Situ et al., 2021; Walter, 2024). In addition, the doctrine promotes green technological innovation, encouraging industries to adopt sustainable practices through incentives and state support. Public awareness campaigns and education initiatives also reflect doctrinal influence, fostering a collective sense of responsibility for environmental protection.

Despite the philosophical richness these traditions offer, especially in terms of promoting harmony between humans and nature, their practical applications in contemporary ecological preservation remain underexplored (Geng & Lo, 2023; Ma & Wang, 2024; Zhao et al., 2022). China continues to advance its commitment to ecological sustainability while navigating the complexities of economic growth and environmental stewardship toward conservation value. The concept of "Ecological Civilization," a guiding doctrine promoted by the Chinese government, integrates sustainability into economic and social development. This doctrine emphasizes harmony between humanity and nature, serving as the foundation for environmental regulations and policy enforcement. There remains a gap in integrating deeper ethical and philosophical frameworks into these efforts. However, existing research primarily focuses on the technical, economic, and policy dimensions of China's ecological preservation strategies, such as renewable energy development, biodiversity conservation, and reforestation initiatives (Kuo et al., 2017; Song et al., 2022).

Less attention has been given to the ethical underpinnings of these policies, particularly the influence of indigenous philosophies such as Confucianism, Daoism, and Sinicized Buddhism. The philosophical and practical consequences of implementing this doctrine concerning individuals' ecological awareness, particularly as Tiantai Buddhism doctrine, need to be confirmed to promote people's environmental awareness. To align with the research objectives, the following research questions are formulated to guide the investigation into the ethical contributions of Tiantai Buddhism and its potential application in China's ecological preservation practices. These questions aim to explore the theoretical and practical implications of integrating Tiantai principles into contemporary environmental strategies. What is the interpretation of the philosophical significance of the doctrine of sentientless beings in Tiantai Buddhism regarding environmental conservation in China? How can the doctrine be utilized in formulating and implementing environmental conservation policies and practices in China? What are the philosophical and practical consequences of implementing this doctrine concerning individuals' ecological awareness?

2. Literature Review

2.1 Tiantai Buddhism and Buddha-Nature Doctrine

Tiantai Buddhism is one of the primary streams in the Mahayana Buddhism tradition undergoing accelerated development in China. This flow emphasizes a systematic approach to Buddhist teachings, primarily emphasizing the silk lotus as a sacred text that serves as the cornerstone of its doctrines (Acharya et al., 2021; Altin, 2024). The Buddhist-Nature theory is a basic philosophical idea in Buddhism of the Ainch. It holds that everyone, inert and alive, can reach enlightenment. This idea goes beyond the traditional understanding that limits the Buddha-Nature to the living entities, providing a conceptual framework for a whole awareness of human relations and environment (Margulies, 2024). The Buddhist-Nature doctrine in Tiantai Buddhism is founded on the principle of Threefold Truths (three truths), which comprise Emptiness, Provisional Existence (temporary existence), and the Middle Way. Through this doctrine, Tiana teaches that all entities, including inert creatures such as mountains, water, and trees, possess an inherent natural enlightenment (Agarwal & Bhattacharjee, 2024; Borchert, 2023). Tiantai Buddhism underlines that by broadening the definition of Senticent Beings to include Senticentless Bears, natural materials

have intrinsic and instrumental values (Cairns et al., 2023; Feng et al., 2024). From this point of view, nature is seen as a spiritual being with natural rights and values rather than only a target of human exploitation. The concept of interdependence (interrelatedness) frequently encountered in the Mahayana tradition is pertinent to the philosophy of Tiantai Buddhism. Tiantai underscores the profound interdependence of humans and nature, as the devastation of nature will directly impact human suffering (Geng & Lp, 2023; Jiang et al., 2019). Thus, the Buddhist-nature doctrine within the Tiantai tradition may provide a philosophical basis for addressing the ecological crisis. This notion signifies a transformative change from the conventional perspective of human supremacy over the natural world to a more integrated approach that recognizes the spiritual essence inherent in all universe components (Thepa, 2024).

2.2 Theory of environmental ethics

Bourban (2023) and Furness (2021) emphasize that humans are not the rulers of nature but rather a crucial component of a broader biotic community. Consequently, environmental ethics necessitates acknowledging that each component of nature, whether a living organism or not, possesses inherent values that must be honored (Epstein, 2022). This theory underscores the significance of ecological solidarity, which entails the responsibility of humans to safeguard and restore ecosystems that have been harmed by human activity. This concept emphasizes the inseparability of human existence from the existence of nature. Deep Ecology challenges traditional anthropocentric perspectives by advocating for an ecocentric perspective that assigns intrinsic value to all natural entities, regardless of utility. In this context, it is expected that humans will develop a more profound ecological awareness and take actions that consider the equilibrium of all ecosystems rather than exclusively concentrating on their immediate interests (Hernández Guzmán et al., 2023; Moore et al., 2022).

The theory of environmental ethics reflects a method anchored in Environmental Justice. This approach emphasizes the link between social inequality and environmental damage and implies that underprivileged people are usually the ones who suffer most from environmental deterioration (Jiang et al., 2019; Ma & Wang, 2024). This point of view holds that human environmental responsibility consists of preserving natural resources and creating inclusive and socially fair environmental policy (Mehra et al., 2025; Ofori-Sasu et al., 2023). Environmental ethics addresses ecological and societal aspects. Thus, it is relevant for world concerns such as climate change and biodiversity loss (Raihan & Mainul Bari, 2024).

Furthermore, environmental ethics theory is expanding to include spirituality-based perspectives. Buddhism contributes substantially to the discussion of environmental ethics by emphasizing the interdependence between humans and nature. Buddhism emphasizes the principle of ahimsa, which promotes nonviolence toward all forms of life, including natural elements (Shang et al., 2022). Integrating the spiritual dimension into environmental ethics fosters an understanding of individuals' moral responsibilities to nature and integrating these responsibilities into their daily routines.

2.3 The practice of ecological preservation in China

In China, ecological preservation is based on a comprehensive approach encompassing philosophical values, cultural traditions, and government policies. Since its inclusion in the state constitution in 2012, the concept of ecological civilization has served as a fundamental theoretical framework that has been central to environmental policies in China (Shang et al., 2022; Situ et al., 2021). This idea underlines the need to balance social cohesiveness, environmental sustainability, and economic development to foster a more lasting link between people and nature (Song et al., 2022; Vu et al., 2021). Ecological civilization also incorporates traditional Chinese viewpoints, including Taoism, which stresses the harmony between people and nature and supports resource efficiency, biodiversity preservation, and low-carbon development (Zhang & Shi, 2024). This approach promotes policies that address the needs of the present generation while safeguarding the availability of natural resources for future generations. China uses this idea under national projects like Grain-For-Green (GFG), which seeks to convert marginal agricultural land into forests or grasslands to lower soil erosion and boost carbon absorption capacity (Wang & Tan, 2024; Yang et al., 2024). This initiative is a shining illustration of the useful use of sustainable development theory in the framework of environmental preservation.

From a philosophical approach, traditional Confucian ideas stressing human moral responsibilities to society and the environment affect methods of ecological preservation in China. Ren (humanity) and li (order) from Confucian teachings inspire the ethical framework, including environmental concerns in decision-making. Modern Confucianism has been developed to support environmental ethics by emphasizing the interdependence between humans and nature (Silva, 2023; Swearer, 2006). These values support ecological preservation initiatives by establishing a moral basis for safeguarding nature as a fundamental aspect of human existence. On the other hand, the effort to preserve the environment in China is influenced by technology-driven scientific approaches, including the ideas of green technology and smart cities. Emerging as essential elements of the nation's ecological preservation efforts are sustainable technology inside industrial activities, the progress of renewable energy sources, and waste management system optimization. For example, initiatives to create low-carbon urban settings such as Shenzhen have shown how well technical developments may reduce greenhouse gas emissions and improve resource economy (Moore et al., 2022; Sen, 2002). This approach provides sensible solutions for environmental problems and strengthens China's position as the leader in sustainable technological innovation.

2.4 Buddhism and Ecological Holistic Models

The framework combining Buddhism with ecology emphasizes the close relationship between Buddhism's spiritual principles and the need for environmental protection (Cairns et al., 2024). Within Buddhism, the idea of nature as a whole is firmly anchored in the *pratītyasamutpāda*, sometimes known as "interdependent causes". This doctrine asserts that all phenomena in the universe are interconnected and that the consequences of harming a single element can affect the entire ecosystem (Wang & Tan, 2024). This methodology offers a comprehensive perspective on ecology, recognizing humans as natural custodians and essential elements of a more extensive

web of existence (Winter et al., 2021). As a result, this instruction promotes the development of conscientious and synergistic interactions with the natural world. Nonviolence or ahimsa plays a major role in interpersonal contacts, relationships with other living entities, and interaction with natural elements. Every facet of Buddhism includes important principles that go beyond simple utilitarian benefit. This principle is consistent with the ethnocentric ethical perspective, which considers all life forms essential elements of a sacred cosmos (Simonds, 2023).

Additionally, the Buddhist doctrine of Buddha-nature encompasses all entities, including inanimate beings like mountains, rivers, and forests, to expand spirituality's importance. In the Mahayana tradition, which encompasses Tiantai Buddhism, there is a conviction that all entities, whether sentient or otherwise, have the innate capacity to achieve enlightenment. This belief encourages a deep love for nature and helps us understand that caring for the environment is an important part of our spiritual journey (Mehra et al., 2025; Sen, 2002). This view offers a clear framework highlighting the development of human understanding, which is important for living sustainably, along with efforts to protect the environment.

3. Methodology

3.1. Research design

The initial phase addresses inquiries regarding the philosophical significance of the Sentientless Benings doctrine in the context of environmental preservation in China. The analysis of the thought of Tiantai Buddhism, precisely Jingxi Zhanran's Thoughts, which interpreted this doctrine, is a qualitative research method. Content analysis was used to study the data and find the main ideas linking this theory to environmental problems. The second stage is dedicated to using the Sentientless Being doctrine in China's policies and practices of environmental preservation. Data was gathered via polls, including environmental activists, legislators, and religious groups engaged in environmental protection.

3.2. Participants

This investigation involves participants from various contexts for each research stage, which is customized to serve the research objectives. This stage entails conducting in-depth interviews with seven experts, including academics, senior monks, and writers specializing in Tiantai Buddhism and environmental philosophy. Respondents were selected through the purposive sampling method, informed by their expertise in the doctrine of Buddhism of Tied and their philosophical understanding of human relations with nature. This phase includes semi-structured interviews with seven participants from local communities, monks engaged in environmental preservation initiatives, and environmental volunteers. Participants were selected from the region that served as the focus of case studies, specifically areas significantly influenced by the teachings of Tiantai Buddhism in ecological preservation, comprised of 2 academics, 3 senior monks, and 2 environmental practitioners.

3.3. Data collection

Data were collected via in-depth interviews employing semi-structured guidelines. Interviews are conducted online via the Zoom platform, contingent upon the availability of respondents. The interview utilized a semi-structured guide featuring questions to explore the doctrine of "Sentientless Beings with Buddha-Nature" in Tiantai Buddhism and its connection to environmental preservation. The interviews were conducted between March and April 2024, with each session lasting 60 to 90 minutes. In stage 2, data were collected via semi-structured interviews, allowing for flexibility in exploring respondents' direct experiences in environmental preservation influenced by the teachings of Tiantai Buddhism. Interviews were conducted utilizing a semi-structured interview guide that included inquiries regarding implementing religious-based environmental practices, associated challenges, and their effects on ecological awareness. The interviews were conducted from August to October 2024, each lasting 45 to 60 minutes, and took place directly at the study site.

3.4. Research Instrument

3.4.1. Interview Protocol 1

Three experts, including a philosophy professor with Tiantai Buddhist expertise, reviewed the interview guide: an environmental ethics and ecology specialist and a qualitative research practitioner. Expert evaluation of the relevance, clarity, and depth of the questions Validation used a Likert scale assessment form ranging from 1–5, 1 representing not relevant and 5 denoting very significant. The feedback offered consisted of the rephrasing of the queries and the inclusion of additional exploratory elements that were pertinent to the ecological conservation context. Experts provided feedback on revising questions to prevent ambiguity, including using excessively technical philosophical terms. Additionally, an additional question regarding collaboration with non-religious communities was incorporated. Subsequently, five respondents participated in a trial interview. The Cohen's Kappa reliability coefficient for each item was 0.80–0.91, with an average of 0.86 (excellent category), as indicated by the trial analysis results.

Table 1. Cohen's Kappa reliability coefficient for each item of Interview Protocol 1

No	Interview question	Cohen's Kappa
1	How do you explain the concept of "sentientless beings with Buddha-nature" in Tiantai Buddhism?	0.90
2	How do you understand the "Sentientless Beings with Buddha-Nature" doctrine in Tiantai Buddhism? What source do you use?	0.81
3	What is the relevance of the doctrine to human relations and nature?	0.86
4	How does this doctrine affect the view of Tiantai Buddhism on ecology?	0.91
5	Is there a special interpretation of this doctrine that applies in China?	0.83

6	How is this concept integrated with the teachings of Buddhist environmental ethics?	0.80
7	How does this doctrine affect daily religious practices related to environmental preservation?	0.85
8	In your opinion, is there a gap between theory and practice when applying this doctrine?	0.86

Interview protocol 1 is employed to investigate the philosophical interpretation of the doctrine of "Sentientless beings with Buddha-Nature" in Tiantai Buddhism and its significance in environmental preservation. This interview guide comprises eight question items that address the philosophical significance of the Sentientless beings' doctrine, its relevance to the preservation of ecology, and the doctrine's ethical implications and theoretical perspectives.

3.4.2. Interview Protocol 2

The interview guide was evaluated by three experts: a professor of religious ecology, an anthropologist focused on rural communities, and an expert in qualitative research techniques. Experts were asked to assess the questions' relevance, clarity, and applicability on a scale of 1–4, determining their content validity concerning the research objectives. The validation results indicated an average CVI value of 0.88 for the entire interview protocol, which is classified as "good." The experts provided two suggestions for improvement: (1) the questions were revised to be more specific, such as modifying the language to be more appropriate for the local community, and (2) adding two questions related to obstacles to environmental conservation. Subsequently, five respondents participated in a trial interview. The Cohen's Kappa reliability coefficient for each item was 0.78–0.89, with an average of 0.83 (excellent category), as indicated by the trial analysis result.

Table 2 Cohen's Kappa reliability coefficient for each item of Interview Protocol II

No	Interview question	Cohen's Kappa
1	What motivates you to participate in environmental conservation initiatives?	0.79
2	In what ways do the teachings of Tiantai Buddhism influence your actions in the field of ecological conservation?	0.83
3	How do you practice the doctrine of "sentientless beings with Buddha-nature"?	0.82
4	What actions have you taken to preserve the environment in your community?	0.87
5	In what manner do local communities react to environmental conservation initiatives that are rooted in Buddhism?	0.79
6	Does the doctrine of Tiantai Buddhism offer a viable approach to ecological preservation?	0.86
7	How do the monastic community, local communities, and the government collaborate in conservation activities?	0.83

8	What are the primary challenges in implementing Tiantai Buddhism's value-based environmental conservation program?	0.83
9	What strategies did you employ to address these challenges, and do you require further assistance to enhance the circumstances?	0.85

Interview protocol 2 is employed to investigate the direct experiences of environmental volunteers, monastery communities, and local communities in applying Buddhist teachings to Tiantai Buddhism for ecological preservation. The stage comprises nine questions that pertain to practical experience in environmental preservation, the impact of the Tiantai Buddhist doctrine on ecological awareness, and the obstacles and challenges associated with implementation.

3.5 Data Analysis

Data from in-depth interviews in stage 1 were examined to help answer the study question of how the philosophical importance of the doctrine of sentient beings in Tiantai Buddhism is understood in China's environmental preservation framework. During the study process, the narratives of environmental philosophy and Buddhism specialists underwent thematic analysis techniques to uncover main themes and patterns (Cresswell & Cresswell, 2022). The interview transcript data was entered into NVivo 12. Reading the whole transcript in the first step helped one to have a thorough awareness of the data. The data then was arranged according to themes, including the idea of sentient entities, the viewpoint on human-nature harmony, and applying the Buddha-nature principle to environmental preservation. The data from semi-structured interviews conducted during stage 2 were analyzed to address research inquiries regarding the practical and philosophical implications of applying the doctrine of sentient beings to the ecological awareness of the community. The transcribed interview data were analyzed using NVivo 12 software to execute initial coding. The primary themes identified were the impact of Tiantai Buddhism-based programs on community environmental behavior, the involvement of religious communities in conservation practices, and the changes in community environmental awareness.

4. Result

Interview 1 explores the doctrine perception of "sentientless beings with Buddha-nature". This phase 1 interview was conducted with seven respondents consisting of academics (2 people), senior monks (3 people), and environmental practitioners (2 people). This interview was conducted to complement the results of the analysis of Doctrinal Insights from Jingxi Zhanran's Thoughts and Teaches of Zhiyi about "Sentientless Beings with Buddha-Nature" based on academic perceptions, senior monks, and environmental practitioners. Table 4.1. the following detailed respondents' data for phase 1 interviews.

Table 3. Interview participant (Interview 1)

No	Initial Name	Age (year)	Background
1	AY	45	Academics
2	BR	38	Academics
3	CW	60	Senior monk
4	XN	55	Senior monk
5	ZH	62	Senior monk
6	CY	40	Environmental practitioners
7	ZC	35	Environmental practitioners

4.1 Findings

In order to address the third inquiry, the researcher interviewed seven respondents, including two members of the local community, three members of the monastic community, and two environmental volunteers. The second stage of the interview is distinguished from the first stage by the fact that it concentrates on respondents who are engaged in environmental conservation activities. This interview was conducted online using the Zoom application, with each respondent participating for 30-45 minutes. The respondent data for the second interview is presented below.

Table 4. Interview participant (Interview 2)

No	Initial Name	Age (year)	Background
1	Li W	35	Local community
2	Wang M	42	Local community
3	Shi Y	50	Monastic community
4	SH	48	Monastic community
5	SG	55	Monastic community
6	Zhang X	30	Environmental volunteers
7	Liu X	28	Environmental volunteers

What motivates you to participate in environmental conservation initiatives?

People are motivated to participate in environmental conservation initiatives for various reasons, including personal values, social influences, economic incentives, and a sense of responsibility toward future generations. As participants stated:

Li W: My connection to the environment and obligation to the next generations inspire me.

Wang M: Along with the wish to motivate others to act, the obvious environmental damage in my neighbourhood pushes me.

Shi Y: I see conservation as a means of addressing climate change; my family taught me a love of the natural world.

SH: The urgency to preserve ecosystems and the chance to work with like-minded people motivate me.

SG: My training as an environmental scientist drives me to use my knowledge and observe real outcomes.

Zhang X: Inspired by firsthand experience seeing illegal logging, I decided to work for conservation.

Liu X: I channel the health effects of pollution I have personally seen in my family into useful activity.

Tiantai Buddhism, emphasizing interconnectedness, compassion, and the inherent Buddha nature of all beings, offers profound ethical and philosophical guidance for ecological conservation. Here are some key ways Tiantai teachings can influence environmental action:

Li W: Tiantai Buddhism reminds me that damaging the environment immediately affects mankind since it stresses the connectivity of all things. This instruction directs my attempts toward ecological balance and sustainable living.

Wang M: The idea of Three Thousand Realms in a Single Moment of Life motivates me to recognize how even little deeds like recycling or waste reduction add to more general ecological harmony.

Shi Y: Tiantai's emphasis on compassion inspires me to care for all living entities since they are essential components of the ecology, including plants and animals.

SH: Employing mindfulness in Tiantai Buddhism, I can remain conscious of my everyday consumption patterns, guaranteeing they complement ecological preservation ideas.

SG: Tiantai's lessons on the oneness of mind and environment have helped me better see how inner tranquility supports outside ecological equilibrium. This motivates me to support holistically minded conservation.

Zhang X: Tiantai's Buddhist dependent origination theory reminds me that the surroundings are closely entwined with human activities. It motivates me to participate in pollution control and tree-planting projects.

Tiantai Buddhism emphasizes spiritual practice and respect for the natural surroundings. This viewpoint motivates me to see environmental protection as a holy obligation rather than a need. Tiantai philosophy teaches that all beings and phenomena are interdependent. This view fosters a deep ecological awareness, recognizing that harming nature ultimately harms humanity. Conservation efforts align with this belief by promoting harmony between humans and nature, ensuring sustainable ecosystems. Meditation and mindfulness cultivate awareness of one's actions and consequences, leading to more eco-conscious decisions. Practitioners may incorporate mindfulness in daily habits, such as reducing carbon footprints, using renewable energy, and engaging in reforestation efforts. This result aligns with prior studies that found that meditation and

mindfulness are important in influencing people's conservation awareness. It also pursues people to take real action, such as:

Shi Y: I have observed successful cooperation whereby the government implements environmental rules, monks prepare awareness programs, and the community actively supports events such as tree planting and clean-ups.

SH: Communities seeing such initiatives as an extension of their faith usually respond positively. Some, meanwhile, require further study to see the connection between Buddhist principles and environmental responsibility.

Zhang X: As it provides a cultural and spiritual dimension, I have observed that people get more involved when projects are connected to Buddhist rituals such as tree ordinations or environmental prayers.

How do the monastic community, local communities, and the government collaborate in conservation activities?

Li W: Usually, the cooperation is robust. While local communities and the government help with resources and policy assistance, monastic groups lead by offering moral and spiritual direction. Wang M: It is a harmonic relationship. Through Buddhist teachings, local communities supply workers, the government grants financing and logistical support, and monks stimulate action.

Shi Y: I have observed successful cooperation whereby the government implements environmental rules, monks prepare awareness programs, and the community actively supports events such as tree planting and clean-ups.

What are the primary challenges in implementing Tiantai Buddhism's value-based environmental conservation program?

Li W: A primary obstacle is ignorance. It is difficult to get general support since many individuals, especially local populations, do not know how Tiantai Buddhist beliefs relate to environmental preservation.

Wang M: One other primary concern is funding. Although the idea is interesting, putting initiatives in line with these ideals usually calls for financial resources that are not always easily accessible.

Shi Y: Another difficulty can come from cultural variances. Different communities mean different understandings or acceptance of Tiantai Buddhism, which might impede group projects.

SH: Another difficulty is juggling contemporary environmental remedies with ancient Buddhist methods. Some traditional ceremonies call for cautious adaption since they contradict ecological principles.

Implementing Tiantai Buddhism's doctrine of interconnectedness fosters an understanding that all forms of life, including the environment, are deeply interrelated. Respondents mentioned how the belief that every action impacts the greater whole shapes individuals' ecological awareness. When individuals realize the interconnectedness of nature, they become more inclined to protect it. Applying this doctrine offers a philosophical consequence of cultivating empathy and mindfulness toward the environment, motivating individuals to take environmentally conscious actions. Compassion, a central tenet of Tiantai Buddhism, directly influences individuals' ecological preservation approaches. The interviews revealed that respondents view environmental conservation as an extension of Buddhist compassion (*ahimsa*). This value encourages individuals to act with care and responsibility toward nature and non-human beings. The practical consequence is that individuals are more likely to engage in initiatives that promote the environment's well-being, as their actions are rooted in the moral obligation to reduce harm to all living beings.

The influence of monastic communities in guiding environmental conservation initiatives through their leadership was highlighted as a critical factor in implementing Tiantai Buddhist values. Monks educate and inspire communities through teachings and actions, motivating others to embrace ecological awareness. The practical consequence is that monastic communities serve as role models, making Tiantai Buddhism's environmental teachings more tangible and accessible to laypeople. The participants also emphasized the importance of educational efforts, such as workshops, seminars, and digital platforms. These campaigns raise awareness and deepen understanding of how Tiantai Buddhism connects with ecological issues. The philosophical consequence is a shift in how individuals perceive environmental conservation as a practical matter and a spiritual responsibility. The practical consequence is empowering individuals with the knowledge to engage in sustainable practices.

Integrating Buddhist principles with local cultural practices makes the conservation programs more relatable and acceptable. Respondents mentioned how they tailored environmental programs to align with local customs, creating a blend of traditional and contemporary approaches to conservation. The philosophical consequence is expanding ecological awareness to include spiritual values and local wisdom. Practically, this approach increases community participation and fosters a sense of ownership and pride in environmental initiatives. The challenge of engaging younger generations was acknowledged, with respondents noting that modern lifestyles often distract youth from ecological concerns. However, efforts to use social media and youth-focused programs have shown promise in fostering a new generation of environmentally-conscious individuals.

The philosophical consequence of this strategy is the cultivation of a value system that connects Buddhism, ecology, and the next generation's responsibility to the environment. The practical consequence is the creation of long-term environmental stewards among younger people, helping to ensure the continuity of conservation efforts. Respondents highlighted the importance of balancing traditional practices with current environmental concerns in adapting Buddhist rituals to suit modern environmental needs, such as making ceremonies more eco-friendly. This allows the doctrine to remain relevant in contemporary society. The philosophical

consequence is the adaptability of Buddhist teachings in addressing ecological concerns. Practically, this adaptation helps preserve traditional practices while aligning them with sustainable practices, ensuring that the environment benefits from both spiritual and modern approaches.

Tiantai Buddhism advocates for a viewpoint that emphasizes the significance of compassion for the environment and the interdependence of all living organisms. This leads to a profound ethical commitment to preserving the environment, as individuals acknowledge the intrinsic value of nature and sense a moral obligation to safeguard it. Conservation efforts based on Tiantai Buddhist principles include involving young people, working with the government, and encouraging community engagement. However, challenges remain, such as lack of awareness, adapting to different cultures, and measuring effects. The theory offers a straightforward way to include awareness of the environment in our daily lives, encouraging a practical and important method for protecting nature.

5. Key Finding

5.1 Discussion

The initial discovery from research question 1 is that Zhiyi offers a philosophical framework for comprehending the doctrine of "sentientless beings with Buddha-nature" through teaching the Three Truths. This concept underscores that all creatures, whether living or non-living, are endowed with Buddha-nature due to their interconnectedness through the principle of universal truth. Zhiyi also introduced the principle of "Yinian Sanqian" (一念三千), which posits that there are three thousand potential realms in a single moment of consciousness. This principle underscores the profound interdependence of all elements of existence, whether living or non-living and their connection to the spiritual dimension (Swearer, 2006; Zhang & Shi, 2024). This concept demonstrates that human actions toward nature have an impact on the moral and spiritual dimensions in addition to the physical world in the context of the environment (Simonds, 2023; Wang & Tan, 2024). Zhiyi espoused that the devastation or neglect of non-living elements, including rivers, mountains, and trees, is equivalent to disrupting the overall cosmic equilibrium. Consequently, cultivating reverence for nature is an essential component of spiritual practice, particularly in environmental exploitation based on materialistic or anthropocentric perspectives.

Interviews with academics, senior monks, and environmental practitioners have yielded findings that bolster the doctrine of "sentientless beings with Buddha nature." They primarily comprehend the doctrine through the Tiantai commentaries of Zhiyi, while environmental practitioners comprehend it through discussions with priests and Buddhist environmental advocacy programs. The preliminary results of the research are internally consistent with these findings, which suggest that the teachings of the Three Truths and the principle of Ichinen Sanzen by Zhiyi provide a philosophical foundation for comprehending the interconnectedness of all beings, both living and non-living, within a broader cosmic system. The primary factor contributing to the increased reliance on Zhiyi's commentaries by academics and senior clergy is the textual analysis-based nature of academic and religious studies (Blown & Bryce, 2018; Sen, 2002). Zhiyi is a prominent figure in the Tiantai school, where he offered a systematic interpretation of Buddhist teachings, which included the doctrine of Buddha-nature in inanimate entities. Consequently, academicians

and senior monks who have access to classical texts and engage in in-depth studies of Buddhist philosophy are inclined to comprehend this doctrine through primary sources, specifically Tiantai commentaries.

Conversely, environmental practitioners gain a more comprehensive understanding of this doctrine by participating in Buddhist environmental advocacy programs and directly interacting with monastic communities. This can be attributed to the experiential approach characteristic of Buddhist-based environmental practices. Conservation practices, ecosystem restoration, and community-based waste management are among the areas in which environmental practitioners prioritize the application of teachings in real-world contexts (Ardoin et al., 2020). Discussions provide direct experiences that assist in the internalization of doctrines in concrete actions with monks and involvement in advocacy programs. From a philosophical perspective, these discoveries illustrate the distinction between text-based and practice-based comprehension in the Buddhist tradition. Although both groups comprehend the same doctrine, their approaches to accessing and interpreting it differ. Academics and senior monks prioritize conceptual and historical analysis through Zhiyi's commentaries, whereas environmental practitioners concentrate on pragmatic aspects and their practical application in daily life. Nevertheless, both are rooted in the same fundamental principle: the profound interconnection between humanity and nature within a broader cosmic system.

The results of this study are consistent with the research conducted by Situmorang and Silalahi (2019), which determined that Buddhist teachings foster sustainable environmental management by emphasizing the significance of preserving a harmonious relationship between humans and nature (Agarwal & Bhattacharjee, 2024; Choudhury, 2025). They emphasize that Buddhist principles can be implemented in the administration of conservation areas, such as Lumbini Nature Park, where the foundation of conservation practices is respect for all life forms, including the unconscious. Furthermore, the perspective on living in harmony with nature is demonstrated through tangible actions, including adopting a vegetarian lifestyle and cultivating trees (Zhang & Shi, 2024; Zhao et al., 2022). This demonstrates that the teachings regarding the interconnectedness of all entities, including the unconscious, are implemented to promote environmental preservation.

Simods (2023) and Swearer (2006) discovered that Buddhist teachings, particularly those in the Mahayana tradition, establish a robust philosophical framework for environmental ethics, which is consistent with the results of this study. The concept of interconnectedness in Buddhism is frequently translated into an attitude of respect for nature. However, they disclosed that its implementation in environmental policies continues to encounter various structural and social obstacles. Moreover, Purser and Milillo (2014) and Vu and Tran (2021) discovered that the interpretation of Buddhist doctrine in the environmental context is frequently contingent upon the community and individual approaches to interpreting the teachings. This is the reason for the discrepancy in comprehension regarding how the Tiantai doctrine offers a novel perspective on the relationship between humans and nature in this study. Educational and social factors also influence this comprehension. Acharya et al. (2021) also discovered that adopting ecological teachings in Buddhism frequently is contingent upon the local cultural and economic context. This corroborates

the discovery that, despite respondents' comprehensive understanding of this doctrine, there is still uncertainty regarding its practical application in contemporary environmental conservation. This is attributable to external factors, including policies and socioeconomic conditions.

These results suggest that the Tiantai Buddhism doctrine has significant potential to be used as a guide in developing environmental policies. This can be attributed to the fundamental concept of Tiantai Buddhism, which underscores the principle of harmony between humans and nature. This world is interconnected in the unity of reality, as elucidated in the doctrine of the Three Truths developed by Zhiyi, which includes the relationship between humans and nature. Consequently, this philosophical teaching establishes a moral and spiritual foundation for environmental policies prioritizing sustainability. Nevertheless, the disparities in respondents' perspectives regarding the practical application of these teachings in environmental conservation programs. These results are consistent with the research conducted by Tucker and Williams (2020), which discovered that ecological teachings in Buddhism are frequently regarded as a powerful source of values for environmental policies. However, their implementation frequently fails due to insufficient systematic frameworks and institutional support. The research conducted by Tucker and Williams (2020) demonstrates that although numerous environmental policies in Asian countries, particularly Thailand and China, incorporate Buddhist principles, their implementation in concrete regulations remains restricted by more influential political and economic factors.

Additionally, Cairns et al. (2024) researched environmental sustainability based on religious values, which revealed that integrating Buddhist teachings into environmental policies frequently succeeds at the local community level but encounters obstacles at the broader scale. They discovered that programs designed around spiritual values, such as those implemented at Wat Chak Daeng in Thailand, effectively fostered a high level of environmental consciousness. However, integrating these principles into more comprehensive environmental policies continues to encounter structural obstacles (Borchert, 2024). Christopher and An (2024) investigated the correlation between Buddhist philosophy and environmental policy in China. Their findings indicated that, despite the widespread recognition of Buddhist principles in environmental conservation, their concrete implementation is frequently impeded by secular and economically motivated state regulations. This research demonstrates that while Buddhist teachings can establish a robust ethical framework for environmental policies, political and economic support are still critical to their successful implementation (Feng et al., 2024; Kuo et al., 2017). This study's results confirm that Tiantai Buddhism's teachings have significant potential as a guide for environmental policy, as has been observed in numerous other studies. Nevertheless, the primary obstacle to implementing this doctrine in concrete programs is the discrepancy between spiritual principles and practical application.

The results of this study indicate that the implementation of Buddhist doctrine toward individual ecological awareness is hampered by three primary challenges: the gap between environmental awareness and the comprehension of the teachings, the necessity of integrating modern environmental practices with traditional practices, and the low level of engagement of the younger generation in sustainability issues. Despite the philosophical comprehension of Buddhist principles, such as the interconnectedness of living entities and the balance of nature, the

discrepancy between the comprehension of teachings and actual actions indicates that many individuals have not yet implemented them in their daily lives. This can be attributed to the influence of contemporary consumer culture, the lack of translation of teachings into concrete practices, and the minimal external encouragement, such as regulations and incentives, that support environmentally responsible behavior. The significance of integrating traditional practices with contemporary environmental practices presents a distinctive obstacle to the development of ecological awareness in accordance with Buddhist teachings. In order to be more pertinent in addressing contemporary environmental concerns, spiritual principles in Tiantai teachings must be contextualized with a scientific approach. The impact of these teachings on individual behavior change will be restricted if they are not conveyed in a universal language or combined with policy and technology-based strategies. Some prior studies, including those conducted by Li et al. (2020), Shang et al. (2022), and Song et al. (2022), demonstrate that religion-based environmental programs are more effective when they integrate traditional elements with contemporary innovations. Consequently, it is imperative to fortify the development of a narrative that establishes a connection between Buddhist environmental ethics and sustainable policies and empirical methodologies.

5.2. Conclusion and Recommendations

This research contributes significantly to the discourse on Tiantai Buddhism and Ecological Preservation. This study yields three primary conclusions. Zhiyi's Three Truths teaching provides a philosophical framework for comprehending the doctrine of "sentientless beings with Buddha-nature," which implies that all beings, whether living or non-living, possess Buddha-nature due to their interconnectedness through the principle of universal truth. Interviews with academics, senior priests, and environmental practitioners have yielded findings that bolster the doctrine of "sentientless beings with Buddha nature." They primarily comprehend the doctrine through the Tiantai commentaries of Zhiyi, while environmental practitioners comprehend it through discussions with priests and Buddhist environmental advocacy programs. Secondly, quantitative results indicate that the doctrine of Tiantai Buddhism is well comprehended by respondents, particularly in human-nature harmony. Three aspects were assessed: the comprehension of the doctrine of Tiantai Buddhism, the implementation of the doctrine in ecological conservation policies, and the influence of Tiantai Buddhist teachings on public environmental awareness.

Public environmental awareness does not necessarily correspond with a comprehensive comprehension. Respondents' comprehension of the public environment most closely indicates their awareness of it. There is a discrepancy between the doctrine's comprehension and the ecological awareness of the general population. This necessitates establishing a connection between traditional and contemporary environmental practices to render the program more relatable and acceptable. Additionally, youth engagement is essential, as contemporary lifestyles frequently divert youth from ecological concerns. Even though the doctrine is widely comprehended, its capacity to motivate practical action remains restricted by the absence of transformative mechanisms linking philosophical principles with tangible environmental practices. Consequently, this research suggests that religious institutions should be bolstered in their capacity

to develop sustainability practice models based on Tiantai teachings. This can be achieved by implementing continuous education, fortifying partnerships with ecological communities, and adapting the teachings to a more inclusive and contemporary context. A comparative study of Tiantai Buddhism and other Buddhist traditions, such as Chan or Vajrayana, can also offer a more comprehensive understanding of the efficacy of teachings in fostering environmental awareness and action. Future research should also investigate strategies for youth engagement in Buddhism-based conservation movements to make them more relevant to their lifestyles, given the contemporary challenges encountered by the younger generation in ecological issues. Furthermore, the efficacy of environmental education programs based on Tiantai teachings can be assessed to ascertain their influence on the public's awareness and involvement in ecological practices. Consequently, additional research can contribute more comprehensively by connecting Tiantai teachings with more applicable and extensively impactful conservation practices.

5.3. Theoretical implications

Tiantai Buddhism provides a profound philosophical framework for environmental ethics, emphasizing interdependence, compassion, and sustainable living. At its core, the doctrine of Dependent Origination (緣起, Pratītyasamutpāda) teaches that all beings and phenomena are interconnected. This perspective aligns with ecological science, reinforcing that human actions directly affect ecosystems, biodiversity, and climate stability. Another key Tiantai concept, Yinian Sanqian (一念三千, "Three Thousand Realms in a Single Thought"), posits that every thought and action influences reality on a vast scale. This suggests that even small conservation efforts, such as reducing waste or protecting local ecosystems, contribute to global environmental well-being. Recognizing the Buddha-nature in all beings, including animals, plants, and even inanimate elements, cultivates a moral responsibility toward nature, discouraging exploitation and promoting harmonious coexistence.

Ethically, Tiantai Buddhism fosters compassion (慈悲, Cǐ Bēi) as a guiding principle for ecological action. From afforestation to sustainable agriculture, conservation efforts become an expression of this compassion, ensuring both present and future generations benefit from a balanced environment. Additionally, the Middle Way (中道, Zhōng Dào) advocates for avoiding extremes in consumption and industrial practices, promoting sustainability.

From a practical standpoint, Tiantai Buddhism provides a spiritual motivation for ecological conservation, positioning environmental care as a sacred duty rather than a mere policy goal. It integrates meditative awareness with environmental consciousness, encouraging mindful decision-making in daily life. Thus, Tiantai Buddhism offers a holistic ecological ethic that merges spiritual wisdom with modern environmental science. By applying these principles, conservation efforts gain deeper ethical grounding, inspiring long-term sustainable practices and fostering a more profound respect for nature.

5.4. Practical implications

One significant implication is the promotion of sustainable living practices. The Middle Way (中道, Zhōng Dào) encourages balance, advocating for mindful consumption, reduced

waste, and eco-friendly habits. To reduce their environmental footprint, Tiantai practitioners may adopt minimalism, sustainable diets (such as plant-based eating), and low-carbon lifestyles. The doctrine of Dependent Origination (緣起, Pratītyasamutpāda) highlights the interconnectedness of all life forms, reinforcing the need for community-driven conservation projects. Buddhist temples and organizations can lead reforestation programs, water conservation efforts, and sustainable agriculture initiatives, demonstrating how spiritual practice translates into tangible environmental action.

Tiantai's emphasis on compassion (慈悲, Cí Bēi) extends to environmental policies and ethical business practices. Companies influenced by these principles might integrate green technologies, reduce pollution, and support fair-trade, eco-conscious supply chains. Additionally, Buddhist-led initiatives can advocate for government policies on climate change, deforestation, and wildlife protection. Furthermore, Tiantai meditation and mindfulness practices can enhance environmental education. By integrating environmental awareness into spiritual training, practitioners develop a deeper respect for nature. Schools and community programs influenced by Tiantai principles can incorporate ecological mindfulness exercises, promoting long-term sustainable habits among younger generations. Lastly, the belief in Buddha-nature in all beings strengthens conservation ethics. This perspective discourages harmful practices such as deforestation and habitat destruction, advocating for holistic land and wildlife preservation strategies instead.

5.5. Limitations and Future Study Directions

While Tiantai Buddhism provides a strong ethical and philosophical foundation for ecological conservation, there are several limitations to its practical application. One challenge is the lack of direct environmental policies within traditional Tiantai teachings. Unlike contemporary environmental science, Buddhist scriptures do not explicitly address modern issues such as climate change, deforestation, or industrial pollution. This requires reinterpretation and adaptation of Buddhist principles to contemporary ecological concerns. Another limitation is cultural and regional variations in practice. Tiantai Buddhism is primarily practiced in East Asia, meaning its environmental influence may be less prominent in regions where other belief systems dominate. Future research could explore how Tiantai's ecological ethics can be integrated into global conservation efforts beyond Buddhist communities.

The effectiveness of Buddhist-inspired conservation programs remains underexplored. Empirical studies must assess whether Tiantai-based environmental initiatives lead to measurable ecological benefits. Comparative studies between religious and secular conservation approaches could offer valuable insights. Future research could also examine how Tiantai meditative practices influence pro-environmental behavior. Investigating the psychological impact of Buddhist mindfulness on sustainable decision-making may provide practical strategies for environmental education and policy-making. By addressing these gaps, scholars can further bridge Tiantai Buddhist philosophy with modern ecological action.

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THE IMPACT OF TEAM-TEACHING APPROACH ON MIDDLE SCHOOL PHYSICAL EDUCATION
LEARNERS' ACADEMIC ACHIEVEMENT IN HU BEI PROVINCE, CHINA

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ABSTRACT

This study aimed to investigate the effect of the team-teaching approach on traditional teaching. Approach in enhancing learners' academic achievement and examine students' attitude towards team-teaching of middle school physical education learners. This study adopted the quantitative research method. Sixty-one questionnaires were issued, and 61 were valid, with a validity of 100%. The test consists of pre-test and post-test items. The experimental group comprises 31 students from Class 1, while the control group includes 30 students from Class 2. This study finds that the academic achievement of the team-teaching approach is better than the traditional teaching approach in improving middle school physical education learners. Students who learn with a team-teaching approach to improve the academic achievement of middle school physical education learners have high satisfaction. Based on the analysis results, the following suggestions have been put forward. Different teachers can design and guide various curriculum components based on their expertise. Team teaching can take the form of group exercises, allowing students to consolidate their learning through practical participation and improve each other's learning outcomes through teamwork.

Keywords: Team Teaching, Physical Education Learner, Academic Achievement

1. Introduction

With the continuous growth of socially productive forces and the continuous development of science and technology, people's requirements for quality of life are increasing. The rapid development of the national economy has significantly improved people's living standards. People have more and more channels to access information, and their quality is getting higher and higher. At the same time, national health awareness has increased significantly. According to the results of the 8th National Report on Students' Physical Health Survey by the Ministry of Education of China, although the excellent and good rate of physical health of Chinese students is constantly rising (Wang et al., 2020), it has not yet reached the expected goal. The prevalence of myopia remains high, and the rate of overweight and obesity is on the rise, showing a trend of younger age. Due to the relatively superior material conditions, students are suffering from overnutrition (Ge et al., 2019), leading to a gradual increase in the rate of overweight and obesity among them. Due to the lack of physical exercise and insufficient physical activity, students' grip strength has declined. These problems are crucial to the development of students, and it is urgent to solve them. Improving the physical health of adolescents is of great importance, and it is also one of the urgent problems that must be solved at present (Chen et al., 2020).

The team teaching approach holds significant relevance and importance in enhancing students' Academic achievement and addressing adolescent physical health issues. The team-teaching model demonstrates unique advantages and potential (Zhang et al., 2019). Team teaching emphasizes cooperation and interaction, stimulating students' interest and sense of participation through group activities and collective projects. This approach enhances students' physical fitness and improves their physical education and Academic achievement, as students encourage and support each other in mastering sports skills and knowledge within a team setting. Team teaching facilitates the joint participation of schools, families, and society (Zhang et al., 2019). By enhancing students' sense of participation and interest, enabling multi-party collaboration, addressing individual differences, and fostering teamwork spirit, team teaching provides a comprehensive, scientific, and sustainable solution for the healthy development of adolescents. Therefore, promoting and implementing the team-teaching model is of great significance in improving physical and health students' academic achievement and achieving national strategic goals for the healthy development of adolescents.

2. Literature Reviews

Construct Learning Theory

The core of constructive learning theory revolves around student-centeredness, emphasizing students' active exploration, discovery, and construction of meaning for the knowledge they acquire. It prioritizes "learning" over "teaching" in the traditional sense. Based on their unique prior experiences, individuals may have diverse interpretations of the same phenomenon. According to Constructivism, knowledge is acquired by learners through meaning construction, facilitated by others (including teachers and peers) within a specific context (Brown et al., 2005). This theory identifies "context," "collaboration," "conversation," and "meaning construction" as the four essential elements of a learning environment (Piaget, 2010).

The constructive learning theory emphasizes that learners actively construct knowledge through interactions with their environment and others. The three dimensions of team teaching—teacher collaboration, teaching methods, and assessment and feedback—are rational in enhancing learners' Academic achievement (Schafer, 2015). Within the Constructivist framework, these dimensions operate synergistically to provide students with abundant learning resources and interactive opportunities, fostering their active engagement and deep understanding of knowledge construction, ultimately leading to improved academic achievement. (Sangsawang, 2017; Schafer, 2015)

Step of Team-Teaching Approach

1. Introduction to the Curriculum

This phase involves introducing the primary content and objectives of the course to students, ensuring a shared understanding among all participants regarding the instructional materials. The teaching team collaborates to design and introduce the curriculum, clarifying course goals and themes. The introductory stage emphasizes captivating students' interest and guiding them into a learning mindset (Schafer, 2015).

2. Division of Labor for Teaching

Teachers allocate teaching tasks and responsibilities based on their respective expertise and interests. This division enhances teaching efficiency and quality. The teaching team distributes teaching roles according to individual professional backgrounds and teaching styles. Some teachers focus on theoretical lectures, while others specialize in practical guidance or facilitating group activities. The rationality of this division directly impacts teaching effectiveness (Liang & Li, 2018).

3. Encouraging Student Participation in Discussions

Students are encouraged by organizing classroom discussions and interactive activities, fostering their comprehension and mastery of knowledge. Teachers employ questioning, case analysis, and group discussions to stimulate student participation. Research indicates that multi-teacher interaction in team teaching contributes to an open classroom atmosphere and increased student engagement (Sangsawang, 2017; Schafer, 2015). This corresponds with Thepa (2024), who sees teaching or education as a cornerstone for empowerment and social reform.

4. Guiding Students to Summarize

Teachers assist students in summarizing and organizing classroom content, ensuring they can effectively review and consolidate learned knowledge. Teachers jointly guide students through the summarization process at the end of each teaching segment. This helps students reinforce their understanding, reflect on their learning journey, and consolidate knowledge (Al-Rahmi et al., 2018).

5. Reflecting on and Improving the Teaching Process

The teaching team regularly reflects on the effectiveness of the teaching process, identifies issues and challenges, and discusses improvement strategies to enhance teaching quality. After each teaching session, teachers reflect, sharing classroom performance and student feedback to pinpoint areas for improvement. Literature highlights that a significant advantage of team teaching is the ability to refine teaching strategies through teacher feedback and discussions (Pande & Bharathi, 2020).

6. Sharing and Exchanging Outcomes

Teachers share their teaching experiences and students' learning outcomes, fostering knowledge exchange and best practices, thereby optimizing teaching strategies. Teachers and students share learning achievements, while teachers exchange successful experiences and lessons learned. This not only contributes to teachers' professional growth but also further enhances the effectiveness of teaching (Yilmaz, 2011).

Educational Goal Classification Theory

Academic achievement consists of knowledge mastery, skill application, and attitude and behavior, which can be based on Bloom's theory of educational goal classification (Gomes & Jelihovschi, 2019). Bloom's Taxonomy of Educational Objectives, proposed in 1956, divides educational objectives into the cognitive, emotional, and motor skill domains, corresponding to the three components of academic achievement: Knowledge acquisition, skill application, attitude, and behavior (Sozer et al., 2019). The three components of academic achievement (knowledge mastery, skill application, and attitude and behavior) correspond respectively to the cognitive domain, the motor skill domain, and the emotional domain in the theory of educational goal classification (Meyer & Rowan, 1977). Bloom's taxonomy provides a systematic framework to help educators comprehensively assess and develop students' knowledge, skills, and attitudes to achieve comprehensive educational goals (Sozer et al., 2019). Through this theoretical framework, educators can design and implement various teaching and evaluation methods to comprehensively improve students' Academic achievement.

Related Studies

Academic achievement reflects students' learning outcomes and mastery of knowledge, serving as an evaluation of their learning results (Zeilhofer, 2020). It is a relative concept referring to the knowledge and skills acquired through continuous education, representing a relatively straightforward and defined range of learning effects. Research on academic achievement mostly takes the standard scores of mid-terms or final exams in Chinese, mathematics, and English, the three core subjects, as reference standards (Carolan, 2015; Zeilhofer, 2020).

The study of team teaching and academic achievement has a long history. There is abundant research on the impact of team teaching on academic achievement (Frenk et al., 2020). Team teaching enhances academic achievement by improving student engagement, knowledge richness, and cognitive and psychological levels. Scholars conducted a group experimental study involving 214 sixth-grade students, analyzing academic achievement between experimental and control classes. The results demonstrated a significant impact of team teaching on students' academic achievement (Pauwe, 2022). Studies in Texas, USA, have shown that team teaching improves primary school students' math and reading scores. Surveys of American high school students through questionnaires revealed that enhancing academic achievement is related to team teaching, with various programs, environments, and intensities of team teaching influencing students' academic achievement (Teece, 2019). Experimental research results indicate that team teaching promotes students' executive and judgment abilities, thereby improving academic

achievement by fostering these skills. While team teaching can elevate students' academic achievement, indirect factors such as student's health status, self-confidence, and attitudes across different age groups also play a role in this relationship (Zeilhofer, 2020).

The comprehensive review of previous research reveals a consistent correlation between team teaching and academic achievement. Scholars have elucidated the influence of team teaching on students' academic achievement from diverse perspectives, providing theoretical support for the present study.

3. Methodology

This study adopts a quantitative research design to examine the impact of team-teaching on the academic achievement of middle school physical education learners (Liang & Li, 2018). Quantitative research collects numerical data and uses statistical methods to test hypotheses and analyze relationships between variables (Ortiz, 2007). In this case, the research will measure students' academic achievement based on standardized tests, allowing for objective comparisons between different teaching methods.

Specifically, this study utilizes an experimental research design, a form of quantitative research aimed at determining cause-and-effect relationships by manipulating one variable and observing its impact on another (Pattison et al., 2019). In this design, participants are randomly assigned to either an experimental or control group. The experimental group will be taught using team-teaching methods, while the control group will receive traditional teaching. This structure allows for a direct comparison of the effects of these two instructional methods on academic achievement, making it ideal for assessing the impact of teaching strategies.

The experimental research design is particularly well-suited for this study because it allows for the controlled manipulation of teaching methods while minimizing external factors that could influence student outcomes (Pande & Bharathi, 2020). By randomly assigning classes to each group, the study can reduce bias and ensure that any differences in academic achievement are due to the teaching methods rather than other variables such as prior knowledge or student characteristics. This design offers a robust framework for evaluating whether team teaching enhances students' academic achievement compared to traditional instruction methods.

The independent variable in this study is team teaching, while the dependent variable is academic achievement. Survey questionnaires, learning plans, and mathematical thinking tests will be designed based on these variables. The questionnaire is divided into two parts. The first part will collect basic demographic information from the sample, including gender, age, and other demographic characteristics. The second part will consist of measurement items based on students' attitudes towards team teaching, including their acceptance and adaptation levels, participation in the learning process, evaluations and recognition, and feedback on learning outcomes. It will measure students' attitudes towards team-teaching, with four items designed for each process, totaling 20 questions. The questionnaire will utilize a Likert five-point scale for responses.

4. FINDINGS

Demographic Characteristics

TABLE 1 Descriptive Characteristics

Items	Options	Frequency	Percent%
Gender	Male	34	55.7
	Female	27	44.3
Age	Under 14	25	41.0
	14	13	21.3
	15	9	14.8
	Over 15	14	23.0
	Under 2	6	9.8
	2.1-2.5	19	31.1
GPA	2.6-3.0	28	45.9
	3.1-3.5	2	3.3
	Over3.5	6	9.8
	Total	61	100.0

The physical education learners from Class 1 and Class 2 of the second grade in junior high school at A Middle School demonstrate a relatively balanced distribution in demographic variables. They exhibit some significant differences and characteristics. For gender, the proportion of male students is 55.7%, slightly higher than the 44.3% of female students, indicating a nearly equal gender ratio but with a slight male majority. Regarding age, students are concentrated mainly under 14, accounting for 41.0%, followed by those above 15, who make up 23.0%. The proportions of students aged 14 and 15 are 21.3% and 14.8%, respectively. This distribution reveals a relatively wide age span among the students, but the majority are under 14 years old. For GPA (Grade Point Average), students' GPAs fall within the range of 2.6-3.0, accounting for 45.9%. The next largest group is within the range of 2.1-2.5, representing 31.1%. The proportions of students with GPAs exceeding 3.5 and below 2 are relatively low, each accounting for 9.8%. A small part of students have GPAs of 3.1-3.5, which is 3.3%. These data reflect the characteristics of the students in the sample in terms of gender, age, and academic performance, with a balanced gender and age and a trend of GPA distribution concentrated in the middle range.

Improving Academic Performance of Junior High School Physical Education Learners through Team-teaching

The research findings reflect the performance characteristics of the two classes in the pre-tests by describing the sample size, mean, standard deviation, and standard error of the mean for both classes. From the data, Class 1 has 31 students, and Class 2 has 30 students, with a very close sample size ensuring the rationality of the comparison. In terms of the mean, Class 1 has an average score of 10.61, while Class 2 has an average score of 10.90. Although Class 2 scores slightly higher, the difference is only 0.29, indicating that the baseline levels of the two classes in the pre-test stage are quite close. The research results show that the baseline levels of Class 1 and Class 2 are the same, with no significant differences. Such results provide a good prerequisite for

subsequent research to explore the impact of team teaching, making two classes more fair and scientific, as shown in Table 2 and Table 3.

The results of the independent sample t-test were conducted on the scores of physical education learners from Class 1 and Class 2 of the second grade in junior high school at A Middle School. This analysis showed significant differences in the pre-tests between the two classes. The results of Levene's test for equality of variances show an F-value of 0.024 with a corresponding significance level (Sig.) of 0.877. This indicates that the variances of the scores between the two classes are equal, as the significance level exceeds 0.05, and the subsequent t-test adopts the results under the assumption of equal variances. According to the t-test results, the t-value is -0.928, with a degree of freedom (df) of 59, and the corresponding two-tailed significance level (Sig. (2-tailed)) is 0.357. Since the significance level exceeds 0.05, it can be concluded that the mean differences in pre-test scores between Class 1 and Class 2 are not statistically significant. This conclusion is further verified by the confidence interval, with the 95% confidence interval for the mean difference being [-0.906, 0.332], which includes zero, indicating that the difference is insignificant. The results of the independent sample t-test indicate no significant differences in the baseline levels of scores between the physical education learners from Class 1 and Class 2 before the implementation of team-teaching.

TABLE 2 Pre-Test Group Statistics

Class	N	Mean	Std. Deviation	Std. Error Mean
1	31	10.61	1.202	0.216
2	30	10.90	1.213	0.222

TABLE 3 Pre-Test Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2- tailed)	95% Confidence Interval of the Difference	
Equal variances assumed	0.024	0.877	-0.928	59	0.357	-0.906	0.332
Equal variances are not assumed.			-0.928	58.893	0.357	-0.906	0.332

After team-teaching, data tests were conducted on physical education learners from Class 1 and Class 2 of the second grade in junior high school at A Middle School. The experimental group consisted of 31 students from Class 1. In comparison, the control group included 30 students

from Class 2. 61 valid test papers were collected, and independent sample t-tests were performed on the scores of students from the two classes. See Tables 4 and 5 for details.

The research data present statistical information on the post-tests conducted on physical education learners from Class 1 and Class 2 of the second grade in junior high school at A Middle School after the team-teaching. There were significant differences in performance between the experimental group (Class 1) and the control group (Class 2) in the post-tests, providing data support for exploring the effectiveness of team teaching. The experimental group (Class 1), consisting of 31 students, had a post-test mean of 19.97, a standard deviation of 0.875, and a standard error of the mean of 0.157. The standard deviation and standard error indicate that the score distribution of students in this class is relatively concentrated. The control group (Class 2), consisting of 30 students, had a post-test mean of 17.30, a standard deviation of 1.495, and a standard error of the mean of 0.638. Compared to the experimental group, the control group's mean was significantly lower, and the standard deviation was higher, indicating that the score distribution of students in this class was more dispersed, with higher individual differences.

The research results show the results of the independent sample t-test for the post-test scores of the experimental group (Class 1) and the control group (Class 2) after the team-teaching. This test aims to compare whether the difference in the means of the post-test scores between the two classes is statistically significant. The results of Levene's test for equality of variances showed an F-value of 15.792 and a significance level (Sig.) of 0.000, which is less than 0.05. This indicates that the data variances are not equal, and subsequent analysis needs to refer to the t-test results under the assumption of "Equal variances not assumed." According to the t-test results under the assumption of "Equal variances not assumed," the t-value is 4.059, the degree of freedom (df) is 32.508, and the corresponding two-tailed significance level (Sig. (2-tailed)) is 0.000, which is much less than 0.05. This indicates that the difference in the means of the post-test scores between the experimental and control groups is highly statistical. The 95% confidence interval for the mean difference is [1.330, 4.006], with both the upper and lower limits of the interval being positive, indicating that the mean score of the experimental group is significantly higher than that of the control group.

TABLE 4 Post-Test Group Statistics

Class	N	Mean	Std. Deviation	Std. Error Mean
1	31	19.97	0.875	0.157
2	30	17.30	1.495	0.638

TABLE 5 Post-Test Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means				
	F	Sig.	t	df	Sig. (2- tailed)	95% Confidence Interval of the Difference	
Equal variances assumed	15.792	0.000	4.119	59	0.000	1.372	3.964
Equal variances are not assumed.			4.059	32.508	0.000	1.330	4.006

Students Attitudes Towards Team-Teaching

The research results presented the reliability statistics for the questionnaire assessing team teaching effectiveness. Cronbach's alpha coefficients were adopted to evaluate the consistency and reliability of the measurement items within each dimension of the questionnaire. The Cronbach's alpha coefficients for all dimensions ranged from 0.842 to 0.896. All dimensions had Cronbach's alpha coefficients significantly above 0.8, suggesting high internal consistency across various questionnaires. Higher Cronbach's alpha coefficients reflect good correlation among items within each dimension, indicating that the item design is good and focused on specific topics without apparent redundancy or deviation. The questionnaire exhibits high reliability, providing a powerful measurement tool for studying team teaching effectiveness, as shown in Table 6.

TABLE 6 Reliability Statistics

Dimension	Cronbach's Alpha	N of Items
Acceptance and Adaptation	0.896	5
Participation in The Learning Process	0.892	5
Student Evaluation and Recognition	0.866	5
Feedback on the Learning Effect	0.842	5

The KMO test result with a value of 0.855 demonstrates a high level of sample adequacy and strong correlations among variables. The chi-square value for Bartlett's Test of Sphericity is 765.167, with 190 degrees of freedom and a significance of 0.000. The significance level is far less than 0.05, indicating that the correlation matrix among variables is not an identity matrix and has significant correlations. This result further confirms that the data are suitable for factor analysis. According to the factor analysis results of each variable, the cumulative explanatory rates for

acceptance and adaptation, participation in the learning process, student evaluation and recognition, and feedback on the learning effect are 69.203%, exceeding 0.5, indicating four valid factors.

TABLE 7 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.855
Bartlett's Test of Sphericity	Approx. Chi-Square	765.167
	df	190
	Sig.	0.000

The research data presents descriptive statistics on students' attitudes towards group teaching, specifically categorized into acceptance and adaptation, participation in the learning process, student evaluation and recognition, and feedback on the learning effect. Each dimension comprises multiple items, displaying the mean and standard deviation (Std. Deviation) for each item in Table 8. The mean values of all items range from 3.23 to 3.74, indicating high overall ratings by the participants and reflecting relatively positive evaluations of the relevant dimensions. The standard deviations, ranging from 1.006 to 1.410, suggest some variability in scores among different participants, but the overall distribution is relatively stable.

TABLE 8 Descriptive Statistics

Dimension	Item	N	Min	Max	Mean	Std. Deviation
Acceptance and Adaptation	Q1	61	1	5	3.44	1.259
	Q2	61	1	5	3.33	1.221
	Q3	61	1	5	3.43	1.147
	Q4	61	1	5	3.33	1.091
	Q5	61	1	5	3.30	1.116
Participation in The Learning Process	Q6	61	1	5	3.56	1.232
	Q7	61	1	5	3.59	1.006
	Q8	61	1	5	3.62	1.171
	Q9	61	1	5	3.52	1.410
	Q10	61	1	5	3.46	1.259

Student Evaluation and Recognition	Q11	61	1	5	3.49	1.273
	Q12	61	1	5	3.44	1.259
	Q13	61	1	5	3.23	1.216
	Q14	61	1	5	3.59	1.101
	Q15	61	1	5	3.51	1.312
Feedback on the Learning Effect	Q16	61	1	5	3.62	1.098
	Q17	61	1	5	3.66	1.078
	Q18	61	1	5	3.74	1.353
	Q19	61	1	5	3.41	1.202
	Q20	61	1	5	3.72	1.082

Discussion

The post-test mean score for the experimental group was 19.97, while that for the control group was 17.30, with a mean difference of 2.67. The independent samples t-test ($t = 4.059$, $df = 32.508$, $Sig. = 0.000$) showed a significance level of less than 0.05, indicating that the performance improvement in the experimental group was statistically significant. Further analysis revealed a 95% confidence interval for the mean difference of [1.330, 4.006], which was entirely positive, further validating the conclusion that the experimental group's scores were significantly higher than those of the control group. The higher mean score of the experimental group indicated that team teaching had a significant effect on promoting student learning outcomes. The standard deviation of the experimental group (0.875) was significantly lower than that of the control group (1.495), suggesting that team teaching not only improved overall scores but also reduced the variability in scores among individuals within the group, leading to more balanced learning outcomes. This is because team teaching emphasizes cooperation and interaction, enabling students of different abilities to understand and master physical education skills, thereby bridging individual differences. In contrast, traditional teaching modes focus more on unilateral knowledge transmission, resulting in a more dispersed distribution of student scores within the group (Zeilhofer, 2020).

The study results demonstrate that team teaching has significant advantages over traditional teaching in improving the physical education performance of middle school students. This teaching method significantly enhances learning efficiency and outcomes by strengthening collaborative learning among students and diversified guidance among teachers, particularly in physical education courses that require teamwork. This finding provides data support for team teaching in middle school physical education and offers insights into traditional teaching modes. Teachers should pay more attention to differentiated needs among individuals.

This outcome reflects the potential advantages of team teaching in terms of student's learning experience and effectiveness and indirectly validates its applicability in physical education. This viewpoint is consistent with the research by Liang and Li (2018) and Pande and Bharathi (2020). Students' high satisfaction with team teaching is closely related to the characteristics of this teaching method. By facilitating collaboration among teachers and students, team-teaching provides a more dynamic and engaging learning environment for students. In such an environment, students can overcome learning difficulties through communication and mutual support. Team teaching significantly enhances students' learning experience and sense of engagement. It offers students more personalized guidance and feedback, and this teaching approach, which focuses on students' needs, further boosts their learning confidence and recognition of the teaching method (Paauwe, 2022).

Despite students' positive attitudes towards team teaching, the distribution of mean scores for different items reveals some variation in their evaluations of specific dimensions of team teaching. For example, some items have higher mean scores (close to 3.7), reflecting stronger perceptions among students of team teaching's role in promoting academic performance or learning interest. Items with relatively lower mean scores (such as 3.23) involve aspects that students believe need further improvement, such as the balance of group cooperation or the rationality of teaching activity design. These differences provide directions for further refining the team-teaching model. For the distribution of standard deviations, the discreteness of item scores ranges from 1.006 to 1.410, indicating that although the overall attitude is positive, there are still some differences in ratings among different students. This variation is related to factors such as students' personalities, learning habits, and experiences with teamwork. For instance, students with learning abilities tend to perform more prominently in team teaching, while students accustomed to independent learning may require some time to adapt to the cooperative mode of team teaching (Fung et al., 2018). Students' evaluations of team teaching support its promotion in middle school physical education courses. By emphasizing cooperation and interaction, team teaching significantly improves students' satisfaction and enthusiasm for learning, promoting academic performance more effectively (Pande & Bharathi, 2020).

5. Conclusion

The study compared the effectiveness of team teaching and traditional teaching in improving the physical education performance of middle school students, revealing significant differences between the two teaching methods. The study results indicate that students generally hold positive attitudes towards team teaching, with mean scores for all items ranging between 3.23 and 3.74. This demonstrates that the participants' ratings on the Likert 5-point scale are at the mid-to-high level. The results show that the students recognize the role of team-teaching in improving physical education performance.

6. References

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EVALUATING THE INTEGRATION AND EDUCATIONAL IMPACT OF PROTOOLS TECHNOLOGY IN
DIGITAL MUSIC PRODUCTION CURRICULA: A CASE OF B UNIVERSITY IN HU BEI PROVINCE,
CHINA

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ABSTRACT

The purpose of the study was to Examine the impact of the Pro Tools technology on students' digital music. production education and also to investigate how Pro Tools technology enhances students' learning achievements in digital music production education and whether using Pro Tools in digital music production courses demonstrates greater student self-efficacy in digital music production education. This study adopted the quantitative research method. Initially, the study sampled 322 music production students, selecting a subset of sixty-eight participants for the study. This study focuses on Class 1 (33 students) and Class 2 (35 students). students) of the 2023 intake in the Music Production major at B University in Hubei Province, China. It compares the impact of integrating Pro Tools. Technology in teaching (experimental group) versus traditional teaching methods (control group) affects students' achievements and self-efficacy. The students' learning achievements and self-efficacy tests in digital Music production education consist of pre-test and post-test items. This study finds that 1) ProTools technology positively impacts students' digital music production education; 2) ProTools technology enhances students' learning. Achievements in digital music production education; 3) Students using Pro Tools in digital music production courses demonstrate greater student self-efficacy in digital music production education. This research contributes to understanding technology integration in music education and provides practical recommendations for institutions implementing digital audio workstations in their curricula. The findings affect curriculum design, instructor professional development, and student engagement strategies in digital music production education.

Keywords: *Pro Tools, Digital Music Production, Educational Impact, Curricula*

1. Introduction

In China, the music industry has been experiencing significant growth, with a rising demand for skilled professionals in digital music production. This trend has increased the focus on music technology education in Chinese universities. B University in Hubei Province, recognizing the importance of staying current with industry standards, has integrated Pro Tools into its digital music production curriculum (Aminah et al., 2020). However, integrating Pro Tools in educational settings presents both opportunities and challenges. While it offers students hands-on experience with professional-grade software, it also requires significant investment in equipment, licensing, and instructor training (Yang, 2024). Moreover, the rapid pace of software updates and the complexity of Pro Tools' features necessitate continuous adaptation of teaching methodologies and curriculum design.

This research aims to investigate the integration of Pro Tools technology in digital music production education at B University and assess its impact on various aspects of the educational process and outcomes (Chuang, 2021). By examining factors such as the level of integration, instructor proficiency, and student engagement, this study seeks to provide insights into the effectiveness of Pro Tools as an educational tool in the context of a Chinese university (Resch & Schrittemesser, 2023). The findings of this research will benefit B University by refining its approach to digital music production education and contributing to the broader understanding of technology integration in music education. As more institutions in China and globally consider incorporating industry-standard software into their curricula, this study will offer valuable perspectives on such initiatives' challenges, best practices, and potential outcomes.

2. Literature Reviews

Technological Pedagogical Content Knowledge (TPACK) Framework

In this sense, the Technological Pedagogical Content Knowledge (TPACK) appears as a valuable framework for understanding the inclusion of technology in educational settings and, more specifically, within digital music production education. Moreover, with all of the above being said, it turns out that TPACK is an extension (a critical one) of Shulman's original work on Pedagogical Content Knowledge (PCK) (Alrwaished et al., 2020). For this study, the study could use a TPACK framework to examine Pro Tools technology in terms of its level of integration (TC) by how proficient our instructors are with teaching engineering principles and tools like Pro Tools best coupled together (GP) as well as using it all effectively so students want-to-know-and-understand-this(SC). The Technology Pedagogy Content Knowledge (TPACK) framework suggests that meaningful integration of technology in teaching and learning using tech reflective practice begins with the unique knowledge base at interaction points between three primary forms based on Knowledge for Teaching Disciplines, technologies disciplines (Aminah et al., 2020). Hence, the depth of integration available in Pro Tools technology is a function of how well-trained and able teachers are to use this comprehensive method.

Social Cognitive Theory

Albert Bandura's Social Cognitive Theory (SCT) offers a valuable theoretical model for understanding student success and building self-efficacy within digital music production education. As explained earlier, SCT suggests that learning comes in the social context where individuals are influenced by the interaction of their environment, behavior, and others (Chuang, 2021). These ideas around observational learning, self-efficacy, and reciprocal determinism run parallel to those of SCT, which can be seen when studying digital music production education at B University. The basic premise of SCT is that people learn by observing other individuals who act as models, particularly when the behavior exhibited by these role models is rewarded. During digital music production education, Pro Tools is the technology teachers use as a model for Students to reference and learn from (Yang, 2024). How well the students can observe and learn is tempered by how proficient their instructor happens to be at Pro Tools. Professors who show high competence and confidence with the technology persistently use it to model effective practice while creating an environment that encourages students to imitate them.

Social Cognitive Theory offers a framework for understanding the learning process (Chuang, 2021). SCT emphasizes that learning occurs through observation, imitation, and social interaction. In learning music production with Pro Tools, students learn technical operations through the teacher's demonstrations and improve their skills and self-efficacy through collaboration, discussion, and peer feedback. SCT also highlights the influence of the environment on learning (Yang, 2024). Similarly, Singh (2024) underscores the need for a shift in human attitudes toward advocating for a view that respects its sacredness and recognizes its finite nature. It calls for a collective effort to develop practices that align with the ethics of moderation interdependence in a technology-rich learning environment.

In a technology-rich learning environment, students can better combine theoretical knowledge with Pro Tools for hands-on work and experience music production. This environment not only enhances students' technical skills but also, through continuous practice and reflection, helps them develop a deeper understanding of music production. By combining the TPACK and SCT theories, the research can analyze the methods of integrating Pro Tools technology into digital music production courses and its specific impact on teaching outcomes (Han, 2021). This integration helps teachers design and implement instructional activities more effectively and enhances students' technical skills and self-efficacy, significantly improving their learning experience and achievements.

Pro Tool Technology

The Pro Tool technology is a major step forward in industrial automation and provides a powerful platform for integrating systems and apparatuses within one production environment. Pro-Tool is intrinsically empathic as it promotes better communication between machines, sensors, and control systems, leading to a higher level of integration that becomes quintessential for new-age manufacturing processes (Baqays, 2020). One of the most notable features of Pro Tool technology is its versatile hardware and software integration properties. This includes support for devices such as Programmable Logic Controllers (PLCs), Human-Machine Interfaces, and sensors.

Pro Tools allows these elements to communicate correctly and all that comprise a production system to work together properly (Sanchez et al., 2020). This also optimizes the requirement of manual efforts, decreases error probability, and heightens overall productivity (Han, 2021).

1. Integration Level of Pro Tools Technology

Pro Tool has extensive integration capabilities with hardware and software systems in an industrial setting. It is designed for various industrial protocols and standards and is, hence, compatible with different software platforms used in manufacturing. It is compatible with other software applications for process control, data analysis, and production management (Bueno et al., 2020). As a result, Pro Tool allows all software tools to work together and efficiently share their data so managers can make more informed decisions that keep the entire operation functioning smoothly.

2. Instructor Proficiency with Pro Tool Technology

Effective education and subsequent implementation require the instructor to be proficient in Pro Tool technology within industrial settings. Industrial automation and production procedures are far more sophisticated, and the need for seasoned trainers to successfully pass on information about Pro Tool technologies is larger (Loukatos et al., 2022). In addition to their technical knowledge, these instructors must also know how to translate complex ideas into a format that can be learned and applied by all different types of people.

3. Student Engagement with Pro Tool Technology

A supportive learning environment will be created to engage students with Pro Tool in our working spaces. Instructors can serve your students' various needs and learning speeds with more focus, as additional help can easily be included. This can take the form of providing individual coaching, setting up student-run study groups, or running online forums where students have a space to talk about problems and success stories. It is a way to maintain engagement at higher levels while avoiding frustration and disengagement by ensuring the class gives all students support and value (Skilling et al., 2021).

Digital Music Production Education

In the information age, the necessity of digital music production education has stepped in as the creation and manipulation technique used to produce sound for media applications has evolved with each passing year while making its way through advancement at a rapid pace. Software Instruments and DAWs in modern music production look at technology as its primary. The invention of Digital Audio Workstations (DAWs) and a paradigm shift in VST Plugins have changed how people create, produce, and distribute music (Douglas, 2024). As such, digital music production is nowadays taught not only as the playing of an instrument and understanding loosely how to put a track together musically but also about learning every detail for you to be able to produce professional quality music within a topical commodifying innovational ecological ecosystem.

1. Student Achievement in Digital Music Production

Student achievement in digital music production education has become increasingly important as technology reshapes the music industry. Integrating digital audio workstations (DAWs) like Pro Tools into music education curricula has significantly impacted how student achievement

is measured and understood in this field. Research by Kardos (2012) suggests that using music technology can make sound and music worlds more accessible to student composers, potentially leading to improved achievement outcomes. This accessibility factor is crucial in understanding how technology integration affects student performance. Building on this, Bell (2018) argues that the proliferation of DAWs has democratized music production, allowing students to achieve higher levels of production quality than ever before. The literature suggests that student achievement in digital music production education is multifaceted, influenced by technology integration, pedagogical approaches, assessment methods, and the balance between technical and creative skills. As technology advances, ongoing research will be crucial to understand and optimize student achievement in this dynamic field.

2. Student Self-Efficacy in Digital Music Production

Student self-efficacy, a concept rooted in Bandura's (1997) social cognitive theory, plays a crucial role in digital music production education. In music technology, self-efficacy refers to students' belief in successfully using digital tools for music creation and production. This concept has gained increasing attention as music education has become more technologically oriented. The longitudinal development of self-efficacy in music production has been examined by Tobias (2015), who found that students' self-efficacy tends to follow a U-shaped curve throughout their education. Initially, high levels of confidence often dip as students encounter the complexities of professional-grade software before rising again as they gain mastery. This pattern highlights the need for sustained support and encouragement throughout the learning process. In conclusion, student self-efficacy in digital music production education is a complex construct influenced by various factors, including technology integration, instructional quality, hands-on experience, and individual differences. As music education continues to evolve with technological advancements, fostering student self-efficacy remains a crucial goal for educators in this field.

Related Studies

Integrating ProTools technology into digital music production education has shown promising results in enhancing student learning outcomes, skill development, engagement, and overall curriculum effectiveness. Research indicates that Pro Tools can make sound and music creation more accessible to students, potentially leading to improved achievement in composition and production tasks (Kardos, 2012; Bell, 2018). The software's professional-grade capabilities allow students to develop industry-relevant skills, better preparing them for careers in music production (D'Errico, 2021). Studies have found that engaging with ProTools can increase student motivation and self-efficacy in music technology courses (Chuang, 2021; Yin, 2024). However, the educational efficacy of Pro Tools is contingent on factors such as proper integration into the curriculum, instructor proficiency, and pedagogical approaches that balance technical skill development with creative expression (Herbst & Muehlausen, 2015; Yang, 2024). When effectively implemented, Pro Tools can be a powerful teaching tool that enhances the overall quality and relevance of digital music production education, fostering technical competence and artistic innovation among students.

The educational significance of ProTools also lies in stimulating students' creativity. Despite its complex and professional functions, the software's interface design and function settings provide users with sufficient flexibility and possibilities. This flexibility allows students to unleash their imagination and innovation within technical constraints. Through ProTools, students learn to follow technical rules while exploring new artistic expressions by breaking those rules (Nagahi et al., 2021). This balance is crucial for cultivating talent in proficiency and creativity. ProTools technology is a tool in digital music production education and is a driving force for changing educational methods and cultivating comprehensive talent (Carless, 2022). It tightly integrates technology and art, theory and practice, and individuals and teams, giving music production education a deeper meaning.

3. Methodology

The study adopted a quantitative methodology to understand the research problem comprehensively. The study will use a survey to investigate the relationship between the integration level of Pro Tools technology, instructor proficiency with Pro Tools, student engagement with the technology, and student achievement and self-efficacy within digital music production education. This study evaluates the impact of Pro Tools technology on students' achievement and self-efficacy in digital music production education through a lesson plan and testing (Ng et al., 2022). Combining pre-tests and post-tests, the educational value of Pro Tools technology is identified through comparative analysis. Before the study's commencement, pre-tests are conducted to assess students' achievement and self-efficacy at the starting point of the course. The achievement assessment includes measurements of students' competencies in digital music production. This test part is implemented through task completion, scoring criteria, and performance-based evaluations. Through comparative analysis of pre-test and post-test data, the data analysis will integrate quantitative research with feedback from students' personal experiences to ensure the scientific validity and practicality of the research conclusions.

The subjects of this study are students and teachers in digital music production courses at a private B university in Hubei province, China. This applies to students studying digital music production at university and the teachers teaching these subjects. Enrollment records show there are nearly 1,000 students and about 50 instructors. Class 1 and Class 2 of the 2023 intake in the Music Production major at B University in Hubei Province, China, was selected as the study population for the effectiveness test of Pro Tools technology in music production. Class 1 consisted of 33 students, while Class 2 had 35 students. Classes 1 and 2 of the 2023 intake in the Music Production major were divided into an experimental group and a control group. Class 1 of the 2023 intake adopted an integrated teaching approach with Pro Tools technology, while Class 2 continued with traditional teaching methods.

4. Findings

To Examine the Impact of the Pro Tools Technology on Students' Digital Music Production Education

TABLE 1 Descriptive Characteristics

Items	Options	Frequency	Percent
Gender	Male	176	54.7
	Female	146	45.3
Age	Under 18	1	0.3
	18-25	277	86.0
	26-35	13	4.0
	36-45	21	6.5
	Above 45	10	3.1
Do you know Pro Tools technology?	Yes	322	100.0
	No	0	0
Total		322	100

Regarding gender distribution, the sample includes 176 males (54.7%) and 146 females (45.3%), indicating a relatively balanced distribution, with a slight majority of males. For age distribution, the participants (86.0%) fall within the 18-25 age group, making it the dominant demographic in the study. Smaller proportions are observed in other age groups, including 26-35 (4.0%), 36-45 (6.5%), and above 45 (3.1%), while only 0.3% of participants are under 18. This suggests that the study primarily targets young adults, which is typical for educational or training environments. In familiarity with Pro Tools technology, all 322 participants (100.0%) indicated that they are familiar with it, with none reporting unfamiliarity. This uniformity ensures that the participants share a consistent baseline understanding of the technology, making them suitable for the study's focus on Pro Tools-related educational outcomes.

The study reveals that Pro Tools significantly enhances music production education by improving curriculum quality (mean = 3.69), updating features regularly (mean = 3.62), and fostering student familiarity with the software (mean = 3.61). It promotes collaboration (mean = 3.64), engagement (mean = 3.47), and technical skills (mean = 3.55) while boosting self-efficacy (mean = 3.68) and skill development (mean = 3.69). However, challenges remain consistent across courses (mean = 3.51), instructor proficiency (mean = 3.41–3.60), and aligning classroom learning with industry expectations (career preparation mean = 3.51). Addressing these issues could further optimize Pro Tools' impact on music production education.

The Integration Level of Pro Tools Technology Positively Impacts Digital Music Production Education

Data was collected from 322 participants (278 students and 44 instructors) through surveys and analyzed using descriptive and inferential statistics. The integration level of Pro Tools technology positively impacts digital music production education. Results revealed a strong positive correlation between Pro Tools integration and digital music production education ($\beta = 0.967$, $p < .001$), with each unit increase in integration corresponding to a 0.968-unit increase in digital music production education. Instructor proficiency with Pro Tools technology emerged as a crucial factor ($\beta = 0.785$, $p < .001$), demonstrating that teacher competency significantly influences digital music production education. Student engagement with Pro Tools positively affected digital music production education ($\beta = 0.769$, $p < .001$).

TABLE 2 Regression Analysis of Integration Levels of Specialized Tool Technologies

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.947	.416		2.275	.024
	Integration Level of Pro Tools Technology	.968	.014	.967	68.123	.000

TABLE 3 Regression Analysis of Instructor's Proficiency with Pro Tools Technology

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.166	.930		8.777	.000
	Instructor Proficiency with Pro Tools Technology	.734	.032	.785	22.673	.000

TABLE 4 Regression Analysis of Student Engagement with Pro Tools Technology

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.655	.958		9.038	.000
	Student Engagement with Pro Tools Technology	.716	.033	.769	21.512	.000

To investigate How Pro Tools Technology Enhances Students' Learning Achievements in. Digital Music Production Education

The subject of this study is the students from Class 1 and Class 2 of the 2023 Music Production major. Students in both classes were exposed to Pro Tools technology and traditional teaching methods in their music production education. Classes 1 and 2 of the 2023 Music Production major were divided into experimental and control groups. Tests were conducted twice, once before the study began (pre-test) and once after it ended (post-test). The pre-test aimed to assess students' digital music production performance before receiving different teaching methods, while the post-test evaluated changes in students' performance after using Pro Tools technology. The test content was aligned with the course syllabus Pro Tools operations, audio recording and editing techniques, MIDI sequencing, mixing and signal processing, and project management within the Pro Tools environment.

TABLE 5 Compare Variance of Class Integrating Pro Tools Technology and Variance of Class Traditional Teaching Methods (Before Learning)

Class	df	Mean	Variance	F
Integrating Pro Tools Technology	32	22.06	4.24	1.24
Traditional Teaching Methods	34	22.18	5.25	

TABLE 6 Compare Average Achievement of Integrating Pro Tools Technology and Traditional Teaching Methods

Class	Mean	Variance	df	t
Integrating Pro Tools Technology	38.06	1.47	66	7.37
Traditional Teaching Methods	31.65	24.13		

The $F_{0.975,32,34} = 0.497 < F_{compute} = 1.24 < F_{0.025,32,34} = 1.995$ means the test variance of the class integrating Pro Tools Technology equals the variance of the class's traditional teaching methods. So, after learning, use the t-test to equal the variance. The $t_{compute} = 7.37 > t_{0.05,66} = 1.997$, which is significantly greater than the critical value. There are no significant differences in the mean values and variances of the pre-test data between the two groups, indicating that the experimental and control groups have similar initial levels. The post-test data show that Pro Tools technology-integrated teaching significantly improves students' achievement, with the mean post-test score of the experimental group being higher than that of the control group. Therefore, the conclusion is that the Pro Tools technology-integrated teaching can significantly enhance students' learning achievements compared to traditional teaching methods.

To Study Whether Using Pro Tools in Digital Music Production Courses Demonstrates Greater Student Self-Efficacy in Digital Music Production Education

The subjects of this study are students from Class 1 and Class 2 of the 2023 Music Production Major. Students in both classes were exposed to two methodologies in music production education: Pro Tools technology and traditional teaching methods. The pre-test aimed to assess students' self-efficacy in digital music production before receiving different teaching methods, while the post-test evaluated changes in their self-efficacy after using Pro Tools technology. Before teaching with Pro Tools technology, self-efficacy tests were conducted on students from Class 1 and Class 2 of the 2023 Music Production Major, and 68 tests were collected. An independent-sample t-test was performed on the scores of students from both classes.

TABLE 7 Compare Variance of Class Integrating Pro Tools Technology and Variance of Class Traditional Teaching Methods (Before Learning)

Class	df	Mean	Variance	F
Integrating Pro Tools Technology	32	32.55	8.506	1.71
Traditional Teaching Methods	34	32.49	14.551	

TABLE 8 Compare Average Self-Efficacy of Integrating Pro Tools Technology and Traditional Teaching Methods

Class	Mean	Variance	df	t
Integrating Pro Tools Technology	57.73	2.83	66	2.75
Traditional Teaching Methods	50.57	60.958		

The $F_{0.975,32,34} = 0.497 < F_{compute} = 1.71 < F_{0.025,32,34} = 1.995$ means the test variance of the class integrating Pro Tools Technology equals the variance of the class's traditional teaching methods. So, after learning, use the t-test to equal the variance. The $t_{compute} = 2.75 > t_{0.05,66} = 1.997$, which is significantly greater than the critical value. The mean values and variances of the pre-test data for both groups showed no significant differences, indicating that the initial levels of the experimental and control groups were similar. The post-test data revealed that integrating Pro Tools technology in teaching significantly enhanced students' self-efficacy, with the experimental group scoring higher on average in the post-test compared to the control group. Therefore, the conclusion is that, compared to traditional teaching methods, the integration of Pro Tools technology in teaching can significantly improve students' self-efficacy.

Discussion

The integration of Pro Tools technology in digital music production education has demonstrated significant advantages. The study's conclusions align with those of Yang (2024), Harrison (2020), and Dobbs (2017). As an industry-standard software, Pro Tools provides students with a platform that closely mirrors real-world working environments. The utilization of this tool

equips students with basic operations in the classroom. Pro Tools technology endows students with core skills essential for entering the industry. In teaching, Pro Tools' intuitive interface and comprehensive functionality greatly enhance teaching efficiency. Students can directly engage in processes such as recording, editing, and mixing, and this practical learning approach stimulates their interest and enhances learning outcomes. The integration of this technology has transformed teaching methodologies. Traditional teaching relies more on theory and static presentations, whereas the application of Pro Tools supports dynamic and interactive teaching methods (Chuang, 2021). Teachers can demonstrate complex audio production processes, allowing students to observe in real time and perform operations, thereby cultivating their ability to solve practical problems (Bell, 2020). More importantly, this integration also fosters creativity.

In digital music production education, the Pro Tools technology significantly enhances students' performance compared to traditional teaching methods, with improvements in practical skills, theoretical understanding, and creativity cultivation. This viewpoint is consistent with the research by Resch & Schritteser (2023) and Sickmen-Fox (2023). Pro Tools technology provides students with a learning environment, whereas traditional teaching methods often emphasize theoretical instruction or simulated operations, lacking connection with real-world workflows. In traditional classrooms, students learn about recording, editing, and mixing through demonstrations or theoretical lectures, but opportunities for hands-on practice are limited (Miranda et al., 2021). Pro Tools help students hear the effects of adjustments during the operation, enabling them to improve. The study's conclusions align with Yang's (2024) and Harrison (2020) conclusions. The Pro Tools technology in digital music production education significantly improves students' performance compared to traditional teaching methods. By combining industry-standard tools with a practice-oriented teaching model, students grasp theoretical knowledge and demonstrate their skills and creativity through high-quality practical work. This teaching approach stimulates students' interest in learning and lays a solid foundation for their future development.

In digital music production courses, students using Pro Tools software demonstrate higher self-efficacy in music composition and production. This phenomenon can be attributed to the professional tools, practice-oriented learning environment, and immediate feedback mechanisms provided by Pro Tools, which significantly enhance students' technical skills and self-confidence (Miranda et al., 2021). As an industry-standard digital audio workstation, Pro Tools boasts powerful functionalities and a comprehensive toolset, catering to the creative needs of both beginners and professionals. Pro Tools emphasizes practice and operation, enabling students to progress through hands-on learning. Students using Pro Tools exhibit higher self-efficacy in digital music production courses, primarily due to the software's professionalism, practice orientation, and instant feedback. This viewpoint is consistent with the research by Barton and Dexter (2020), Loukatos et al. (2022), and Sung et al. (2021). However, to fully leverage its advantages, reasonable guidance and support must be provided in teaching to enable students to overcome challenges in the learning process and maximize their skills and confidence. This enhanced self-efficacy manifests academically and lays a solid foundation for students' future careers in music.

5. Conclusion

This study investigated ProTools technology's integration and educational impact on digital music production curricula at B University in Hubei Province, China. This study finds that ProTools technology positively impacts students' digital music production education. The ProTools technology enhances students' learning achievements in digital music production education. Students using ProTools in digital music production courses demonstrate greater student self-efficacy in digital music production education.

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IMPACT OF INTERACTIVE LEARNING TOOLS ON THE COGNITIVE DEVELOPMENT AND DANCE
CREATIVITY OF SIXTH-GRADE SCHOOL LEARNERS

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ABSTRACT

The study aimed to investigate interactive learning tools to enhance the cognitive development and creative skills of primary school learners in dance education and to study whether primary school learners are satisfied with the interactive learning tools in dance education. The study adopted the quantitative research method. Data was collected through questionnaires, lesson plans, and tests. Initially, the study sampled 159 sixth-grade learners from Primary Schools in Hubei Province, selecting a subset of 90 learners, with 45 learners comprising the experimental group utilizing interactive learning tools and another 45 learners forming the control group receiving traditional instruction. The findings revealed that interactive learning tools significantly improved cognitive development and creative skills, with the experimental group outperforming the control group in post-test assessments. Furthermore, students generally positively perceived interactive learning tools, particularly regarding course content satisfaction. The conclusion emphasizes the potential of interactive learning tools to markedly enhance cognitive development and creativity in dance education while increasing student satisfaction. Future research is recommended to expand the sample size, conduct longitudinal studies, and explore the application of interactive learning tools across other artistic disciplines. The study's limitations include the restricted sample to sixth-grade students from a single school, the short duration of the study, and the primary focus on cognitive and creative development, omitting other significant areas such as emotional engagement, self-directed learning, and collaboration.

Keywords: *Interactive Learning Tools, Cognitive Development, Dance Creativity, Primary School*

1. Introduction

In the rapidly evolving primary education landscape, interactive learning tools have emerged as powerful instruments for enhancing cognitive development across various subjects. Dance education, particularly in the realm of creativity, presents a unique opportunity to leverage these tools for fostering cognitive growth in young learners. As dance combines physical movement with creative expression, it offers a rich environment for cognitive development, including spatial awareness, problem-solving, and abstract thinking (Koff, 2000). Technology integration in education has been a growing trend over the past few decades, with interactive learning tools becoming increasingly sophisticated and accessible. These tools, which range from simple digital interfaces to complex virtual reality systems, have shown promise in enhancing engagement, motivation, and learning outcomes across various subjects (Mayer, 2019). However, their application in dance education, particularly in fostering creativity among primary school students, remains a relatively unexplored area.

Dance creativity develops students' ability to generate, refine, and express original movement ideas (Amalia, K., 2024; Koff, S. R., 2000). This process involves complex cognitive skills, including divergent thinking, spatial reasoning, and kinesthetic awareness (Torrents et al., 2015). The potential for interactive learning tools to support and enhance these cognitive processes in the context of dance creativity is significant and warrants in-depth investigation. This research investigates the impact of interactive learning tools on the cognitive development of dance creativity learners in primary schools. By examining factors such as the types of tools used, frequency of usage, and mode of implementation, this study seeks to provide insights into the effectiveness of these tools in enhancing cognitive aspects of dance creativity, including dance fluency, originality, and choreographic problem-solving. The findings of this research will not only benefit primary schools in refining their approach to dance creativity education and contribute to the broader understanding of technology integration in arts education.

2. Literature Reviews

Constructivism Theory

Constructivism theory stresses the learner being an active participant in learning while dealing with content, experimenting, and thereby gaining understanding through working and reflecting (Korucu-Kış, 2021). The remainder of what is typically called constructivist learning—inherently interactive designs such as digital apps, virtual reality (VR), or instructional software that provide students a vehicle to interact with content in dynamic and meaningful ways. Interactive learning tools are meant to be appealing and interactive, but they also should encourage active participation from learners. Constructivist theory states that this engagement is necessary for understanding learning (Lombardi, 2008; Strommen and Lincoln et al. When used in the dance education of primary school children, interactive tools encourage learners to participate actively and are no longer just receivers. Interactive learning tools can also be seen as tools for constructivists considering integrating social processes. Most of these tools come with collaborative features that enable students to collaborate, share their progress, and learn from each other. This partnership is inspirational and adds to the educational process by providing students with a range

of views and concepts. Perhaps in a dance class, students use an app to work together on creating choreography for which each student brings their steps (Hsia & Hwang, 2021). This social component brings a greater understanding of dance as an art, and it challenges students by allowing them to think critically about what steps flow nicely into one another within the performance.

Multiple Intelligences Theory

The theory of Multiple Intelligences was first formulated over 20 years ago. Howard Gardner, in his groundbreaking book, frames intelligence as primarily cognitive, featuring a range of the extent to which one is quick or slow studies) Different types of intelligence are distinct and relatively independent of each other. Concerning the cognitive development of dance creativity learners, Gardner's theory provides insight into how these varying intelligences are relevant for primary-aged children during their creative and intellectual growth as part of engaging in a Dance educational program at school. The theory pointed to bodily-kinesthetic, musical, and spatial intelligence for fostering dance creativity (Kassing & Jay, 2020). As dance is a collection of body expressions, it activates this intelligence in students by making them involved and exploring maximum physical activity (Vancea, 2020).

Additionally, Singh (2024) calls for a collective effort to address the pressing crisis and promote sustainable practices informed by teachings. In Dance creativity learners, cognitive development is seen through bodily-kinesthetic intelligence (translating abstract ideas and emotions into physical movements). The translation process for the words is much more cognitively involved, including things like planning, problem-solving, and memory, which can also be improved with dance practice.

Interactive Learning Tools

In dance education, interactive learning tools are gradually becoming a vital means of enhancing students' learning outcomes (Lykesas et al., 2020). These tools help stimulate students' interest in learning, enhance classroom interaction, and foster the development of their cognition and creativity. Interactive learning tools in dance education refer to instruments that facilitate the learning process for students in comprehensive dance curricula, spanning stages such as preparation, learning, collaborative practice, creation, presentation, feedback, and reflection and improvement (Carmona, 2021). Through methods such as motion decomposition, real-time correction, creative design, and data feedback, these tools comprehensively support students' cognitive development and dance creativity, aiding them in more effectively achieving course objectives (Washbrooke, 2023).

The application of interactive learning tools in dance education spans multiple stages, from preparation to reflection and improvement, comprehensively supporting students' cognitive development and dance creativity through motion decomposition, real-time correction, creative design, and data feedback (Kirakosian et al., 2021). Literature suggests that these tools increase students' motivation and provide an efficient learning experience (Lykesas et al., 2020). With the continuous development of technology, interactive learning tools in dance education will become

more widespread, becoming an essential resource for promoting students' comprehensive development (Angelov, 2023).

Cognitive Development

Research on the cognitive basis of dance is fragile. However, several findings can be sketched: The most critical instrument for ballet choreography appears to be a lead limb that indicates an approximately in-phase relationship with two co-choreographed limbs; different kinds of inhibitions tend not to be translatable between verbalizing and executing balance steering or walking plans. Dance as an art is not just about physical ability but also involves cognitive processes that develop creativity and innovation (Lykesas et al., 2020). The relationship between cognitive development and dance creativity: problem-solving, memory recall, relation to space around us (spatiality), affective expressions. Cognitive development is one of the primary functions of dance creativity, which is improving the problem-solving skills that are part and parcel of our daily lives. Dancing frequently involves work on choreography in which dancers learn to think critically about a series of movements, transitions, and the story they want to tell (Walton & Mackay, 2022).

Creative Skills

Dance artists are the people who enjoy and are capable of creating dance expression. Everyone from beginner-level dancers up to professionals brings that inimitable focus or ability into their part of creative energy. Dance creativity students are lifelong learners who engage in a creative process journey heavily weighted towards learning for autonomy, experiential discovery, and novelty movement making (Coogan, 2021). After all, the early dance creativity learners' stages must be preceded by solid dance technique training. This foundation is important as it gives the weapons required for a creative outlet. As novices get more of a hold on fundamental moves, they can better experiment with twisting them or combining and transforming pieces into something new (Gray & Banerjee, 2021). That kind of experimentation lies at the core of dance creativity, and students are encouraged to drill through conventional techniques to find their voice. Experimentation encourages curiosity, clearly, but more importantly, it brings learners into the open, where they access their creative voice.

The Primary School Learners' Satisfaction

Literature on primary school learners' satisfaction reveals the profound impact of course content, interactive tools, learning outcomes, and teacher-student interaction on student satisfaction. Studies show that enjoyable and challenging course content, user-friendly and highly interactive learning tools (Multazam et al., 2023), clear feedback on learning outcomes, and active and effective teacher-student interaction are all key factors in enhancing student satisfaction. With technological advancements, especially the continuous development of interactive learning tools (Coogan, 2021), these factors in dance education will continue to be strengthened, providing students with more personalized and efficient learning experiences.

Related Studies

In dance education, cognitive development refers to the student's cognitive abilities through learning dance movements, understanding dance expressions, and improving body control (Li, 2021). Research has shown that interactive learning tools significantly boost students' cognitive skills, particularly in movement decomposition, rhythm sense, and spatial awareness (Bojner Horwitz et al., 2022). Studies indicate that video tutorials and real-time feedback tools assist students in more clearly understanding the structure of complex dance movements. Through these tools, students can repeatedly view and analyze dance movements, deepening their memory and understanding of dance skills (Multazam et al., 2023). Technological tools also enhance students' cognitive engagement through interactivity (Gray & Banerjee, 2021). Scholars have employed Virtual Reality (VR) for dance training, which provides an immersive learning experience but also helps students develop spatial perception abilities by simulating dance environments (Crow & Tlhpe, 2020). VR technology enables students to understand the structure and movement pathways, leaving a profound cognitive impression and influencing their mastery of dance techniques.

In dance education, creativity refers to the unique artistic expression and innovative thinking when choreographing and performing dances. Numerous studies have shown that interactive learning tools significantly promote students' creative thinking and artistic expression (Multazam et al., 2023). Research about interactive design tools for dance creation can stimulate students' creative potential (Coogan, 2021). These tools provide students with movement options and freedom to create, helping them explore personal styles and enhance their innovative abilities. Studies also show that during the creative process, students can better demonstrate their creativity through interactive tools such as motion capture technology and dance choreography software (Carmona, 2021). With motion capture technology, students can instantly view movement changes, and virtual demonstrations help them discover new ideas and possibilities in dance creation (Chan et al., 2019). This highly interactive learning approach fosters autonomy in dance creation among students, stimulates their creativity, and enhances their understanding of dance expressions.

Some studies comprehensively explore the dual impact of interactive learning tools on primary school students' cognitive development and creative skills. Interactive learning tools not only help students master the basic skills of dance movements but also encourage them to create and express themselves based on these skills (Vancea, 2020). These tools enhance students' cognitive abilities by decomposing complex movements, providing immediate feedback, enhancing spatial perception, and stimulating their creative potential by granting them freedom and flexibility in creation (Kassing & Jay, 2020). The comprehensive application of interactive learning tools in dance teaching can break the limitations of traditional classrooms and provide personalized learning paths (Washbrooke, 2023). These tools support students in gradually establishing cognitive frameworks during autonomous learning and stimulate their desire to explore creation through modules such as movement analysis, rhythm practice, and choreography design and undergoing cognitive development (Chan et al., 2019).

3. Methodology

The study adopted a quantitative methodology to understand the research problem comprehensively. The purpose is to obtain an in-depth, empirical understanding of the effect of interactive learning technologies on cognitive development and dancing creativity at a particular grade level through primary school students. This approach demonstrates the statistical significance of effectiveness and provides insight into learner experiences and educator perspectives (Vancea, 2020). The study will also use a quasi-experimental design, recruiting and comparing an experimental and control group under pre- and post-test conditions. In all cases, the educational design (dance curriculum) will be implemented in conjunction with a set of interactive learning technologies. Consequently, these will offer a much broader perspective on students' creativity and cognitive growth.

The research will supply the learners with pre- and post-tests to measure their cognitive improvement using standardized examinations. Questionnaires will measure students' satisfaction with the learning tool. The data collected includes videography of the process and interactions with interactive technologies to observe how students engage with creative processes live. The quasi-experimental design will enable data collection in organic contexts and real-life primary school dance programs where the learning tools are already operational. Standardized instruments for data collection that guaranteed consistency and reliability across the sample were part of this research design. The overarching perspective is expected to facilitate a more intricate understanding of the contribution of interactive learning tools in promoting cognitive growth in learners with dance creativity within the backdrop of primary school settings.

Students were nurtured through learning plans, and pre-test and post-test data were collected to analyze the differences. For the effectiveness test of interactive learning tools in dance education, Class 1 and 2 in the Hubei Hope Primary School were selected as the study population. Class 1 consisted of 45 students, while Class 2 had 45 students. Students were divided into an experimental group and a control group. Students in Class 1 intake adopted interactive learning tools, while Class 2 continued with traditional teaching methods.

4. Finding

Investigate Interactive Learning Tools to Enhance the Cognitive Development of Primary School Learners in Dance Education

TABLE 1 Compare Variance of Class Interactive Learning Tools and Variance of Class Traditional Teaching Methods (Before Learning) on Cognitive Development

Class	df	Mean	Variance	F
Interactive Learning Tools	44	20.69	10.265	1.679
Traditional Teaching Methods	44	21.98	6.113	

TABLE 2 Compare Average Achievement of Interactive Learning Tools and Traditional Teaching Methods on Cognitive Development

Class	Mean	Variance	df	t
Integrating Pro Tools Technology	38.49	1.846	86	5.34
Traditional Teaching Methods	31.40	12.973		

The study focuses on Class 1 and Class 2 in the Hubei Hope Primary School. It compares the impact of interactive learning tools in dance education (experimental group) versus traditional teaching methods (control group) on students' cognitive development, aiming to explore the effectiveness of interactive learning tools in dance education. $F_{0.025,44,44} = 0.550 < F_{compute} = 1.679 < F_{0.975,44,44} = 1.820$ means the test variance of class interactive learning tools equals the variance of class traditional teaching methods. So, after learning, use the t-test to equal the variance. $t_{compute} = 5.34 > t_{0.05,86} = 1.997$, which showed that significantly greater than the critical value, the null hypothesis was rejected, indicating that the mean post-test score of the experimental group was significantly higher than that of the control group.

There are no significant differences in the mean values and variances of the pre-test data between the two groups, indicating that the experimental and control groups have similar initial levels. The post-test data show that interactive learning tools significantly improve students' cognitive development, with the mean post-test score of the experimental group being higher than that of the control group. Therefore, the conclusion is that interactive learning tools can significantly enhance students' cognitive development compared to traditional teaching methods.

Investigate Interactive Learning Tools to Enhance the Creative Skills of Primary School Learners in Dance Education

TABLE 3 Compare Variance of Class Interactive Learning Tools and Variance of Class Traditional Teaching Methods (Before Learning) on Creative Skills

Class	df	Mean	Variance	F
Interactive Learning Tools	44	32.38	6.104	1.143
Traditional Teaching Methods	44	32.98	5.340	

TABLE 4 Compare Average Achievement of Interactive Learning Tools and Traditional Teaching Methods on Creative Skills

Class	Mean	Variance	df	t
Integrating Pro Tools Technology	38.06	1.47	86	7.37
Traditional Teaching Methods	31.65	24.13		

The study focuses on Class 1 and Class 2 in the Hubei Hope Primary School. It compares the impact of interactive learning tools in dance education (experimental group) versus traditional teaching methods (control group) on students' creative skills, aiming to explore the effectiveness of interactive learning tools in dance education.

$F_{0.025,44,44} = 0.550 < F_{compute} = 1.143 < F_{0.975,44,44} = 1.820$ means the test variance of class interactive learning tools equals the variance of class traditional teaching methods. So, after learning, use the t-test to equal the variance. $t_{compute} = 7.37 > t_{0.05,86} = 1.997$, which showed that significantly greater than the critical value, the null hypothesis was rejected, indicating that the mean post-test score of the experimental group was significantly higher than that of the control group.

There are no significant differences in the mean values and variances of the pre-test data between the two groups, indicating that the experimental and control groups have similar initial levels. The post-test data show that interactive learning tools significantly improve students' creative skills, with the mean post-test score of the experimental group being higher than that of the control group. Therefore, the conclusion is that interactive learning tools can significantly enhance students' creative skills compared to traditional teaching methods.

Primary School Learners Are Satisfied with The Interactive Learning Tools in Dance Education

The averages, standard deviations, and interpretations of the impact of interactive learning tools on students' satisfaction across four dimensions: course content satisfaction, interactive tools satisfaction, learning outcomes satisfaction, and teacher-student interaction satisfaction are presented in Table 5. For course content satisfaction, the average scores for the five questions ranged from 3.38 to 3.69, with a total average of 3.57 and a standard deviation of 0.964. The interpretation indicates that students agreed that the course content met their expectations, except for Q4, where responses were neutral. In the dimension of interactive tools satisfaction, the total average score was 3.54, with a standard deviation of 1.005. Students agreed with Q6 and Q10, while their responses to Q7, Q8, and Q9 were neutral, suggesting a mix of positive and moderate feedback on the tools used in the learning process. For learning outcomes satisfaction, the total average score was 3.44, with a standard deviation of 1.038. While students agreed with Q11 and Q15, their responses to Q12, Q13, and Q14 were neutral, indicating a more reserved perception of the tools' impact on their learning outcomes. Finally, in the dimension of teacher-student interaction satisfaction, the total average score was 3.45, with a standard deviation of 1.048. Only Q18 received an "agree" interpretation, while responses to the other questions were neutral. This suggests a need for improvement in fostering stronger interactions between teachers and students using interactive learning tools. The findings show that while students generally had a positive perception of the interactive learning tools, their satisfaction levels varied across specific dimensions and questions, highlighting areas that require further enhancement.

TABLE 5 Show Average, Standard Deviation, And Interpretation of the Impact of the Interactive Learning Tools On Students' Satisfaction

	Questions	Average	Std. Deviation	Interpretation
Course Content Satisfaction	Q1	3.69	0.812	Agree
	Q2	3.65	0.981	Agree
	Q3	3.60	0.982	Agree
	Q4	3.38	1.060	Neutral
	Q5	3.53	0.986	Agree
Total		3.57	0.964	Agree
Interactive Tools Satisfaction	Q6	3.66	0.899	Agree
	Q7	3.48	1.024	Neutral
	Q8	3.53	1.054	Neutral
	Q9	3.37	1.139	Neutral
	Q10	3.67	0.911	Agree
Total		3.54	1.005	Agree
Learning Outcomes Satisfaction	Q11	3.53	0.891	Agree
	Q12	3.41	1.014	Neutral
	Q13	3.40	1.142	Neutral
	Q14	3.36	1.110	Neutral
	Q15	3.50	1.030	Agree
Total		3.44	1.038	Neutral
Teacher-Student Interaction Satisfaction	Q16	3.40	0.975	Neutral
	Q17	3.49	1.049	Neutral
	Q18	3.52	1.054	Agree
	Q19	3.49	1.067	Neutral
	Q20	3.35	1.097	Neutral
Total		3.45	1.048	Neutral

Discussion

The result that interactive learning tools enhance the cognitive development of primary school learners in dance education suggests that these tools can significantly contribute to students' intellectual growth and understanding of dance concepts. Interactive tools, such as motion capture systems, video feedback, and virtual platforms, provide students with visual and real-time feedback, which helps reinforce their learning. This enables them to understand complex movements better, develop spatial awareness, and improve their memory retention of dance routines (Kirakosian et al., 2021). Additionally, interactive tools may support personalized learning by catering to different learning paces, allowing students to revisit specific movements and techniques until they master them (Chan et al., 2019). The cognitive benefits can extend beyond just dance techniques; these tools can also foster critical thinking, problem-solving, and creativity as students engage with challenges in the learning process and explore innovative ways to express

themselves. The interactivity of the tools keeps students engaged, making the learning process more dynamic and stimulating, which can result in improved concentration and mental processing (Coogan, 2021).

The result that interactive learning tools enhance the creative skills of primary school learners in dance education suggests that technology can significantly support the development of students' artistic expression and innovation. Using tools such as virtual reality, motion capture, or digital choreography platforms, students can explore different movement possibilities, experiment with their creative ideas, and gain immediate feedback on their performances (Chan et al., 2019). These tools encourage students to push the boundaries of their creativity by offering diverse ways to visualize, modify, and remix dance movements, thus fostering an environment where creativity is actively nurtured. Interactive learning tools also provide students with a more immersive and engaging learning experience. For example, when students can manipulate visual representations of their movements or collaborate with virtual partners, they may be more likely to take risks and try new, creative approaches without fearing making mistakes. The instant feedback these tools provide helps students refine their work and explore new ideas more effectively (Bojner Horwitz et al., 2022), further enhancing their creative development. Moreover, engaging with technology in an artistic context exposes students to new forms of creativity, integrating digital tools with their dance expression in ways that may not be possible through traditional methods alone (Carmona, 2021).

The results highlight the potential and limitations of interactive learning tools in dance education. Students' general agreement on course content satisfaction suggests that these tools can effectively enhance the relevance and engagement of learning materials. This demonstrates their role in supporting structured and dynamic content delivery, making the learning experience more enjoyable and accessible (Chan et al., 2019). However, the mixed feedback on tool satisfaction and the neutral responses in learning outcomes and teacher-student interaction point to areas where these tools could be improved (Angelov, 2023). While they provide valuable resources for learning, their usability, adaptability, and ability to foster deeper cognitive and creative engagement need refinement. Similarly, the limited impact on teacher-student interaction suggests that these tools should be better integrated into teaching strategies to enhance communication and personalized guidance (Carmona, 2021).

5. Conclusion

This study investigates the impact of interactive learning tools on sixth-grade primary school students' cognitive development and dance creativity. Amidst the growing prevalence of interactive learning tools in education, these instruments present a unique opportunity to foster cognitive growth within dance education. Interactive learning tools enhance primary school learners' cognitive development and creative skills in dance education. The primary school learners are satisfied with the interactive learning tools in dance education.

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STUDENTS' PERCEPTION OF THE 6-STEP COLLABORATIVE LEARNING MODEL ON THEIR ENGLISH SKILLS IMPROVEMENT

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ABSTRACT

The 6-step collaborative learning model is one of the teaching modes of an efficient classroom. This study explores the six-step collaborative learning method's key role in improving middle school students' English skills in Jianshui Experimental Middle School. Recognizing that the six-step cooperative learning method is the key to effectively improving middle school students' English skills, this study uses a quantitative method to analyze the cognition and perception of the six-step cooperative teaching method. This study includes the students and teachers of Jianshui Experimental Middle School. The research objectives are as follows: 1) The influence of the six-step efficient teaching mode on the English skills of middle school students. 2) Teachers and students using the 6-step collaborative learning model view this teaching method. 3) Factors influencing the implementation of the six-step teaching method, Based on Krejcie and Morgan's table. One thousand students were selected for the questionnaires, and 14 teachers were selected for the interviews. The study is a mixed method of quantitative and qualitative research. Teachers and students who use the six-step method generally believe it can improve their English skills, mainly listening, speaking, reading, and writing skills. This study shows that the study should emphasize the importance of the 6-step collaborative learning model, which is of great help to the improvement of English skills of middle school students, improves their interest in English learning, and requires teachers to implement a 6-step collaborative learning model and innovate teaching methods strictly.

Keywords: 6-step collaborative learning model, middle school students, English skills

1. Introduction

Integrating collaborative learning models into language education has garnered significant attention in recent decades, driven by the need to enhance students' communicative competence and critical thinking skills. Among these frameworks, the 6-step collaborative learning model (CLM) has emerged as a structured approach to foster peer interaction, shared responsibility, and reflective practice in language acquisition. While existing studies have explored the efficacy of collaborative strategies in improving English proficiency, limited research has focused on *students' perceptions* of systematic multi-step models like the 6-step CLM, particularly concerning its impact on discrete language skills such as speaking, writing, listening, and integrated communication. This gap underscores the importance of investigating how learners interpret and internalize the stages of this model—ranging from goal-setting to peer evaluation—and how these experiences shape their linguistic development.

Current literature emphasizes that collaborative learning enhances motivation and reduces anxiety in language classrooms by creating a supportive environment for risk-taking and feedback exchange. However, standardized models like the 6-step CLM, which methodically guides students through preparation, role allocation, task execution, and reflection, remain underexplored. A deeper understanding of student perspectives is critical, as their engagement and satisfaction directly influence the model's effectiveness. For instance, do learners perceive structured collaboration as a catalyst for skill improvement, or do they view it as overly rigid compared to traditional methods? How do specific steps, such as peer feedback or group accountability, contribute to their confidence in English?

This study addresses these questions by analyzing students' qualitative and quantitative evaluations of the 6-step CLM in an English as a Second Language (ESL) context. The research aims to provide educators with actionable strategies for optimizing collaborative pedagogy by bridging the gap between theoretical frameworks and learner-centric insights. Furthermore, it seeks to contribute to the broader discourse on language education by highlighting the interplay between structured collaboration, metacognitive awareness, and skill-specific outcomes. The findings will validate or challenge existing assumptions about collaborative models and offer a nuanced road map for adapting such frameworks to diverse educational settings.

The subsequent sections of this paper will delineate the theoretical foundations of the 6-step CLM, outline the methodology for capturing student perceptions, present empirical results, and discuss implications for curriculum design and future research. The study advocates for a learner-centered evolution of collaborative language teaching practices through this exploration.

2. Literature Review

The 6-step collaborative learning model (CLM) and its impact on language acquisition have been explored through various theoretical and empirical lenses. Chapter 2 will be divided into three main parts to show the content stated in this chapter. The first part will detail the instructional approach (Deshler & Lenz, 1989). What kinds of instructional approaches are used, and what instructional approach will be used in this paper? The collaborative learning approach. The second part will describe in detail the 6-step collaborative learning: a warm-up session,

introduction session, thinking session, discussion session, presentation session, and comment session. The third part introduces the English skills of middle school students and the four essential English skills that middle school students need: reading abilities, reading abilities, listening skills, and speaking skills (Margulies, 2024).

6-step collaborative learning model

The 6-step collaborative learning model has changed the traditional teaching mode and educational ideology, conforming to the new curriculum standards' educational philosophy, effectively improving students' academic performance, and enhancing their comprehensive abilities, laying a solid foundation for their future development. The 6-step collaborative learning model enhances students' self-learning ability. The thinking section in the 6-step collaborative learning model requires students to preview new learning content and focus on self-learning in the classroom, which greatly helps students' self-learning ability. The awareness of collaborative inquiry has been improved. The discussion link in the 6-step collaborative learning model requires collaborative learning so that students can understand mutual help and respect and carry out a reasonable vision of labor. This not only strengthens the understanding between students but also enables them to understand that the collective power is strong and that they should learn to tolerate and communicate. The 6-step collaborative learning model enhances students' confidence. The 6-step collaborative learning model is student-centered and led by teachers, allowing each student to fully utilize their talents, truly teach according to their aptitude, and allow every grass to bloom its flowers. This enhances students' confidence, clarifies their outlook on life and values, and lays a solid foundation for their future development. Liberating teachers from the classroom and integrating modern educational concepts has indeed achieved the goal of returning the classroom to students, putting students at the center, making their learning process a process of exploration and discovery, genuinely becoming the subject of cognition, enhancing their thirst for knowledge, and thus improving their learning ability, genuinely reflecting the spirit of students' "learning autonomy."

English skills

English skills encompass a range of linguistic, cognitive, and communicative competencies that enable individuals to understand, produce, and interact in English effectively. These skills are broadly categorized into core domains and integrated abilities, each contributing to holistic language proficiency.

English skills are dynamic and context-dependent, evolving through practice, feedback, and exposure. Modern pedagogical approaches, such as collaborative learning models, aim to bridge gaps between isolated skill training and real-world application, ensuring learners develop technical mastery and adaptive communicative strategies. Understanding these dimensions is critical for designing interventions that target specific skill improvements, as explored in studies on collaborative learning efficacy (JingXuan, 2024).

3. Research Method

Design

This study explores the relationship between the six-step learning model and improving students' English skills. Specifically, this study aims to explain how implementing the six-step learning model improves middle school students' English skills. This study will include one main factor: implementing the six links of the six-step collaborative learning model. First, it will involve a systematic analysis of four variables of students: students' listening skills, writing skills, reading skills, and speaking skills. Moreover, every link in the six-step learning model should be researched. The design of this study belongs to a correlational study. The correlation study examines the potential relationship between two variables (six-step collaborative learning models and English skills). In this study design, researchers will quantify two variables relevant to their research question and then statistically determine if they are related (Magnusson, 2020).

The purpose is to explore the correlation between the six-step learning model and the improvement of middle school students' English skills to understand better how this main factor affects English skills. (Pangket, 2019). Secondly, from the perspective of implementing the six-step learning model, the impact of the six-step collaborative learning model on students' English skills will be analyzed. This analysis will include a comprehensive investigation of the warm-up, introduction, thinking, discussion, presentation, and review sessions. In this regard, we also will investigate the impact of each session of the six-step collaborative learning model on each skill in English skills.

Research instrument

Questionnaire

Based on the previous theoretical research, the researcher will divide English skills into four dimensions: listening, reading, writing, and speaking. (Hinkel, 2006). According to the requirements of the course standards for secondary school students, teaching and assessment activities should refer to students' English proficiency and corresponding levels. (Cheng, 2011). Considering the situation of uneven educational development in China and recognizing that curriculum standards do not uniformly stipulate the content scope of first-level English language knowledge, this study excludes the dimension of investment in English knowledge in the curriculum from the dimension of learning participation. English skills will be divided into four variable dimensions: listening, reading, writing, and speaking skills. First, in terms of listening skills, students can understand correct words and sentences, identify or point out pictures or objects, understand teacher or student instructions, and complete simple listening content. Able to understand most sentences and simple content communications. Stories can be imitated based on recordings. Able to exchange simple greetings. Secondly, the reading dimension includes six indicators: being able to recognize and read the words learned; being able to read simple words according to the rules of spelling; being able to read brief requirements or instructions in textbooks; being able to understand simple information expressed in greeting cards and other; Be able to read simple stories or short passages with the help of pictures; and develop the habit of reading according to meaning, and be able to read the learned stories or short passages correctly. Third, the writing dimension includes four indicators: the ability to use uppercase and lowercase letters and commonly used

punctuation marks correctly; the ability to write simple greetings and blessings; the ability to write short sentences based on prompts from pictures, words, or examples; Able to write simple compositions. Finally, according to the curriculum standards, English skills are assessed through two indicators: a listening test and a test on reading, writing, and grammar, consistent with the overall goals and language proficiency standards at the end of the first grade. In addition, the options for each program are structured based on the specific requirements that students will need to meet as they approach the end of the initial phase of Level 1 objectives.

In summary, the variables measured in this study will be established from historical literature, relevant questionnaires used in previous studies, discussions with peers and teachers, student pilot testing, and brainstorming sessions with mentors.

Interview

Discussion is a key indicator of student participation and will penetrate all parts of the questionnaire design. High-quality discussions can promote deep learning and improve students' critical thinking skills. Therefore, the questionnaire will include frequency of discussion, richness of discussion content, and application of discussion results. Furthermore, the options for each item are constructed based on the specific needs that students need to meet near the end of the initial phase of the first-level goal.

Data collection and analysis

This study will conduct a descriptive statistical analysis on various dimensions and measurement indicators of the impact of the six-step learning model on middle school students' English skills, including the calculation of means and standard deviations. Frequency analysis will be performed on the collected basic data, such as statistics on gender distribution, age, and grade. The characteristics of the sample (such as basic behavior or cognitive attitude correlation) can also be used to summarize and compare different groups of people, such as gender, age, and other different groups, to see the differences in their attitudes towards the items, analysis of variance or complex descriptive analysis can be used. Descriptive analysis will mainly describe the basic information of the respondents, such as gender, education, and age. Finally, summarize the required data into tables or charts (pie charts/bar charts), supplemented by text descriptions to clarify the results. Analyze the questionnaire's mean, standard deviation, percentage, and frequency.

The interview results on whether participating in the six-step learning model will affect the English skills of middle school students will be analyzed based on the text information in the interview records, including the degree of impact of each session of the six-step learning model on English skills, and the impact of the warm-up session on English skills. Thematic analysis was carried out in six categories: degree influence, impact on English skills in the introduction stage, impact on English skills in the thinking stage, impact on English skills in the discussion stage, impact on English skills in the presentation stage, and impact on English skills in the review session, and then the interviews were organized and classified according to these six categories. Researchers and experts will interpret this topic.

4. Research Findings

Question (RQ1): How do EFL students perceive their teachers' six-step collaborative learning model on their English skills improvement?

In response to the first research question, based on the previous theoretical research, the researcher will divide English skills into four dimensions: listening, reading, writing, and speaking. (Hinkel, 2006). According to the requirements of the course standards for secondary school students, teaching and assessment activities should refer to students' English proficiency and corresponding levels. (Cheng, 2011). Considering the situation of uneven educational development in China and recognizing that curriculum standards do not uniformly stipulate the content scope of first-level English language knowledge, this study excludes the dimension of investment in English knowledge in the curriculum from the dimension of learning participation. English skills will be divided into four variable dimensions: listening, reading, writing, and speaking skills. First, in terms of listening skills, students can understand correct words and sentences, identify or point out pictures or objects, understand teacher or student instructions, and complete simple listening content. Able to understand most sentences and simple content communications. Stories can be imitated based on recordings. Able to exchange simple greetings. Secondly, the reading dimension includes six indicators: being able to recognize and read the words learned; being able to read simple words according to the rules of spelling; being able to read brief requirements or instructions in textbooks; being able to understand simple information expressed in greeting cards and other; Be able to read simple stories or short passages with the help of pictures; and develop the habit of reading according to meaning, and be able to read the learned stories or short passages correctly. Third, the writing dimension includes four indicators: the ability to use uppercase and lowercase letters and commonly used punctuation marks correctly; the ability to write simple greetings and blessings; the ability to write short sentences based on prompts from pictures, words, or examples; Able to write simple compositions. Finally, according to the curriculum standards, English skills are assessed through two indicators: a listening test, a test on reading, writing, and grammar, consistent with the overall goals, and language proficiency standards at the end of the first grade. In addition, the options for each program are structured based on the specific requirements that students will need to meet as they approach the end of the initial phase of Level 1 objectives.

In summary, the variables measured in this study will be established from historical literature, relevant questionnaires used in previous studies, discussions with peers and teachers, student pilot testing, and brainstorming sessions with mentors.

About Questionnaire Structure, "The formal questionnaire for this study consists of two main parts, with a total of 24 questions. It will be divided into closed questions. The specific structure will be as follows: The questionnaire contains 1) Warm-up stage (4 closed questions), 2) Introduction (4 closed questions), 3) Thinking session (4 closed questions), 4) Discussion session (4 closed questions), 5) Display session (4 closed questions), 6) Review session (4closed questions).

This questionnaire will also include the student's school age and grade. This section will introduce in detail all parts of the six-step collaborative learning model: warm-up session,

introduction session, thinking session, discussion session, display session, and review session. The survey content will revolve around students' interest in learning English, analysis of the progress of English class forms, understanding of students' learning status, and the impact of the six-step learning model on improving middle school students English skills. (Note: The "grade" item was added to the questionnaire to exclude the possibility of responses from students not in the first grade of junior high school.) In order to protect students' privacy, this questionnaire was conducted anonymously. Table 3-1 in the attachment will present the overall questionnaire structure. The design of questionnaires is a craft the medical profession has badly neglected. A questionnaire should be appropriate, intelligible, unambiguous, unbiased, capable of coping with all possible responses, satisfactorily coded, piloted, and ethical. The key steps in designing a questionnaire are to decide what data you need, select items for inclusion, design the individual questions, compose the wording, design the layout and presentation, think about coding, prepare the first draft and pretest, pilot, and evaluate the form, and perform the survey. (Stone, 1993).

Research Question (RQ2): According to their perceptions, how can the six steps of CLM improve their English skills (the answer will be through interview)

The interview method refers to a job analysis method in which job analysts deepen their understanding of employees' work and obtain job information through face-to-face communication with employees. An interview survey is an interviewer who asks relevant questions to the interviewees orally according to the needs of the investigation and collects objective factual materials through the interviewees' responses. This investigation method is flexible, convenient, and feasible and can be provided to the interviewees according to the research needs. Different types of people understand different types of material. An interview survey is a direct communication between the interviewer and the respondent. Through the interviewer's efforts, the respondent can eliminate worries, relax, and think carefully before answering the questions. This improves the authenticity and reliability of the survey materials. (Cannell & Laurent, 1977)

In order to gain a deeper understanding of the correlation between the six-step learning model and improving middle school students' English skills, in addition to using questionnaires, interview methods were also used to make the research content more comprehensive, and the research results more reliable and valid. The interview questions included all aspects of the six-part learning model and students' English skills. The interviewer will select three first-grade students from Jianshui Experimental Middle School in Jianshui County to participate. The first student will randomly select one of the students with the best English scores, and the second student will choose one from the students with average English scores. The last student chose one of the students with the worst English scores to make the research results more comprehensive.

The interview content mainly includes the basic information of the interviewee, such as name grade and six open-ended questions related to the topic of this research. The interview questions will include: can you improve your English skills? 2. What are the problems with

learning English skills? 3. What are the advantages of learning English skills? 4. What is the weakness of learning English skills? 5. the difficulties of learning English skills ?6.the most English skills to master? The interview structure will be as follows: The contains: 1) Warm-up stage (1 open-ended questions), 2) Introduction (1 open-ended questions), 3)Thinking session (1 open-ended questions), 4)Discussion session (1 open-ended questions), 5)Display session (1 open-ended questions), 6) Review session (1 open-ended questions). The overall interview structure will be presented in Table 3-2 in the attachment.

Discussion

Discussion of Warm-up Session

In the variance analysis, it was found that the warm-up session had a significant impact on English listening, speaking, reading, and writing skills. According to the research results, participants' views on the strict implementation of the warm-up showed significant differences. In the sample, 91 students (10.6%) completely disagreed with the strict improvement of English listening skills during the warm-up, 36 students (3.4%) disagreed, 177 students (16.6%) were neutral, 506 students (47.8%) agreed, and 523 students (21.6%) strongly agreed.

From the average value of each option, there are obvious differences in students' improvement of English listening skills in the warm-up session. Within the range of score 1 (complete disagree) to score 5 (firmly consent), the average student score gradually increased from 1.70 to 4.53, showing a trend of gradual increase. To sum up, there is a significant correlation between the strict implementation of the warm-up session before class and improving English listening skills. Teachers can focus more on implementing the warm-up to improve students' listening skills. However, individual differences and other factors affecting listening skills should also be noted to provide a more comprehensive reference for teaching practice.

Meaning is divided into the "Good" and "Moderate" categories. It can be seen that the warm-up session before class for improving their English listening, oral performance in reading and writing, the perception of listening skills is positively correlated with the implementation of the warm-up session before class ($\beta = 0.28$, $t = 5.96$, $p < 0.001$), indicating that students think the warm-up session before class can effectively improve their English listening skills. The perception of the improvement of oral English skills was also positively correlated with the implementation of the warm-up before class ($\beta = 0.44$, $t = 8.52$, $p < 0.001$), and the influence degree was greater than English listening, indicating that students thought that the warm-up before class plays a more significant role in the improvement of English oral skills. The perception of improving English reading skills was positively correlated with implementing the warm-up session before class. However, the impact was small ($\beta = 0.04$, $t = 3.24$, $p = 0.001$), indicating that students believed that the warm-up session had limited effect on improving English reading skills. The relationship between the perception of improving English writing skills and implementing the discussion session was insignificant ($\beta = 0.05$, $t = 1.15$, $p = 0.251$), indicating that students generally believe that the discussion session had no significant impact on improving English writing skills.

The warm-up session significantly improves students' English listening and speaking skills. However, it has a limited impact on improving English reading and writing skills. Therefore, it is

suggested that teachers should pay more attention to training listening and oral skills when designing the warm-up session before class and consider how to better integrate these into improving reading and writing skills. At the same time, future studies can further explore the discussion session's design optimization and practical effect evaluation. Teachers can design more effective warm-up activities based on these results in English teaching practice to promote students' English learning better and improve their comprehensive ability.

Discussion of Introduction Session

Most indicators averaged between 3.97 and 4.00, indicating a significant difference in student perception of the introduction session in improving English writing skills. It can be seen from the changing trend of the mean that with the increase in students' recognition of the introduction link, their perception of the introduction link in improving English writing skills is also enhanced. This result partly supports the importance of the introduction session in improving English writing skills. The introduction session showed a significant positive correlation between spoken English and English listening skills, with correlation coefficients of 0.86 ($p < 0.01$) and 0.83 ($p < 0.01$), respectively. This suggests an effective introduction to the learning process can help improve students' oral and listening abilities. The introduction session also showed a significant positive correlation between English reading and writing skills, with correlation coefficients of 0.84 ($p < 0.01$) and 0.85 ($p < 0.01$), respectively. This shows that students' reading and writing abilities can be promoted by designing appropriate introduction links. However, it is worth noting that there are still some students (74 students) who are entirely negative about the role of the introduction process in improving their English writing skills, which may be related to the student's personal learning style, learning habits, and understanding of the introduction process. Therefore, in future teaching, teachers should pay more attention to the design and implementation of the introduction link to meet students' needs better and improve the teaching effect.

In summary, the introduction process is important in English learning and can help students improve various language skills. Therefore, in teaching practice, teachers should pay attention to the design and implementation of the introduction link to better promote students' English learning effect. It is suggested that teachers fully consider the needs and characteristics of students when designing the introduction link to play a better role in improving English writing skills.

Discussion of Thinking Session

This study aims to explore the influence of thinking on improving English listening skills and the correlation of the strictness of teachers in the thinking process. Through ANOVance analysis, we found that the thinking session significantly affected English listening skills improvement, $F(4,931) = 175.695$, $p < 0.001$. Further analysis of the differences between the groups found that the participants who believed that thinking could help improve English listening skills significantly differed in the degree of rigor in the thinking session. Specifically, among the participants who can significantly improve their English listening skills in the thinking session, the rigor of the teachers in the thinking session is generally high. Among them, participants who strongly agreed that the

thinking session could improve English listening skills had the highest mean level of rigor ($M = 4.68$, $SD = 0.85$), followed by consent group ($M = 4.04$, $SD = 0.80$), neutral group ($M = 3.73$, $SD = 1.01$), disapproval group ($M = 3.42$, $SD = 1.21$), and complete disapproval group ($M = 1.89$, $SD = 1.54$).

In conclusion, the results of this study show that the thinking session significantly impacts the improvement of English listening skills, and there is a correlation between the evaluation of the severity of the teachers and their cognition of the effect of the thinking link. This finding is that the correlation coefficient of practical English listening skills and the thinking link was 0.88, $p < 0.01$, indicating that the thinking link significantly positively impacts improving English listening skills. The correlation coefficient between oral English skills and the thinking session was 0.78, $p < 0.01$, indicating that the thinking session also significantly improved oral English skills. The correlation coefficient between English reading skills and the thinking session was 0.78, $p < 0.01$, indicating that the thinking session also significantly improved English reading skills. The correlation coefficient between English writing skills and the thinking session was 0.85, $p < 0.01$, indicating that the thinking session significantly improved English writing skills. Based on the above analysis results, we show that thinking significantly impacts the improvement of English listening, speaking, reading, and writing skills. Therefore, we can conclude that active thinking sessions can help improve English learners' comprehensive language skills, including listening, speaking, reading, and writing. In English learning, learners can deepen their understanding of language knowledge and improve their language useability through thinking and reflection to achieve better learning results. However, this study also has some limitations, such as a small sample size and limited research scope, and future research can further expand the sample size and deeply explore the relationship between thinking links and English learning to obtain a more comprehensive and in-depth understanding.

Discussion of Discussion Session

The results showed significant differences in the students' views on the strict implementation of the teachers during the discussion session ($F=226.481$, $p < 0.05$). Specifically, the mean value was 1.61 for "totally disagrees", 2.97 for "disagree", 3.59 for "neutral", 4.05 for "agree," and 4.70 for "strongly agree". It shows a correlation between students' cognition of the teacher strictly implemented during the discussion session and whether the discussion session can help improve their English writing skills. In conclusion, there is a significant relationship between the teacher's strict implementation during the discussion session and the student's belief that the discussion session could help improve their English writing skills. Therefore, in English education, teachers should focus on implementing the discussion link to improve students' English writing skills. Further research could explore how to optimize the design of the discussion session to promote students' English writing ability better. From the perspective of the mean value of each option, there are apparent differences in students' improvement of English listening skills during the discussion. Within the range of score 1 (completely disagree) to score 5 (strongly consent), the average student score gradually increased from 3.89 to 3.98, showing a gradual increase.

In conclusion, there is a significant correlation between the strict implementation of the discussion session and improving English listening skills. Teachers can focus more on implementing the warm-up to improve students' listening skills. However, individual differences and other factors

affecting listening skills should also be noted to provide a more comprehensive reference basis for teaching practice. Meaning is divided into the "Good" and "Moderate" categories.

Discussion of Display Session

The table shows significant differences in the participants' views on whether the presentation could help improve their English listening skills. Specifically, for the "totally disagrees" group, the mean was 1.71 (SD=1.38), 3.02 (SD=1.35) for the "disagree" group, 3.60 (SD=1.04) for the "neutral" group, 4.07 (SD=0.77) for the "agree" group and 4.74 (SD=0.79) for the "strongly agree" group. Therefore, whether the teacher strictly implements the presentation session significantly impacts the participants' views on whether the presentation session can improve their English listening skills. In English teaching, attention should be paid to implementing the demonstration link to improve students' listening skills. Future studies could further explore the impact of other factors on English listening skills improvement to develop more effective teaching strategies. Table 1 shows each item's mean value, standard deviation, and correlation coefficients. The results of Pearson's correlation analysis showed that: 1. There was a significant positive correlation between the presentation and the improvement of English listening skills ($r=0.82^{**}$, $p<0.01$), indicating that the presentation had a positive impact on the improvement of students' English listening skills. 2. There was also a significant positive relationship between the presentation and the improvement of oral English skills ($r=0.84^{**}$, $p<0.01$), which showed that the presentation played a significant role in the improvement of students' oral English skills. 3. Similarly, there was a significant positive correlation between the presentation session and improvement in English reading skills ($r=0.82$, $p<0.01$) and improvement in English writing skills ($r=0.83$, $p<0.01$). During the demonstration, there was a significant positive correlation between the teacher's execution and the improvement of English listening, speaking, reading, and writing skills (r values were 0.64, 0.68, 0.64 and 0.62, respectively, $p<0.01$), indicating that the teacher's strict implementation had a positive effect on the improvement of various English skills. The results of this study support the positive role of presentation sessions in improving student skills in English teaching. Through practical participation and presentation, students can better use what they have learned and improve their comprehension of English listening, speaking, reading, and writing. In addition, the teacher's strict implementation is crucial to ensure the effectiveness of the display link, and the teacher's supervision and guidance can help students complete the display task better and improve the learning effect. However, this study has limitations, such as a small sample size and a single data source. Future studies could further expand the sample size with multiple data sources to improve the reliability and universality of the findings. In this study, Pearson's correlation coefficient analysis verified the positive impact on improving students' English listening, speaking, reading, and writing skills and the positive correlation between the teacher's performance and the improvement of each skill. These results provide a useful reference for English teaching, and it is suggested that teachers make full use of the demonstration link in English teaching and strengthen the supervision and guidance of teachers to improve students' comprehensive English application ability.

Discussion of Discussion Session

Students' awareness of whether the comments can improve their English listening skills increased (from completely disagree to very agree), and the strict scores of the teachers in the review process also gradually increased. Specifically, when the students think the comments could not improve their English listening skills (completely disagree), they scored the lowest rigor (mean =1.51). When they think the comments can significantly improve their English listening skills (strongly agree), they scored the highest rigor (mean =4.70). To sum up, there is a significant relationship between the teachers' strict implementation of the comments and the student's belief that the comments can help improve their English writing skills. Therefore, teachers should consider implementing the comment link in English education to improve students' English writing skills. Further research can explore how to optimize the design of the review session to promote students' English writing ability better. This study found a significant positive correlation between the student's perception of whether the review session could improve their English listening skills and their evaluation of the rigor of the teacher's performance during the review session. This finding indicates that when students have a positive cognitive attitude towards the review session, they are more inclined to think that the teacher strictly enforced it. This may be because strict implementation can ensure the effectiveness of the review so that students recognize the role of the review in improving English listening skills. In addition, this study also found that as students' awareness of the review process increased, their ratings of teacher implementation rigor also gradually increased. This trend further supports the view that students' evaluation of the review session is closely related to their perception of the rigor of teacher implementation. Therefore, to improve the comments' effectiveness and promote the improvement of students' English listening skills, teachers should strengthen the management and monitoring of the comments to ensure deep and practical comments.

To sum up, commenting plays an important role in learning English. Through effective design and strict implementation of comments, students' English listening, speaking, reading, and writing skills can be significantly improved, providing strong support for English education. Future studies could further explore the impact of different types of comments on English learning skills and how to optimize the design of comments to improve the teaching effect.

5. Conclusion

The analysis found that in terms of gender distribution, there were 1300 individuals in the valid study population, and the distribution of males and females was roughly comparable. The male population was 610 (46.9%), representing most of the study population, indicating that males were slightly lower than females. The number of women was 690 (53.1%), slightly higher than for men.

The age distribution is divided into four categories: "other" categories represented by the first, second, third, and no middle school, representing individuals who do not belong to the above grade. The highest number of the junior year one student was 1,000 (76.9%), indicating that most of the study population belonged to this age group. The number of students in grade two is 200 (15.3%), accounting for a relatively small proportion of 100 (7.6%), indicating that this age group

represented a relatively small proportion of individuals in the study population. The "Other" category has the least 0 (0%) and may represent outliers or those not attending secondary school. The age distribution is divided into four categories: "other" categories represented by the first, second, third, and no middle school, representing individuals who do not belong to the above grade. The highest number of the junior year one student was 1,000 (76.9%), indicating that most of the study population belonged to this age group. The number of students in grade two is 200 (15.3%), accounting for a relatively small proportion of 100 (7.6%), indicating that this age group represented a relatively small proportion of individuals in the study population. The "Other" category has the least 0 (0%) and may represent outliers or those not attending secondary school.

In conclusion, the detailed data on demographic factors of seventh-grade middle students show the distribution characteristics of this group in gender and grade. These data provide a valuable reference for further research on the influence of the six-step teaching mode (warm-up, introduction, thinking, comment, presentation, and comment) on middle school students' English skills (listening, speaking, reading, and writing).

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BUDDHIST MEDITATION ACTIVITIES IN URBAN CHINA: A CASE STUDY OF THE CHAN HALL OF
Dafo si IN GUANGZHOU

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ABSTRACT

This study investigates the relationship between Buddhist meditation activities and people's psychological well-being. This study employs qualitative methods to form a more profound understanding of Buddhist meditation activities. Semi-structured interviews were conducted with eleven participants in the Hall of *Dafo si* in Guangzhou, China. This study used phenomenological techniques for its data analysis. Understanding these variations provides insight into the complexities of leadership legitimacy in multicultural societies. This study has found that Buddhist meditation plays an important role as a source of therapy among people who are dealing with mental health. Hence, this result provides insight to the government and organizations about maintaining mental health, which is rapidly growing globally. This study is one of the few studies that highlight the Chinese people's Buddhist meditation activities. Hence, the government needs to improve the alignment between meditation and people's mental health and a long-term strategy to combat this issue. This study gives a complete plan that combines technology and strategic meditation to help people live much better.

Keywords: Buddhist, Meditation, Mental Health, Psychological well-being, China

1. Introduction

Mental health has become a crucial issue in the fast-paced and high-pressure society. Stress, anxiety, and depression are on the rise, affecting individuals of all ages (Cowan & Cole, 2022; Dayani et al., 2025). The increasing demands of work, school, and social expectations and the pervasive influence of digital technology contribute to heightened mental distress. One of the most significant issues in mental health today is the prevalence of stress and anxiety disorders (Owens & Bunce, 2022; Scott et al., 2022). Many individuals experience chronic stress due to work pressure, financial struggles, academic challenges, or personal relationships (Asad et al., 2025). Meditation helps manage these stressors by calming the mind and reducing cortisol levels, the hormone responsible for stress (Valor et al., 2024; Walker, 2020). Depression is another major mental health concern, affecting millions worldwide. Meditation fosters self-awareness and emotional balance, allowing individuals to observe their thoughts without judgment. Mindfulness-based meditation has been shown to improve mood and decrease symptoms of depression by encouraging positive thinking and reducing rumination (Mao et al., 2023; Mamede et al., 2022; Pascoe et al., 2021). It also plays a crucial role in enhancing focus and cognitive function, including training the brain to remain present and improving attention span, memory, and decision-making abilities. It mainly benefits people and professionals who require mental clarity and productivity (Thepa, 2024).

Research has increasingly highlighted the effectiveness of meditation as a therapeutic tool for mental health treatment. However, meditation is gaining recognition beyond healthcare in other fields, such as business and education (Margulies, 2024). For instance, meditation-based therapies have shown a positive effect on people's mental health conditions, including anxiety, depression, and stress-related disorders (Lucero-Romero & Arias-Bolzmann, 2023; Skolzkov & Efremova, 2023). Integrating mindfulness practices into educational settings helps people enhance focus, emotional regulation, and overall well-being, leading to better academic performance and reduced psychological distress (Santos Alves Peixoto et al., 2022). Meditation has also been linked to improved decision-making, creativity, and workplace well-being in the business sector. **Loving-Kindness Meditation (LKM)** plays a pivotal role in shaping customer attitudes and behaviors. Research suggests that individuals who engage in LKM tend to develop higher levels of empathy and compassion, positively influencing their consumer choices and interactions with brands (Tosatti & Khamash, 2024; Valor et al., 2024). Companies that incorporate mindfulness practices can foster ethical decision-making and stronger customer relationships. On the other hand, religious mindfulness meditation or prayer is widely used as a spiritual coping strategy to reduce stress and anxiety among peoples (Areskou Sandberg et al., 2024; Walker, 2020; Wongtongkam & Bhavanaveeranusith, 2019).

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distress. Meditation has also been linked to improved decision-making, creativity, and workplace well-being in the business sector. Loving-Kindness Meditation (LKM) plays a pivotal role in shaping customer attitudes and behaviors. Research suggests that individuals who engage in LKM tend to develop higher levels of empathy and compassion, which positively influences their consumer choices and interactions with brands (Mao et al., 2023; Tosatti & Khamash, 2024; Valor et al., 2024). Companies that incorporate mindfulness practices can foster ethical decision-making and stronger customer relationships. On the other hand, religious mindfulness meditation or prayer is widely used as a spiritual coping strategy to reduce stress and anxiety among people (Owen & Bunce, 2022; Walker, 2020; Wongtongkam & Bhavanaveeranusith, 2019).

Some regions, such as China, have applied Buddhist therapy as a means of promoting psychological well-being (Wang et al., 2022; Zhang et al., 2023). Buddhist meditation has been widely recognized for its benefits in reducing stress, enhancing emotional balance, and fostering mindfulness (Fraser & Gregory, 2024; Zhang et al., 2020). Furthermore, prior research on Buddhist meditation in China has primarily concentrated on temples in rural or underdeveloped regions. However, there is a **lack of research specifically examining the role of Buddhist meditation effect on mental health and psychological well-being among people**. Given the increasing levels of anxiety, stress, and emotional distress among people, it is essential to explore how Buddhist meditation can serve as a tool for mental well-being. The important questions arise: **How does Buddhist meditation impact peoples' mental health and overall well-being?** Additionally, different forms of Buddhist meditation, such as **Vipassana (insight meditation), Loving-Kindness Meditation (Metta), and Samatha (calm-abiding meditation)**, may influence people in distinct ways. Another critical area of inquiry is **how integrating Buddhist meditation into educational settings can contribute to mental stability, academic focus, and emotional resilience**, offering a holistic approach to mental health.

In answering these questions, this study contributes to the growing body of research on Buddhist meditation and mental health by exploring its specific impact on people. While mindfulness-based interventions have been widely studied in psychology and education, the role of **Buddhist meditation activities** in people's mental health remains underexplored. This research fills the gap by integrating Buddhist philosophical perspectives with contemporary psychological theories, **expanding Mindfulness Theory to extend the theory, which focuses on secular mindfulness practices, to** incorporate traditional Buddhist meditation techniques, providing a broader understanding of mindfulness as a holistic practice. The study enhances theories related to **people learning, mental resilience, and emotional intelligence**, reinforcing the role of meditation in academic and psychological well-being. In a practical context, this study can be applied in various fields, including education, mental health, and social well-being.

2. Literature Review

2.1. Mindfulness Meditation

Mindfulness meditation, derived from the Buddhist tradition, is a technique that has undergone substantial growth in contemporary metropolitan settings, including China. Chems-Maarif et al. (2025) define mindfulness as being consciously aware of the current moment, achieved

by purposefully directing one's attention without forming judgments. This practice facilitates individuals in gaining a more profound comprehension of themselves, their emotions, and their connections with their environment. Mindfulness meditation has the potential to alleviate symptoms of anxiety and depression while also enhancing overall quality of life (Edenfield & Saeed, 2012). Furthermore, this meditation practice enhances the capacity to handle difficult circumstances with greater composure and wisdom (Monteiro et al., 2024).

Furthermore, current research provides evidence for the efficacy of mindfulness meditation in urban environments. The self-efficacy of mindfulness meditation enhances attention, emotion management, and psychological well-being (Fan & Cui, 2024). Practicing mindfulness can offer substantial advantages in maintaining composure and concentration in city life's fast-paced and demanding nature.

Brown and Ryan (2003) pointed out that the core of mindfulness lies in paying attention to internal and external experiences with an open, accepting attitude and maintaining continuous awareness of one's actions. This allows individuals to act without being influenced by external factors, preventing automatic and mechanized reactions. Furthermore, Malik and Annabi (2022) and Sulosaari et al. (2022) found that mindfulness can enhance individuals' subjective well-being and alleviate burnout, particularly among individuals in professional occupations. Mindfulness facilitates a change in viewpoint, enabling individuals to observe their thoughts and emotions from a detached standpoint, hence diminishing attachment to negative thoughts (Bharti et al., 2023; Pascoe et al., 2021). Furthermore, mindfulness encompasses essential elements such as careful observation, detailed description, deliberate conscious action, non-reactivity to internal experiences, and non-judgment of events. All of these factors collectively contribute to enhanced mental well-being. Mindfulness meditation also enhances fundamental aspects of mental well-being, such as the acceptance of emotions and physical experiences (Borges et al., 2025; Remskar et al., 2024). It indicates that the acceptance component assists individuals in managing internal experiences by adopting an open and non-judgmental approach. This is crucial for minimizing emotional reactivity that may induce stress and other psychological problems. In addition, mindfulness meditation enhances individuals' ability to recognize and attend to their physiological feelings, aiding in alleviating pain and physical discomfort. Enhanced bodily awareness enhances general well-being by diminishing tension and promoting relaxation.

2.2. Buddhist meditation activities

The existing research on Buddhist meditation practices demonstrates diverse advantages, encompassing cognitive and physiological realms. Bray et al. (2022) and Shin ang et al. (2022) found that Chan meditation was found to have a substantial impact on reducing symptoms of depression and anxiety among individuals living in urban areas in China. Liu and Zhang (2020) discovered that practicing Chan meditation enhanced psychological well-being and life satisfaction by promoting heightened mindfulness and improved emotion regulation. Furthermore, Langgapin et al. (2024) confirm that Buddhist meditation can potentially enhance cognitive function and memory in elderly individuals residing in urban areas. Chan meditation enhances concentration and emotional equilibrium, which is crucial in high-pressure metropolitan settings. Cairns et al.

(2024) and Purser and Milillo (2015) emphasized that Buddhist meditation can enhance empathy and social connections among individuals who practice it, hence fostering increased social unity within urban areas. It is also helpful in controlling chronic pain and can serve as an alternative to traditional medical treatments, enhancing physical fitness and vitality. The advantages of this meditation are undeniably interconnected with the actions it entails. Meditation activities encompass a range of methods and exercises designed to attain tranquility of the mind, heightened consciousness, and spiritual flourishing. Furthermore, Chan meditation often incorporates walking meditation, known as *kinhin* (Kang, 2023).

3. Methodology

3.1 Research design

This study employs a case study methodology to explore the distinctive practice of Buddhist meditation in urban China, focusing on the activities conducted in The Chan Hall of Dafo Si in Guangzhou. Dafo Si upholds the Buddhist practice of "summer study and winter meditation," with a particular emphasis on arranging the Chan Seven-day Retreat during the winter period. During these retreats, the usual Buddhist services are reduced, and daily sutras and other services are paused to ensure that everyone in the temple concentrates exclusively on preserving the sacredness of the Chan Seven. In addition to the yearly event, the Urban Chan Hall also takes advantage of holidays and weekends to organize diverse meditation sessions centered around specific themes. During the Labor Day and National Day vacations, the meditation center usually conducts seven-day intensive meditation camps to provide the public with profound meditation experiences.

The author actively participated in tasks such as observation, surveying, conducting interviews, and analyzing documents. Observation activities were conducted throughout 10 meditation sessions from April to mid-July 2024. In addition, this study conducted observation and interview activities with Buddhist monastics from urban areas in China who are over 20 years old and reside in Chan Hall. These monastics have engaged in daily mindfulness meditation since they entered monastic life. The permanent monks of the Chan Hall of Dafo Si frequently engaged in meditation and were also included as subjects for observation. All participants engaged in mindfulness meditation through seated meditation in the early morning. They allocated different durations to walking, meditation, and chanting throughout the day based on their responsibilities and tasks within the monastery. Interviews were performed to delve more into the meditation exercises undertaken by the participants (Cresswell & Cresswell, 2022).

3.2. Participants

The study included Buddhist monastics from Chinese Urban who were over 20 years old and below 40 Years old who also resided in Chan Hall, and regular visitors who engaged in meditation in Chan Hall. The observation activities in this study involved two groups of participants: one group comprised of males and another of females. The researcher consistently recorded the number of participants during each meditation session. However, there were variations in the participants due to some individuals being absent from some sessions. This modification enabled

the researcher to acquire more extensive data from their meditation exercises. This study recruited four individuals, comprising two male and two female participants. Specifically, the sample included two Buddhist monastics and two regular meditation practitioners who visited the research site. These individuals were selected as the subjects of observation for this study. The interview aimed to investigate the impact of meditating with the numerous visitors to Chan Hall on their meditation habits. More specifically, two individuals from urban areas in China were interviewed about the effects of meditation on their mental health balance. The questions also focused on how they manage their busy schedules and organize their meditation routines. A total of 11 individuals have indicated their willingness to participate in interviews. The researcher conducted interviews with each participant for less than 20 minutes. The participants were randomly picked from a pool of individuals who had previously participated in observation activities. Table 1 presents the data of the interview subjects.

Table 1 Information of interview's subject

No	Initial name	Age (year)	Educational background
1	HY	50	Master
2	SY	52	Bachelor
3	XC	51	Doctorate
4	JH	35	Bachelor
5	YX	43	Bachelor
6	FH	34	Bachelor
7	CX	28	Bachelor
8	YZ	29	Bachelor
9	JW	27	Bachelor
10	YY	37	Master
11	ZH	35	Master

4. Result

The primary meditation practices conducted in Chan Hall Dafo Si are sitting meditation and walking meditation. An interview with a resident monk in the Chan Hall revealed that sitting meditation is fundamental to the meditation practice. It allows for extended periods of introspection and the cultivation of deep concentration. Consistent with empirical results, seated meditation typically lasts 30 to 60 minutes daily. Furthermore, the monk highlighted that meditation runs constitute a crucial component of the temple's meditation practice, intending to establish a connection between the mind's awareness and the body's actions. In addition to their meditation practice, participants reported incorporating breathing methods and body awareness, which they learned during meditation sessions, into their temple visits and daily routines. SY and CX states that:

"At Chan Hall Dafo si, we adhere to a well-defined meditation framework to ensure thorough and regular practices. Our program commences each day with a fundamental sitting meditation practice. This session typically ranges from 30 to 60 minutes, during which the participants assume a conventional meditation posture, maintaining an upright and relaxed attitude. The primary emphasis of this session is on breathing, and participants are instructed

to attentively notice their breath and mindfully acknowledge any thoughts that arise without becoming entangled".

"At Chan Hall Dafo si, our meditation activities often commence with a seated meditation session. Typically, we commence our practice with a seated meditation lasting approximately 30 to 45 minutes. Throughout the practice, we maintained an erect posture on the meditation cushion, ensuring our spine was aligned and directing our attention on our breath".

They stated that this exercise aids them in sustaining attention during everyday tasks and confronting cognitive obstacles. These findings emphasize that the practices acquired at Chan Hall Dafo Si are not solely utilized during meditation sessions but are also incorporated into the everyday lives of individuals. Furthermore, this result aligns with the preliminary studies that found that meditation's beneficial influence on both mindfulness and mental well-being (Asad et al., 2025; Bray et al., 2022). Interviews with monks indicated that engaging in meditation, both in a seated and walking position, had a substantial impact on enhancing self-awareness and diminishing stress and anxiety. This aligns with the prior findings indicating that participants have reported an enhancement in their capacity to concentrate on the present moment and have a greater sense of overall tranquility. As JH and YX states:

"We allocate approximately 20 to 30 minutes for meditative walking in the designated area surrounding the temple. This entails engaging in a deliberate and mindful practice of walking leisurely while focusing completely on the sensations of each footstep and the physical sensations of the body in motion."

"Apart from sitting and walking, we also engage in Dharma Talk, during which a monk or instructor imparts lessons or explanations on the fundamentals of Buddhism and meditation."

During the interview, participants also reported improved capacity to regulate their thoughts and emotions. This finding aligns with survey data indicating that meditation aids in decreasing emotional reactivity and enhancing emotional stability (Cairns et al., 2023; Dayani et al., 2025; Fan & Cui, 2024). This discovery indicates that the meditation approach taught at Chan Hall Dafo Si not only yields advantages during the meditation session but also exerts a lasting good impact on participants' daily lives. As HY, XC and YZ states:

"Our efforts to assist people in achieving Mindfulness Meditation encompass several systematic approaches. Initially, we ensure that every participant attains a comprehensive comprehension of the fundamental tenets of mindfulness through dharma lectures and personalized mentoring. Our instruction focuses on

fundamental practices, such as deliberate breathing and heightened bodily perception, which serve as the bedrock of mindfulness."

"We provide regular meditation sessions that include both sitting and walking meditation. These sessions are specifically designed to enhance mindfulness and concentration. In addition, we offer supplementary assistance through individualized counseling sessions, during which participants can openly discuss their experiences and receive tailored recommendations for their personal growth."

"I engaged in meditation training in the comfort of my own home. Each morning, I allocate a certain period for engaging in meditation. Additionally, I make a conscious effort to cultivate mindfulness while performing routine tasks like eating or walking. This practice enables me to cultivate attention throughout my daily activities, extending beyond the dedicated meditation hour."

This study also found that meditation encourages positive thinking and emotional awareness. Practices such as **Loving-Kindness Meditation (LKM)** foster self-compassion and reduce negative self-talk, which is common in depression. Studies suggest that **Mindfulness-Based Cognitive Therapy (MBCT)** can be as effective as antidepressant medication in preventing relapse in individuals with recurrent depression. It also enhances **attention span, memory retention, and decision-making abilities**. The outcomes of meditation lead the brain to focus on the present moment. Meditation strengthens neural connections associated with learning and mental clarity. This is particularly beneficial for people and professionals who struggle with distractions. As YY, SY and JW states:

"Meditation has a substantial influence on our participants' mindfulness and mental well-being. During meditation, our main objective is to cultivate complete mindfulness, which enables individuals to enhance their awareness of their body's thoughts, emotions, and physical sensations. This directly enhances mental well-being."

"Meditation aids in the reduction of stress and anxiety by providing individuals with techniques to control their thoughts and emotions effectively. During meditation, individuals can attentively monitor their thoughts and emotions without engaging in automatic reactions. This skill enables them to confront stressful situations with greater tranquility and self-control."

"I experience a highly beneficial influence of meditation on my mindfulness and mental well-being. Initiating my meditation practice enables me to concentrate effortlessly on the present moment without becoming excessively preoccupied with anxiety or pessimistic thoughts. Meditation enhances my self-

awareness of my emotions and thoughts, enabling me to respond with composure and self-control."

This result aligns with the prior studies demonstrating meditation's beneficial influence on mindfulness and mental well-being (Langgapin et al., 2024; Mao et al., 2023; Pascoe et al., 2021). The participants reported that their capacity to concentrate on the present moment was enhanced, and they had a greater sense of overall tranquility. This discovery indicates that the meditation approach taught at Chan Hall Dafo Si not only yields advantages during the meditation session but also exerts a lasting good impact on participants' daily lives.

5. Discussion

5.1 Key finding

This study confirms that meditation predominately drives meditation activities at Chan Hall Dafo si. These results align with earlier research demonstrating the need to sit in Chan's practice. For instance, studies by Shin et al. (2022) and Sulosaari et al. (2022) revealed that "Mindfulness and the Cultural Construction of Self" stress that while seated meditation can help to increase attention and self-awareness, it is the main practice in the Chan and Zen traditions to reach a strong awareness of their ideas and emotions, which are necessary for the realization of enlightenment in this faith. Furthermore, this finding aligns with the study conducted by Wang et al. (2022), which demonstrated that meditation, particularly in the setting of formal meditation at Chan Hall Dafo Si, successfully enhances the capacity to regulate attention and awareness. This study demonstrates that extended periods of sitting might result in heightened mental tranquility and enhanced emotional equilibrium, corroborating.

Meditation at the Chan Hall of Dafo si follows a rigorous and organized pattern, which embodies the fundamental principles of Chan's practice. This technique entails assuming a particular seated posture, typically in a lotus or semi-lotus position, with an erect back and hands on the lap. During meditation, participants concentrate on their breath or mantras to clear their minds of external and internal disturbances and attain a profound awareness. This finding corroborates prior studies demonstrating that maintaining a stable and concentrated body position is crucial for complete mindfulness and peacefulness. In addition, the meditation practice conducted at Chan Hall Dafo Si incorporates supplementary practices to enhance focus and self-reflection (Owens & Bunce, 2022; Zhang et al., 2020; Zhang et al., 2023). This encompasses practices like engaging in deep breathing exercises, attentively monitoring one's bodily sensations, and observing the mind without being actively engaged in its contents. These strategies aid people in overcoming mental problems and cultivating a more profound comprehension of the inner essence. Therefore, meditation serves as a means of spiritual exercise and a practical method for cultivating profound mental aptitudes.

The study's findings demonstrate that meditation conducted in Chan Hall Dafo si has been substantiated to enhance participants' mindfulness and mental health. This study aligns with previous research findings that corroborate the efficacy of meditation in enhancing mental well-being. Monteiro et al. (2024) demonstrate that mindfulness-based meditation programs can

diminish stress levels and enhance overall quality of life. Mao et al. (2023) elucidated that mindfulness meditation enhances individuals' awareness of present experiences, diminishes anxiety, and enhances overall well-being. The findings corroborate the study's outcomes conducted at Chan Hall Dafo Si, where participants reported a notable enhancement in self-awareness and emotional regulation. Malik and Annabi (2022) and Kang (2023) also found the efficacy of mindfulness meditation in alleviating symptoms associated with depression, anxiety, and stress. It proves that mindfulness meditation programs can substantially benefit mental health, particularly in mitigating stress symptoms and enhancing emotional well-being. The results of Chan Hall Dafo Si's research align with the findings of Edenfield and Saeed (2012) and Fraset and Gregory (2024), who discovered that an augmentation in mindfulness could enhance mental well-being by reducing emotional reactivity and enhancing stress management capabilities.

This study also demonstrates that consistent meditation practice can enhance individuals' mindfulness and reduce susceptibility to emotional problems. These findings provide more evidence of the effectiveness of meditation in promoting participants' mental well-being. Cowan and Cole (2022) and Dayani et al. (2025) demonstrate that incorporating acceptance of bodily sensations and emotions is crucial to mindfulness practice. This acceptance facilitates individuals in confronting their interior experiences with a receptive mindset and refraining from making judgments. This can mitigate the adverse effects of unpleasant emotions and enhance emotional well-being and capacity to acknowledge and overcome bodily sensations and negative emotions. This finding aligns with the research conducted by Bray et al. (2022), which demonstrates that accepting the body's sensations and emotions without evaluating them is a crucial aspect of mindfulness. People can diminish stress and enhance their emotional equilibrium by cultivating the capacity to embrace bodily sensations and emotions without eliciting negative responses.

This study also found a positive correlation between mindfulness meditation and mental health. This result demonstrated that practicing mindfulness meditation can have a substantial positive impact on mental well-being by effectively alleviating symptoms of anxiety, despair, and stress. Mindfulness meditation not only enhances mental well-being but also enhances the immune system, revealing the extensive advantages of meditation practices on multiple dimensions of health. This finding aligns with the prior studies, which affirm that mindfulness-based meditation, particularly mindfulness meditation, is efficacious in averting depression relapse and enhancing mental wellness (Lucero-Romero & Arias-Bolzmann, 2023; Mao et al., 2023). Mindfulness Meditation enhances individuals' ability to regulate emotions and mitigate negative thoughts, enhancing overall mental well-being. Pascoe et al. (2021), Remskar et al. (2024), and Santos Alves Peixoto et al. (2022) further corroborate this conclusion, demonstrating that the Mindfulness-Based Stress Reduction (MBSR) program has a substantial beneficial effect on mental well-being towards alleviating stress symptoms and enhancing overall quality of life. This study demonstrates that mindfulness meditation can enhance mental well-being by bolstering individuals' capacity to cope with stress and heightening their self-awareness.

5.2. Conclusion

This study explored the meditation practices of the urban Chinese population in the **Chan Hall of Dafo Si**, where meditation sessions are conducted continuously from morning until night. Most practitioners engage in **seated meditation** as a primary component of their practice, emphasizing mindfulness and self-awareness. In this study, a crucial aspect of mindfulness is the **acceptance of bodily sensations and emotions**. With regular meditation, practitioners learn to observe internal experiences **without resistance or judgment**, fostering a sense of mental clarity and emotional balance. This approach enables individuals to manage stress, anxiety, and other psychological disturbances more effectively. This study also indicates a **positive association between Mindfulness Meditation and Mental Health**, highlighting the importance of meditation in promoting emotional well-being. Engaging in mindfulness meditation has been shown to **reduce negative thought patterns, increase self-awareness, and cultivate resilience** against mental health challenges. The practice encourages individuals to stay present, acknowledge emotions without suppression, and develop healthier coping mechanisms. Furthermore, **mindfulness meditation serves as a therapeutic tool** for diminishing psychological disturbances such as stress, anxiety, and depression. Meditation contributes to a holistic approach to psychological well-being towards promoting emotional awareness, stress reduction, and self-acceptance, making it an essential practice for mental resilience and personal growth.

5.3. Theoretical implications

This study provides significant theoretical contributions by expanding existing knowledge on **Buddhist meditation and mental health**, particularly in the context of Generation Z. While mindfulness-based interventions have been widely explored in psychology, the role of **Buddhist meditation activities** as a structured mental health practice remains underexamined. This research contributes to the academic discourse by integrating **Buddhist philosophical principles** with contemporary mental health theories. Mindfulness is a central concept in psychological and therapeutic practices, often studied in its secular form. However, this study broadens the scope by incorporating **traditional Buddhist meditation techniques**, such as **Vipassana (insight meditation)**, **Metta (Loving-Kindness Meditation)**, and **Samatha (calm-abiding meditation)**. By distinguishing these forms, the research provides deeper insights into **how different meditation techniques uniquely impact mental health, emotional regulation, and stress reduction**. This study aligns with the **Positive Psychology movement**, which emphasizes well-being, resilience, and personal growth to reinforce the idea that mental health is not just about the absence of illness but also about **developing psychological strengths and enhancing life satisfaction**. Hence, this study advances mindfulness, positive psychology, educational psychology, and cross-cultural mental health research theoretical frameworks. Integrating Buddhist meditation with contemporary psychological models lays the foundation for future research on the **long-term mental health benefits of structured meditation practices**.

5.4. Practical implications

This study offers significant **practical implications** for education, mental health therapy, workplace well-being, and public health policy towards highlighting the benefits of Buddhist meditation in improving mental health. This study shows how **Buddhist meditation activities** contribute to people's psychological well-being. This research provides actionable insights for integrating meditation into daily life. One of the most significant implications of this study is its application in **schools and universities**. Given the increasing levels of stress and anxiety among people, incorporating **Buddhist meditation techniques** such as **Vipassana**, **Loving-Kindness Meditation (LKM)**, and **Samatha** into educational settings can provide people with valuable mental health tools. Schools can introduce **mindfulness programs**, **guided meditation sessions**, or **dedicated meditation spaces** to help people manage academic pressure, improve focus, and enhance emotional regulation. This study reinforces the potential of meditation as an effective **therapeutic tool** for treating anxiety, depression, and stress-related disorders.

Counselors, therapists, and mental health professionals can incorporate mindfulness-based meditation techniques into therapy sessions as a **non-pharmacological intervention**. **Mindfulness-Based Cognitive Therapy (MBCT)** and **Mindfulness-Based Stress Reduction (MBSR)** can be enhanced with religious principles to offer a holistic approach to mental health treatment. Hence, governments and health organizations can use the findings of this study to promote **mental health awareness campaigns** that integrate meditation into **public health policies**. Introducing **community meditation centers**, **workplace wellness programs**, and **school-based mindfulness initiatives** can contribute to a more **mentally resilient society**. Furthermore, healthcare institutions can recommend Buddhist meditation as a complementary therapy for patients experiencing chronic stress, trauma, or psychological distress. While Buddhist meditation originates from Asian traditions, its principles can be adapted to different cultural and religious contexts worldwide. This study supports the **global expansion of mindfulness practices**, demonstrating that meditation is a **universal tool** for mental well-being regardless of religious or cultural background.

5.5. Limitations and Future Study Directions

This study primarily focuses on Buddhist meditation practices within a specific cultural and geographical context, such as urban China and Buddhist meditation halls. The findings may not be fully generalizable to **non-Buddhist populations** or individuals practicing meditation outside structured Buddhist environments. Future research should explore diverse cultural and religious contexts to assess the broader applicability of Buddhist meditation techniques. Some meditation studies, including this one, often measure **short-term effects** rather than long-term impacts. While the findings suggest positive mental health outcomes, it remains unclear how sustained meditation practice influences mental well-being over months or years. **Longitudinal studies** are needed to examine Buddhist meditation's long-term benefits and potential limitations. The study relies heavily on **self-reported data**, which may be subject to **biases such as social desirability or inaccurate self-perception**. Participants may overestimate or underestimate their mental health improvements due to subjective interpretation. Future research should incorporate

objective psychological assessments, neurobiological measures, or physiological indicators to validate findings. This study does not extensively compare Buddhist meditation practitioners with a **non-meditating control group** or individuals practicing secular mindfulness. Without such comparisons, it is difficult to determine whether the observed benefits are **specific to Buddhist meditation** or general to mindfulness practices. Future studies should include **controlled experimental designs** to distinguish between different forms of meditation. Future studies will also consider a broader research sample from different regions of China or even international respondents. This would allow an understanding of whether the research findings are consistent across different cultural backgrounds or regional contexts.

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Figure 1: Standing Meditation Session at *Dafo si*



Figure 2: Sitting Meditation Session at *Dafo si*

Attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province

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ABSTRACT

The research on the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province aims to study and compare the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province. The population used in this study is service recipients who use the services of gold shops in Chonburi Province, whose exact number cannot be specified. The sample size is determined by using 385 service recipients who use the services of gold shops in Chonburi Province. The researcher determined the sample size using a formula for calculating without knowing the population number with a confidence level of 95%, allowing for a deviation of no more than 5%. Data were collected using a questionnaire as a tool for the study. Statistics were used to analyze the data using percentage, mean, standard deviation, and t-test and F-test, and the difference in mean values for each pair was analyzed using the LSD Analysis (Least Significant Difference Analysis) method. The results of the study found that

Most of the respondents the majority of respondents were female, 293 people, or 76.10 percent, aged 36-45 years, 118 people, or 30.65 percent, had lower than bachelor's degree education, 237 people, or 61.56 percent, had income of 20,000-25,000 baht, 145 people, or 37.66 percent, and were self-employed, 130 people, or 33.77 percent.

The level of attitude of service recipients towards increasing efficiency of gold shop management in Bang Kapi District, Bangkok, was at a high level overall. When considering each aspect, it was found that the aspect with the highest average value was price, followed by product, followed by location, and the aspect with the lowest average value was marketing promotion.

A comparison of service recipients' attitudes towards efficiency of gold shop management in Chonburi Province classified by personal factors found that service recipients with different ages, education levels, and occupations had similar attitudes towards efficiency of gold shop management. However, service recipients with different genders and average monthly incomes had different attitudes towards efficiency of gold shop management. They are statistically significantly different at the .05 level, which is in accordance with the specified hypothesis.

Keywords: attitudes; efficiency; Gold shop management

1. Introduction

Gold is a rare and difficult mineral to extract. It has special properties such as luster, beauty, durability, and does not corrode easily over time. It is also malleable and can be shaped into various forms as desired, such as coins, gold bars, and jewelry. It can also be used in various industries. In addition to the special properties and benefits of gold, gold is also a valuable metal that has been popular in human society for a long time since it was recorded in history (Bromberg, 2023). The price of gold in the world market fluctuates according to the global economy. Currently, the price of gold has risen to a very high level. It has received special support because there are negative factors affecting the global economy, especially the COVID-19 outbreak, causing people to invest in other risky assets such as stocks or bonds to invest in gold to escape the risk of a decline in these assets because gold is low risk. As can be seen from the figures from the past 10 years, it reflects the fluctuation of gold prices, which has affected customer behavior, which has changed from buying gold jewelry for beauty to buying gold bars for profit (Thairath Online.,2020). The current high price of gold in the market has caused a problem of consumers slowing down in buying gold. As a result, some gold shops have to close down. As for the gold shops that are still open, there is competition in the market, mostly in terms of price, by reducing the workmanship fee, and there is a concentration of gold shops in the original area, resulting in high competition.

Chonburi Province is a business district with a large number of gold shops, which has a dense population and relatively high purchasing power, resulting in a high rate of competition in the gold shop business. Another important thing is that gold jewelry is a delicate product that changes in price all the time. It can be exchanged for cash immediately, so it is very popular for buying as an accessory or buying as an asset. Therefore, in order to attract service recipients to come back to use the service again, increasing management efficiency is something that gold shops should take into account, so that customers are impressed, confident in the quality and service, and promote the business to continue operating.

For the reasons stated above, the researcher is interested in studying the attitudes of service recipients towards the efficiency of gold shop management in the province. The information obtained from the study will be useful for planning the operation of gold shops, so that the business can continue to exist amidst the highly competitive market and changing economic conditions stably.

Objectives of the study

1. To study the level of attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province
2. To compare the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province classified by personal factors

Hypothesis

1. Service recipients with different genders have different attitudes towards gold shop management efficiency.

2. Service recipients with different ages have different attitudes towards gold shop management efficiency.
3. Service recipients with different education levels have different attitudes towards gold shop management efficiency.
4. Service recipients with different occupations have different attitudes towards gold shop management efficiency.
5. Service recipients with different average monthly incomes have different attitudes towards gold shop management efficiency.

Scope of the Study

The study of the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province has set the scope of the study as follows:

1. Population and sample scope
 - 1.1 The population used in the study is service recipients who use the services of gold shops in Chonburi Province, which cannot be specified in the exact number.
 - 1.2 The sample group used in the study is 385 service recipients who use the services of gold shops in Chonburi Province. The researcher determined the sample size using the calculation formula without knowing the population with a confidence level of 95%, allowing for a deviation of no more than 5%, and using the accidental sampling method.
2. The variables used in this study are:
 - 2.1 Independent variables are personal factors of the people, including gender, age, education level, occupation, average monthly income.
 - 2.2 Dependent variables are service recipients' attitudes towards the efficiency of gold shop management in 4 areas as follows: product, price, location, and marketing promotion.

2. Literature Reviews

Attitude means personal feelings expressed towards something, whether through speaking or writing, which the person feels based on knowledge, experience, status, environment and beliefs (Thanin, 2020). The attitude expressed may agree or disagree with other people, which is part of attitude (Supattra, 1997). or may be used interchangeably. Management can measure attitude from the performance and satisfaction of subordinates that the results of the work performed are in the same direction or direction, helping to make management fair and thorough and helping to raise the standard of management even more.

Management efficiency means the ability to use resources to manage a gold shop successfully by using the least amount of resources in 4 areas: product, price, distribution location, and marketing promotion.(Prapapen, 2013).

Conceptual framework of the study

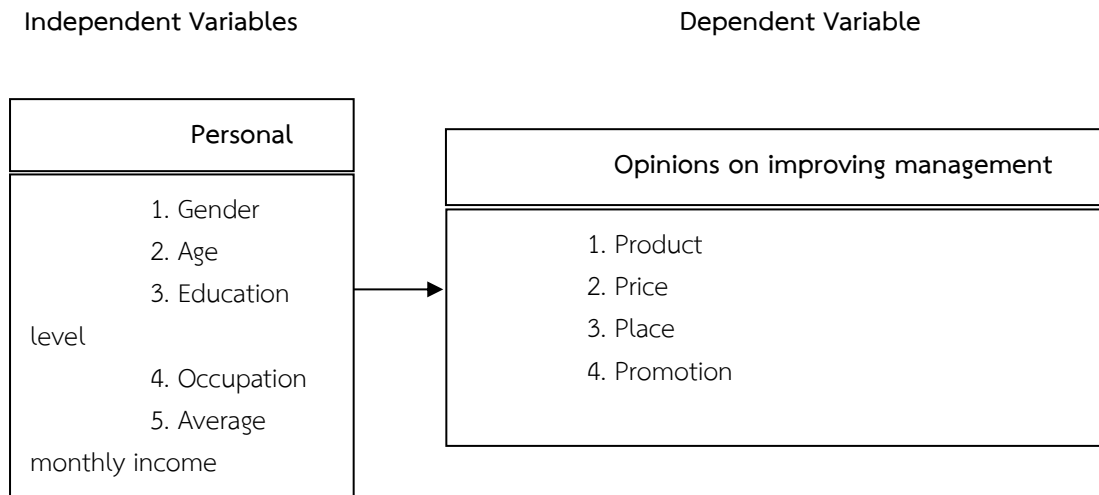


Figure 1 : Conceptual framework of the study.

3. Methodology

Population and Sample

Population

The population used in this research is the service recipients who use gold shops in Chonburi Province, which cannot be specified in an exact number.

Sample

The sample group used in the research was 385 service recipients of gold shops in Bang Kapi District, Bangkok. The researcher determined the sample size using a calculation formula without knowing the population (Kritsanee, 2006). with a confidence level of 95%, allowing for a deviation of no more than 5% according to the following formula.

$$n = \frac{Z^2 PQ}{B^2}$$

n = sample size

B = error level

Z = Z score at confidence level

P = population probability

Q = 1 - P

By substituting values at the population probability level of 0.05, the Z value at the 95% confidence level and the error of 0.05 will be as follows.

$$\begin{aligned}
 n &= \frac{(1.96)^2(0.5)(1-0.5)}{(0.05)^2} \\
 &= 384.16
 \end{aligned}$$

The sample size used in the research was 384.16 or approximately 385 samples.

Instrument Creation and Validation

In this step, we start by studying, analyzing, and synthesizing documents and research from both Thailand and abroad to study ideas from educators who provide ideas about attitudes and management efficiency, with details as follows:

1. Study documents, ideas, theories, and related research to use as guidelines for creating the questionnaire.
2. Create a questionnaire that covers the conceptual framework and objectives of the research and check the content validity, then revise and edit until we get a questionnaire with content validity. Then proceed to the reliability testing process.
3. Take the revised questionnaire to try out to find the quality of the instrument by finding the reliability of the questionnaire and finding the Cronbach's alpha coefficient.

Instruments used in the research

The instruments used in collecting data were questionnaires on the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province, which were created by the researcher. They were divided into 2 parts as follows:

Part 1 was a questionnaire on general information of the respondents.

Part 2 was a questionnaire on the attitudes of service recipients towards the efficiency of gold shop management.

The nature of the questions was a 5-rank rating scale based on the Likert scale, with scores assigned to each rank as the most, most, moderate, least, and least. The scores for each level were as follows

Score	Meaning
5	Most
4	Much
3	Moderate
2	Less
1	Least

Data Collection Method

Quantitative data collection is an important step in conducting research. Various techniques and methods are required to obtain true, correct, and reliable data. The methods are as follows: The researcher distributes and collects questionnaires to the sample group by themselves. The researcher checks the completeness of the questionnaires. Then, the completed questionnaires are coded to give scores according to the weight of each item and the data is recorded on the computer.

Data Analysis

In this study, the researcher checked the completeness of the returned questionnaires and analyzed the data in the following steps:

1. Data from the questionnaires were analyzed as follows:

1.1 Analyze the personal factors of the respondents using frequency and percentage.

1.2 Analyze the attitude level of service recipients towards the efficiency of gold shop management in Bangkapi District, Bangkok using the mean (\bar{x}) and standard deviation (S.D.) by comparing with the average of 5 levels (Boonchum, 2011) and interpret the results as follows:

Mean 4.51 – 5.00 means the most participation

Mean 3.51 – 4.50 means the most participation

Mean 2.51 – 3.50 means the moderate participation

Mean 1.51 – 2.50 means the least participation

Mean 1.00 – 1.50 means the least participation

1.3 Comparison of service recipients' attitudes towards the efficiency of gold shop management in Chonburi Province according to the gender variable using the t-test.

1.4 Comparison of service recipients' attitudes towards the efficiency of gold shop management in Chonburi Province according to the variables of age, education level, occupation, and average monthly income using the F-test and analyzing the differences in the mean values of each pair using the Least Significant Difference Analysis method.

4. Results

1. General information of the respondents

Most respondents Most respondents were female, 293 people, or 76.10 percent, aged 36-45 years, 118 people, or 30.65 percent, had an education level lower than a bachelor's degree, 237 people, or 61.56 percent, had an income of 20,000-25,000 baht, 145 people, or 37.66 percent, and had a personal business occupation, 130 people, or 33.77 percent.

2. Attitudes of service recipients towards increasing the efficiency of gold shop management

The attitudes of service recipients towards increasing the efficiency of gold shop management in Chonburi Province are at a high level overall. When considering each aspect, it was found that the aspect with the highest average value was price, followed by product, followed by location, and the aspect with the lowest average value was marketing promotion. Details of each aspect are as follows:

2.1 Attitudes of service recipients towards increasing the efficiency of gold shop management in Chonburi Province The product aspect is at a high level overall. When considering each item, it was found that the aspect with the highest average value was the reliability of the gold shop, followed by the standard of the weight of the gold, and the aspect with the lowest average value was the beauty of the packaging used to hold the gold, such as boxes and bags.

2.2 The level of attitude of service recipients towards increasing efficiency in gold shop management in Chonburi Province in terms of price is at a high level overall. When considering each item, it was found that the item with the highest mean value was clearly displayed prices that were easily seen, followed by selling according to the standard price announced each day, and the item with the lowest mean value was the standard buy-back price.

2.3 The level of attitude of service recipients towards increasing the efficiency of gold shop management in Chonburi Province in terms of location is overall at a high level. When considering each item, it was found that the item with the highest mean value was the convenience of traveling to the gold shop, followed by the location near home, work, or community area, and the item with the lowest mean value was the convenience of parking at the gold shop.

2.4 The level of attitude of service recipients towards the efficiency of gold shop management in Chonburi Province in terms of marketing promotion is at a high level overall. When considering each item, it was found that the item with the highest mean value was recommending products appropriate for customers, followed by giving away gifts to customers who bought gold jewelry, such as bags, shirts, drinking glasses, etc., and the item with the lowest mean value was advertising and public relations via online media such as Facebook, Instagram.

3. Hypothesis testing results

The hypothesis testing results found that service recipients with different ages, education levels, and occupations had no different attitudes towards gold shop management efficiency, which was not in line with the specified hypothesis. Service recipients with different genders and average monthly incomes had different attitudes towards gold shop management efficiency at a statistically significant level of .05, which was in line with the specified hypothesis.

5. Conclusion and Recommendation

The results of the study on the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province have the following issues for discussion:

The overall level of attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province is at a high level. When considering each aspect, it was found that the aspect with the highest average value was price, followed by product, followed by location, and the aspect with the lowest average value was marketing promotion. The details of each aspect are as follows:

In terms of products, it was found that the item with the highest average value was the reliability of the gold shop. This is because service recipients place importance on the reliability of the gold shop. Since gold is a high-priced product, the reliability of the shop is one of the first things to consider. This is consistent with the research of Wiranyupa Phatcharapakornpong (Wirunyupa, 2023). who studied the factors affecting consumers' decision to buy gold shop via e-commerce systems. It was found that product quality was something that the interviewees gave great importance to. Since gold shop is a high-value product, the interviewees therefore placed importance on the quality of the product, which is real gold and good quality. Therefore, this was the reason for choosing to buy only shops that they trust or have been verified as reliable.

In terms of price, it was found that the item with the highest average value was clearly displayed prices that were easy to see, followed by selling at the standard price announced each day. This may be because what service recipients valued was that the gold shop had a sign showing the buying and selling prices that were clear. This is consistent with the research of Narumon Chatutong (Narumon, 2017). who studied the decision to buy gold jewelry at Panya Gold Shop, Sattahip District, Chonburi Province. It was found that the decision to buy gold jewelry with

beautiful designs was worth the selling price the most. The next most important factor was the clarity of the price. And the most important factor was that the price was cheaper than other shops. Therefore, when service recipients brought their gold jewelry back to sell to the gold shop, they were deducted differently for the price of the workmanship, causing service recipients to feel that the gold shop's buyback price was not standardized.

In terms of location, it was found that the item with the highest average value was the convenience of traveling to the gold shop. This may be because service recipients place great importance on gold shops that are convenient to travel to and from and are located in communities. In addition, buyers consider that they should choose gold shops that have good security. This is consistent with the research of Pochanee Moliswong (Pochanee, 2017). who studied the marketing mix factors of gold shops in Koh Samui District, Surat Thani Province. Factors that consumers have a level of influence on their decision-making in terms of distribution channels have an overall average value at a high level. The level of influence on the decision-making of the sub-factor is being located in a community that is convenient to travel to and from, with an average value at a high level. The item with the lowest average value was the convenience of parking at the gold shop. This may be because most gold shops are located in communities with limited parking space, which is not enough to provide services.

In terms of marketing promotion, it was found that the factor with the highest average value was recommending products that were appropriate for customers. This may be because customers who went to buy gold did not have much knowledge about gold. Therefore, each time they bought gold, the buyers wanted to get good quality gold that was appropriate for the price, along with receiving good service with good manners. Therefore, consumers gave importance to the service of welcoming with good manners, along with the knowledge of sales staff who were very knowledgeable about gold to provide advice on choosing gold for consumers. This is consistent with the research of Busarin Chunganupap (Busarin, 2003).who studied the marketing mix factors that affected consumers in choosing to buy gold jewelry from gold shops in Ban Phaeo District, Samut Sakhon Province. It was found that the factors that consumers had a high level of influence on their decision-making in terms of marketing promotion were as follows: gold shops had sales staff who welcomed and provided service with good manners and good manners, with an average value at a very effective level. This is consistent with the research of Wilaiporn Wongkanchana (Wilaiporn, 2005). who studied the causes and decisions of consumers in using gold shops in Mueang District. Lopburi Province found that the factors that consumers have a level of influence on decision-making in terms of overall marketing promotion have a medium average. The level of influence on decision-making for the sub-factors is having sales staff who welcome and provide friendly service, with an average of a high average. The item with the lowest average is advertising and public relations on online media such as Facebook, Instagram. This may be because most gold shops do not give much importance to public relations on online media, even though currently, a significant number of service recipients choose to buy products and services online, which is another channel that can publicize the store without any cost.

The results of the comparison of the attitudes of service recipients towards the efficiency of gold shop management in Chonburi Province, classified by personal factors, found that service

recipients with different ages, education levels, and occupations had similar attitudes towards the efficiency of gold shop management. This may be because different personal factors of age have similar needs for marketing strategies. This is because no matter how old consumers are, when deciding to buy any product, they must want something good, quality, beautiful, modern, reasonable price, safe when traveling to buy and sell products, including being taken care of by salespeople and providing good service, which is consistent with the research of Boriboon Aphithamwiriya (Boriboon, 2003) studying the attitudes of consumers towards buying gold jewelry on Yaowarat Road. It was found that different ages had different attitudes towards buying gold jewelry on Yaowarat Road. It was also found that consumers with different occupations had different attitudes towards buying gold jewelry on Yaowarat Road in all aspects.

As for service recipients with different genders and average monthly incomes, they have different attitudes towards the efficiency of gold shop management, which is consistent with the research of Boriboon Aphithamwiriya who studied the attitudes of consumers towards buying gold ornaments on Yaowarat Road. It was found that consumers with different average monthly incomes have different attitudes towards buying gold ornaments on Yaowarat Road in various aspects. Consumers with different average monthly incomes have different attitudes towards buying gold ornaments on Yaowarat Road in terms of location.

Suggestions

1. Suggestions from the study results

1.1 In terms of products, it was found that the item with the lowest average value was the beauty of the packaging of gold jewelry, such as boxes and bags. Therefore, it is proposed that gold shops design unique packaging that is beautiful and modern to create a difference for the shop and may create more interest for the gold shop.

1.2 In terms of price, it was found that the item with the lowest average value was the standard buy-back price. Therefore, it is proposed that gold shops organize a standard buy-back system so that service recipients are informed of the price when selling back to the shop. A product warranty may be issued as evidence to confirm the price for clarity and to increase customer confidence.

1.3 In terms of location, it was found that the item with the lowest average value was the convenience of parking at the gold shop. Therefore, it is proposed that gold shops provide sufficient parking for service recipients. If there is not enough parking space in front of the shop, the shop may put up a sign to inform customers of where the shop's customers can park for convenience in using the service next time.

1.4 In terms of marketing promotion, it was found that the item with the lowest average value was advertising and public relations via online media such as Facebook, Instagram. Therefore, it is proposed that gold shops increase advertising channels using online media because there are a large number of users. In this regard, a page may be created on Facebook. Or create a Line Group for the shop to publicize or inform customers of various sales promotions to attract old customers to come back and buy again and increase sales for the shop.

2. Suggestions for future studies

From the study on the attitudes of service recipients towards the efficiency of gold shop management in Bang Kapi District, Bangkok, the researcher would like to suggest the following for future studies:

2.1 A study should be conducted on the satisfaction and expectations of service users towards using gold shop services in Mueang District, Surat Thani Province.

2.2 A study should be conducted on the attitudes of gold shop service users towards gold shop customers' purchases of gold.

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THE ROLE OF MOTIVATION IN PROMOTING LANGUAGE LEARNING AUTONOMY AMONG
CHINESE EFL LEARNERS: A CASE STUDY OF QUANZHOU COLLEGE OF TECHNOLOGY

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ABSTRACT

This study examines the role of motivation in promoting language learning autonomy among Chinese EFL learners at Quanzhou College of Technology. Using a mixed-method approach, data were collected from 400 students via surveys and five English teachers through interviews. Multiple regression analysis and thematic analysis were employed for data interpretation. Findings indicate that intrinsic and extrinsic motivations positively influence autonomy, but learner mechanisms (goal-setting, self-regulation, and self-directed learning) play a more decisive role. While personal interest fosters autonomy, external factors like career aspirations provide only short-term motivation. The exam-driven, teacher-centered education system limits autonomy development, making structured learning strategies essential. This study highlights the need for self-regulation training and active learning strategies in EFL instruction. It contributes to understanding motivation and autonomy in Chinese vocational education and calls for future research on long-term effects and cross-institutional comparisons.

Keywords: Motivation, Language Learning Autonomy, Learner Mechanisms, Chinese EFL Learners, Mixed-Method Research

1. Introduction

In the era of globalization, English has become a crucial international language, influencing education, business, and communication. Chinese EFL learners face unique challenges in developing language learning autonomy, particularly in vocational colleges. Understanding how motivation impacts autonomy is essential for enhancing their learning outcomes.

Motivation plays a key role in language acquisition. According to the Self-Determination Theory (Deci & Ryan, 2000), motivation can be intrinsic (driven by personal interest and enjoyment) or extrinsic (influenced by rewards, expectations, and career prospects). Previous research suggests that motivated learners engage more in self-directed learning and develop autonomy (Noels et al., 2000; Ushioda, 2011). However, the relationship between motivation and autonomy in the Chinese EFL context remains underexplored. Many Chinese students learn English for exams such as "Gaokao" and career advancement rather than personal interest, raising questions about how different types of motivation shape autonomy.

Learner autonomy, defined by Little (1991) as the ability to take charge of one's learning, is linked to goal-setting, self-regulation, and resource utilization (Benson, 2001). Studies indicate that self-regulated learners are more autonomous, yet Chinese EFL students often rely on teacher-centered instruction, limiting their independent learning habits (Reinders & White, 2016).

Previous research has consistently highlighted the role of motivation in fostering autonomy. However, motivation alone is insufficient to foster autonomy. Effective learner mechanisms, such as goal-setting, self-regulation, and self-directed learning activities, must support it. These mechanisms act as practical tools that enable learners to translate their motivation into actionable steps, allowing them to independently plan, monitor, and evaluate their progress.

As we can see, the above studies have examined motivation and autonomy as explained individually (references). Most examine motivation and autonomy using quantitative research (Arifani, 2004; Anwar, 2009). However, they tend to see the non-dynamic aspect of motivation and autonomy because they only analyze from pre-test and post-test. In my opinion, previous studies only used a single quantitative design. This study uses a mixed-method design to examine autonomy's non-dynamic and dynamic aspects.

In summary, this study explores how motivation influences language learning autonomy among Chinese EFL learners, the mechanisms through which motivation promotes autonomy, and how EFL teachers can foster motivation in their classrooms to enhance autonomy. By integrating theoretical insights with practical recommendations, this research seeks to contribute to the ongoing dialogue on how best to support and enhance the language learning experiences of Chinese EFL learners, fostering a more autonomous and motivated learning community.

2. Literature Reviews

Understanding the factors influencing language learning autonomy among Chinese EFL learners, particularly at Quanzhou College of Technology, requires a comprehensive approach. This study draws on three primary theoretical perspectives: Learner Autonomy Theory, Self-Determination Theory (SDT), and Self-Regulated Learning (SRL) Theory. These frameworks provide a structured lens to analyze how motivation, self-regulation, and contextual factors shape students'

ability to engage in autonomous learning. Additionally, empirical studies highlight the complex interplay between intrinsic and extrinsic motivation, the role of cultural and educational influences, and the impact of technology on fostering autonomy. By integrating these perspectives, this study aims to deepen the understanding of how Chinese EFL learners develop autonomy and how educators can support this process effectively.

Theoretical Frameworks

Learner Autonomy Theory

Learner Autonomy Theory (Little, 1991; Benson, 2001) defines autonomy as a learner's ability to take charge of their learning by setting goals, selecting strategies, and evaluating progress. This theory emphasizes that autonomy is not an inherent trait but a learned capability that develops through experience and appropriate support. Teachers, learning environments, and available resources are crucial in fostering autonomy, as learners must be guided toward self-regulation and independent decision-making in their learning processes.

Self-Determination Theory (SDT)

Deci and Ryan (2000) distinguish between intrinsic and extrinsic motivation, asserting that learners are more likely to engage in autonomous learning when their motivation is self-driven rather than externally imposed. While intrinsic motivation, such as personal interest and enjoyment, strongly supports autonomy, extrinsic motivators like exams, career prospects, and social expectations can also contribute if internalized over time. The theory suggests that learners who experience autonomy in their educational environment are more likely to transition from extrinsically to intrinsically motivated learning, leading to long-term engagement and self-directed learning habits.

Self-Regulated Learning (SRL) Theory

Zimmerman (2000) highlights the importance of learners' ability to plan, monitor, and regulate learning. This theory suggests that self-regulated learners actively set goals, apply effective learning strategies, and assess their progress, all contributing to increased autonomy. Research has shown that learners with strong self-regulation skills are likelier to take initiative in their learning, persist in challenging situations, and develop a long-term commitment to language acquisition. SRL is crucial in bridging the gap between motivation and autonomy by providing learners with practical strategies to manage their learning process.

Factors Influencing Language Learning Autonomy

Motivation (Intrinsic and Extrinsic)

Motivation plays a crucial role in determining the level of learner autonomy. Intrinsic motivation, such as personal interest, enjoyment, and curiosity, strongly supports autonomous learning, as students are naturally engaged in the learning process (Noels et al., 2000; Ushioda, 2011). In contrast, extrinsic motivation, driven by external factors like exams, career aspirations, and parental expectations, can also contribute to autonomy, but only if learners internalize these

external motivators (Ryan & Deci, 2009). Research suggests that intrinsically motivated learners are likelier to engage in self-regulated learning, whereas extrinsically motivated learners may require additional support to develop autonomy (Gao, 2010).

Self-Regulation and Learning Strategies

Learner autonomy is closely linked to self-regulated learning (SRL), which involves goal-setting, planning, monitoring progress, and adjusting learning strategies (Zimmerman, 2000). Research indicates that learners with strong self-regulation skills are more likely to take ownership of their learning and persist in overcoming challenges (Vandergrift, 2005). Gao (2010) found that Chinese EFL learners who actively engage in self-monitoring and strategy use demonstrate higher levels of autonomy. However, many students lack training in self-regulated learning strategies, making developing autonomy without external guidance difficult.

The Exam-Oriented Education System

The structure of the Chinese education system significantly affects learner autonomy. A strong emphasis on standardized exams encourages rote memorization rather than independent learning (Peng & Woodrow, 2010). Wang and Pape (2007) argue that Chinese students often develop self-efficacy based on their exam performance, leading to a dependence on teachers and structured curricula. This exam-driven environment limits opportunities for students to engage in self-directed learning, as they prioritize test preparation over exploratory or communicative learning experiences.

The Role of Teachers and Instructional Methods

Teacher-centered instruction remains dominant in Chinese EFL classrooms, impacting students' ability to develop autonomy. Benson (2001) suggests that teachers play a crucial role in fostering autonomy by shifting from direct instruction to facilitation, allowing students to take more responsibility for their learning. However, in many Chinese classrooms, teachers still serve as authoritative figures, providing structured guidance that leaves little room for student-led learning (Reinders & White, 2016). A lack of training in learner-centered teaching methods further reinforces students' reliance on teachers rather than encouraging self-directed learning.

Cultural and Social Expectations

Cultural influences and family expectations also shape learner autonomy. Taylor et al. (2021) found that students from high socio-economic backgrounds receive more encouragement for English learning, while others may view it as an obligation rather than a personal goal. Chen (2021) highlights that family support can reinforce extrinsic motivation, but it does not necessarily translate into higher autonomy unless students feel personally connected to the learning process. Additionally, Chinese cultural values emphasize collective learning and respect for authority, which may discourage students from taking an independent approach to language learning.

The Influence of Technology and Digital Resources

Technology provides new opportunities to enhance learner autonomy. Reinders and White (2016) argue that digital tools, such as online courses, language-learning apps, and virtual tutors, enable students to take control of their learning experience. However, Liu (2015) notes that technology alone does not guarantee autonomy—students must be motivated and skilled in using these resources effectively. Many Chinese EFL learners lack digital literacy or do not use online resources proactively, limiting the potential benefits of technology-assisted autonomous learning.

3. Methodology

This study was designed to identify and analyze the key factors influencing language learning autonomy among Chinese EFL learners at Quanzhou College of Technology. A mixed-method research approach was employed, combining quantitative survey data and qualitative interview insights to understand the relationship between motivation and learner autonomy comprehensively. The study's framework was grounded in Learner Autonomy Theory (Benson, 2001), Self-Determination Theory (Deci & Ryan, 2000), and Self-Regulated Learning (SRL) Theory. These theoretical perspectives provided a solid foundation for examining the influence of intrinsic motivation, extrinsic motivation, and learner mechanisms on learners' ability to engage in autonomous language learning.

The questionnaire is designed to assess three key factors influencing learner autonomy: intrinsic motivation (personal interest, enjoyment), extrinsic motivation (rewards, expectations, recognition), and learner mechanisms (goal-setting, self-regulation, self-directed learning activities). To ensure an accurate measurement of respondents' attitudes and perceptions, the questionnaire employs a Likert scale (Likert, 1932), allowing participants to indicate their level of agreement with each statement. The questionnaire consists of four sections: (1) demographic information, including gender, age, major, and years of English learning, which serves for classification but is not included in data analysis; (2) intrinsic motivation, assessing internal drives such as interest, enjoyment, and curiosity in English learning; (3) extrinsic motivation, examining external incentives like family expectations, peer recognition, financial rewards, and career aspirations; and (4) learner mechanisms, investigating goal-setting, self-regulation, and self-directed learning strategies. The questionnaire was distributed and collected through web links, ensuring efficient data collection and broad participation.

A stratified random sampling method was employed to ensure the sample accurately represented the diverse student body across different academic departments and grade levels at Quanzhou College of Technology. The target population included all undergraduate students enrolled during the 2023-2024 academic year. Stratification was based on grade level and student type to ensure a proportional representation of these groups in the sample. Four hundred questionnaires were collected using the online survey platform "Questionnaire Star" (问卷星), from which 400 valid responses were selected for analysis. This sampling strategy ensured that the sample was representative, enhancing the findings' reliability (Creswell, 2014). Data collection took place over four weeks, with the questionnaire distributed exclusively through "Questionnaire Star."

This online platform allowed for efficient data collection, leveraging the university's internal communication networks and social media platforms to maximize participation.

The data were analyzed using SPSS (Statistical Package for the Social Sciences), a standard tool for statistical analysis in social science research (Pallant, 2020). Descriptive statistics, such as means, frequencies, and standard deviations, were calculated to comprehensively overview the sample's motivation, learner mechanisms, and autonomy trends. Multiple regression analysis was then employed to examine the relationships between the independent variables (intrinsic motivations, extrinsic motivations, and learner mechanisms) and the dependent variable (language learning autonomy). This approach allowed the study to identify significant predictors of language learning autonomy and understand how these factors interact within the Quanzhou College of Technology student population.

Mix-methods employ qualitative research to gain in-depth insights into teachers' perspectives on learner motivation and autonomy in EFL contexts. The study uses semi-structured interviews to examine specific classroom strategies and techniques that promote learner autonomy, providing a rich understanding of instructional practices.

The interview design was inspired by Dörnyei's (2001) work on motivation, which emphasizes the role of a supportive classroom environment, personalized learning experiences, and fostering a sense of achievement in enhancing motivation. Based on these principles, an interview guide was developed, covering key topics such as classroom environment, learner beliefs, instructional strategies, self-assessment, and challenges. Each of the five interview questions focuses on a different aspect of learner autonomy, ranging from how teachers create motivating environments to supporting self-assessment and overcoming challenges in fostering independent learning.

Ethical considerations were rigorously adhered to throughout the research process. Participants were fully informed of the study's purpose, and their consent was obtained before participating. They were assured of the confidentiality and anonymity of their responses, with all data securely stored and coded to protect their identities. These ethical practices were crucial for protecting participant rights and ensuring the credibility and integrity of the study's findings. The study was approved by the ethics committee of Quanzhou College of Technology, ensuring that all research activities complied with ethical standards and guidelines (Creswell, 2014).

4. SUMMARY OF FINDINGS

This study aimed to explore the factors influencing the language learning autonomy of students at Quanzhou College of Technology by examining the impact of intrinsic motivations, extrinsic motivations, and learner mechanisms. The findings, summarized in the tables below, provide detailed insights into how these factors affect the language learning autonomy of college students.

Influence of Intrinsic Motivation Factors

The study examined the role of intrinsic motivation factors—personal interest, enjoyment, curiosity, and satisfaction—on learner autonomy. As presented in Table 1, the scores of each

dimension of intrinsic motivation are lower than 3, which indicates that the student's intrinsic motivation for English learning as a whole is in the lower middle level. Among them, the average value of "personal interest" (Personal interest) is 2.725, which is slightly higher than the other dimensions but still below the neutral level (3.0). This shows that students' interest in English learning is not strong and may be more affected by external factors.

Table 1. Summary Descriptive Statistics of Intrinsic Motivation

Category	Sample	Min	Max	M	SD	Rank
Personal Interest	400	1.000	5.000	2.725	0.988	1
Enjoyment	400	1.000	5.000	2.618	0.979	4
Curiosity	400	1.000	5.000	2.650	0.972	2
Satisfaction	400	1.000	5.000	2.623	0.966	3

The standard deviations were between 0.966 and 0.988, indicating relatively significant individual differences in students' internal motivation. Some students may have a high intrinsic interest in English learning, but this interest is uncommon. This difference may be related to the student's background, learning experience, and goals.

Influence of Extrinsic Motivation Factors

Extrinsic motivations, including financial rewards, family expectations, and peer recognition, were also significant determinants of learner autonomy. Table 2 summarizes the statistical impact of these factors, and the table below shows a highly neutral attitude toward the extrinsic motivation of English learning. This phenomenon may be related to students' learning goals and family background. In China's educational environment, students often face multiple pressures from family and society. Learning English is regarded as an important skill conducive to future employment and career development. However, this extrinsic motivation does not translate into a strong motivation to learn, either because students lack a clear understanding of the practical application of English or lack interest in the learning process itself.

Table 2. Summary Descriptive Statistics of Extrinsic Motivation

Category	Sample	Min	Max	M	SD	Rank
Financial Rewards	400	1.000	5.000	2.592	0.951	2
Family Expectations	400	1.000	5.000	2.688	0.907	1
Peer Recognition	400	1.000	5.000	2.575	0.942	3

From the average, the scores of each dimension of extrinsic motivation are lower than 3, which indicates that the student's overall extrinsic motivation for English learning is in the lower middle level. The standard deviation is between 0.907 and 0.951, indicating relatively large individual differences in students' extrinsic motivation. Some students may be influenced by strong extrinsic motivation, but this influence is not widespread. This difference may be related to the student's family background, social environment, and personal goals.

Influence of Learner Mechanisms

Learner mechanisms refer to the cognitive and behavioral strategies learners use to manage, monitor, and adjust their language learning process. It includes goal-setting, self-regulation, and activities. As shown in Table 3, It can be seen from the above table that students show a high degree of neutrality in the learning mechanism. In China's education system, students often rely on teachers' guidance and classroom learning, and they lack the awareness and ability to learn autonomously. In addition, the limited learning resources and the tension of learning time may also cause students to show a neutral attitude toward learning mechanisms.

Table 3. Summary Descriptive Statistics of Learner Mechanisms

Category	Sample	Min	Max	M	SD	Rank
Goal-Setting	400	1.000	5.000	2.720	0.989	1
Self-Regulation	400	1.000	5.000	2.705	0.983	2
Activities	400	1.000	5.000	2.643	0.960	3

From the average point of view, the scores of each dimension of the learning mechanism are lower than 3, indicating that the students show a medium to low level in the learning mechanism. The standard deviation is between 0.942 and 0.951, indicating that students have relatively significant individual differences in learning mechanisms. Some students may show a strong learning mechanism, but this behavior is not typical. This difference may be related to students' habits, learning resources, and educational environment.

Influence of Language Learner Autonomy

Language learning autonomy refers to the ability of learners to take charge of their learning process.

Table 4. Summary Descriptive Statistics of Language Learning Autonomy

Category	Sample	Min	Max	M	SD
Language Learning Autonomy	400	1.000	5.000	2.643	0.960

From the average point of view, the score of language learning autonomy is 2.643, which is lower than the neutral level (3.0), indicating that the students as a whole show a medium level of language learning autonomy. The standard deviation is 0.960, indicating that students' differences in language learning autonomy are relatively significant. Some students may show substantial autonomy, but this autonomy is not common overall. This difference may be related to students' habits, learning resources, and educational environment.

The Finding of Inferential Statistics

From Table 5, Multiple linear regression analysis demonstrates that both learner motivations and learner mechanisms positively influence language learning autonomy, with learner mechanisms having a more substantial impact (standardized regression coefficient of 0.747, $p <$

0.001) compared to learner motivations (standardized regression coefficient of 0.214, $p = 0.001$). This indicates that while motivation plays a role, the ability to set goals, self-regulate, and engage in self-directed learning activities is a stronger predictor of autonomy.

Table 5. Coefficients of the Model Analyzing Learner Motivation, Learner Mechanisms and Language Learning Autonomy

Model	Non-Standardized Coefficient		Standardized Coefficient	<i>t</i>	<i>p</i>
	B	Std. Error	Beta		
Constant	0.018	0.044	-	0.410	0.682
Motivations	0.228	0.066	0.214	3.475	0.001
Mechanisms	0.751	0.062	0.747	12.152	0.000

a. Dependent Variable: Language Learning Autonomy

Additionally, Pearson correlation analysis further supports these findings, showing a powerful positive correlation between language learning autonomy and learner mechanisms ($r = 0.955$, $p < 0.001$), as well as between language learning autonomy and learner motivations ($r = 0.939$, $p < 0.001$). These results highlight the importance of fostering motivation and structured learning strategies to enhance language learning autonomy, particularly developing effective learner mechanisms to empower students in their language learning journey.

Table 6. Pearson Correlation Analysis of Learner Motivation, Learner Mechanisms and Language Learning Autonomy

Pearson			
	Autonomy	Motivations	Mechanisms
Language Learning Autonomy	1		
Learner Motivations	0.939 ***	1	
Learner Mechanisms	0.955 ***	0.971 ***	1

The Finding of the Interviews

According to the theory of Dornyei (2001), who highlighted the crucial role of motivation in language learning, we designed an interview outline that included a range of topics. Furthermore, this interview was conducted with 5 English teachers from significant backgrounds. Based on the provided transcripts of the valuable insights, intrinsic similarities across these 5 aspects – Classroom Environment, Learner Beliefs, Instructional Strategies, Self-Assessment, and Challenges – lie in their shared goal of making students feel engaged, capable, and responsible for their learning. By creating relevant and immersive learning experiences, building self-belief, providing practical and autonomy-promoting instructional strategies, encouraging self-assessment, and offering targeted solutions to challenges, these teachers successfully foster an environment where students can thrive academically and personally.

Discussion

The Relationship Between Motivation and Language Learning Autonomy

This study revealed a significant positive correlation between learner motivation and language learning autonomy. Motivation acts as a catalyst, initiating the learning process and sustaining learners' engagement. However, the research highlighted that learner mechanisms, such as goal-setting, self-regulation, and self-directed learning activities, substantially impacted autonomy more than motivation alone. While motivation is essential for initiating learning, the learners' ability to manage and regulate their learning process ultimately determines their autonomy level. This suggests that educators should not only focus on enhancing students' motivation but also equip them with effective learning strategies and self-regulation skills.

The Role of Intrinsic and Extrinsic Motivation

The study found that intrinsic motivations, such as personal interest, enjoyment, curiosity, and satisfaction, were crucial in promoting language learning autonomy. However, the descriptive statistics indicated that students' intrinsic motivation levels were relatively low. This may be attributed to the exam-driven education system in China, where students often perceive English as a tool for academic and career success rather than a subject of personal interest. On the other hand, extrinsic motivations, including financial rewards, family expectations, and peer recognition, also contributed to language learning autonomy. The data suggested that these external factors somewhat influenced students, but the impact was not as strong as anticipated. This implies that while extrinsic motivation can provide an initial push, it may not be sufficient to sustain long-term engagement in language learning without developing intrinsic interest.

The Strong Influence of Learner Mechanisms on Autonomy

Learner mechanisms emerged as the primary factor influencing language learning autonomy in this study. The multiple linear regression analysis showed that learner mechanisms had the most significant positive effect on autonomy, with a standardized regression coefficient of 0.747 and a p-value of 0.000. This indicates that students who effectively set goals, self-monitor, and self-regulate their learning behaviors exhibit higher levels of autonomy. The qualitative analysis further supported this finding, with teachers emphasizing the importance of goal-setting, self-assessment, and structured learning strategies in promoting autonomy. These mechanisms enable students to take control of their learning process independently of their motivation levels and are critical for developing sustainable autonomous learning behaviors.

Comparison with Previous Research

This study aligns with previous research in confirming the positive relationship between motivation and learner autonomy. Like Noels et al. (2000) and Gao (2010), this research found that motivated learners are more likely to engage in autonomous learning activities. However, the study also revealed some differences. Unlike prior studies that primarily focused on intrinsic motivation, this research highlighted the more decisive influence of learner mechanisms on autonomy development. This suggests that structured learning mechanisms may be more effective in fostering

autonomy in the Chinese EFL context than relying solely on motivation. Additionally, the study found that extrinsic motivation alone is insufficient to foster long-term autonomy, consistent with Self-Determination Theory (Ryan & Deci, 2000) and previous research indicating that external rewards may provide short-term motivation but do not always lead to self-directed learning behaviors.

5. Conclusion

This study effectively achieved its objectives by examining the factors influencing language learning autonomy among Quanzhou College of Technology students. The findings highlight the significant role of intrinsic motivations, such as personal interest and enjoyment, in fostering autonomy, aligning with broader trends in self-directed learning. Extrinsic motivations, including family expectations and career aspirations, also contribute, though to a lesser extent, to reflect the external pressures and rewards that shape student behavior. Notably, learner mechanisms, such as goal setting and self-regulation, emerged as the most influential factor, emphasizing the importance of structured learning strategies in enhancing autonomy. After interviewing 5 English teachers, it is suggested that educational interventions should be designed to enhance both motivational factors and learner mechanisms.

The theoretical implications of these findings are manifold. Firstly, they reinforce the Self-Determination Theory, which posits that autonomy, competence, and relatedness are essential for intrinsic motivation and self-regulated learning. The significant influence of learner mechanisms aligns with this theory, emphasizing the importance of self-regulation in fostering autonomy. Secondly, the findings support the Expectancy-Value Theory, which suggests that students' motivations are influenced by their beliefs about the value of the task and their expectations of success. Both intrinsic and extrinsic motivations play a role in shaping these beliefs and expectations, thereby affecting language learning autonomy.

However, the study has several limitations, including its reliance on a sample from a single vocational institution in China, which limits the generalizability of the findings to other educational contexts. The use of self-reported data may introduce biases due to socially desirable responses, and the cross-sectional design restricts the exploration of long-term effects on language learning autonomy. External factors such as government policies, economic conditions, and curriculum changes were not thoroughly analyzed, and the complex interplay of motivational and autonomous learning factors makes establishing direct causal relationships challenging. Additionally, while the role of technology in autonomous learning was acknowledged, the study did not extensively evaluate the effectiveness of specific digital tools, suggesting areas for future research, such as longitudinal studies, experimental designs, and a broader examination of diverse educational settings and technological impacts.

Recommendation

Recommendations for Policy Makers

Policymakers should prioritize integrating learner autonomy into national and institutional language education frameworks by mandating the inclusion of self-regulation and goal-setting strategies in curricula. They should also invest in teacher training programs to equip educators with the skills to foster autonomy and allocate resources for adopting digital tools and e-learning platforms. Additionally, policies should address socio-economic disparities to ensure equal access to educational resources, particularly for vocational students, enabling all learners to develop language learning autonomy effectively.

Recommendations for Educators

Educators should focus on creating engaging and interactive learning environments that spark students' intrinsic motivation by incorporating activities aligned with their interests, such as English literature, media, and cultural exploration. They should also leverage extrinsic motivation by connecting external goals like career advancement to students' internal values and using non-monetary rewards like certificates and peer recognition. Additionally, teachers should explicitly teach learner mechanisms, such as goal-setting and self-regulation, and integrate technology and real-world tasks to enhance students' practical skills and autonomy.

Recommendations for Future Research

Future research should employ longitudinal designs to track the long-term impact of motivation and autonomy on language learning outcomes and expand studies to include diverse student populations from various educational settings and cultural backgrounds. Researchers should also investigate the influence of external factors like government policies and economic conditions, explore the effectiveness of specific digital tools and AI-driven platforms, and use qualitative and mixed-methods approaches, such as case studies and experimental designs, to gain deeper insights into learner experiences and causal relationships.

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Investigation on Dual Band Compact Antenna for Vehicle-to-Vehicle Communication

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ABSTRACT

Antenna Design plays crucial role for the vehicular communion as the vehicular technology advancement. Research is carried out for antenna design for V2V communication for vehicular systems. Designed antenna has high efficiency, red for the higher data rate in V2V communication. The Gain, S11 and Efficiency are suitable for V2V communication. Antenna works at 2.45 GHz and 5.9GHz frequency for vehicular Communication. The placement of antenna is another factor which is analyzed by using field pattern of designed antenna. Designed Antenna efficiency is 85% for Vehicular Communication. The Antenna can be used for Vehicle-to-Vehicle communication for 802.11p. The Antenna is designed by using HFSS tool.

Keywords: VSWR, Vehicular Communication, vehicle-to-vehicle communication (V2Y), Patch Antenna. Gain

1. Introduction

Current research is carried out for antenna design and analysis for vehicular communication. Studies have been conducted on wideband communication. The size of the antenna is crucial for fitting into small devices. Many techniques have been employed JO reduce antenna size the connected cars domain is getting focus now days, due to advancement in vehicular technology and SDV.

Nowadays, vehicular communication is becoming increasingly significant for connected vehicles. The safety of vehicles and passenger is most important in Vehicular Technology (Arora et al., 2019). SDV deals with drawbacks in current vehicular system as Collison avoidance and Blind spots detection. SDV are equipped with infotainment systems that provide both information and entertainment. In the automotive sector, connectivity often includes WLAN, Bluetooth, and vehicle-to-vehicle (V 2 V) communication (Artner et al, 2019). Antennas play a critical role in ensuring reliability, accuracy, and efficient communication within connected cars (Yang et al., 2018). Infotainment systems commonly use WLAN and Bluetooth antennas to connect various devices inside the car (Doone et al., 2018). The need of high-throughput efficient antennas is growing significantly for efficient communication (Akdeniz et al.).

The significance of antennas is huge in connected cars domain cannot be neglected (Adhikari et al., 2016). They are vital for ensuring reliable, and efficient communication. This

necessitates the design and implementation of MIMO antennas for infotainment and vehicle-to-vehicle (V2V) communication. The collision avoidance and Infotainment systems typically utilize WLAN and Bluetooth antennas to connect devices. The need of high-throughput efficiency antennas increasing as the number of connected devices increases (Funke et al., 2017).

ITS Connected vehicles, the distance and position of each car is floated to every device in connected cars network (Rappaport et al., 2017). This data needs to be communicated to the cloud. Utilizing the real-time processing through the Internet of Things (IOT) (Milanes et al, 2010). Real-time, low-latency IoT data is crucial role for collision avoidance. Various antenna designs have been proposed in the literature (Mondal et al., 2018). While some of these antennas are easy to install on vehicles and have less bandwidth and efficiency (Ucar et al, 2016). Cost may vary for the antenna design for V2v Communication (Herbert et al., 2014).

2. ANTENNA DESIGN

The design parameters are illustrated in Fig. 1, which provides a top view of the antenna. The physical dimensions of antenna are as shown in Fig. 1

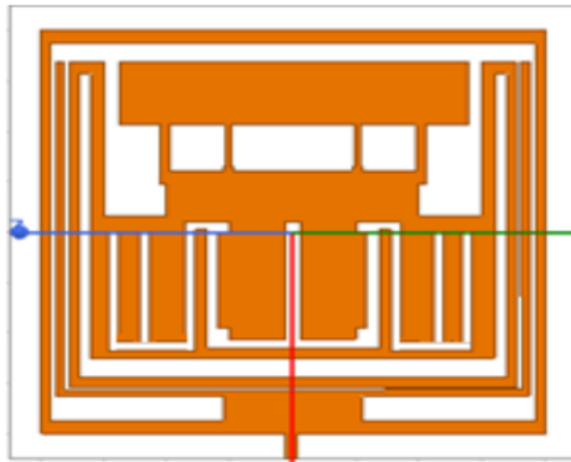


Figure.1 Top view of the antenna Design

Design steps for vehicular antenna:

- 1) Rectangular slot with a size of Length (L) 13.5mm and width (W) of 13.5mm on the substrate.
- 2) White portion is Dielectric
- 3) The antenna is able to generate multiple frequency 2.45 GHz and 5.9 GHz Frequency.
- 4) Substrate Rogers RT-5880 dielectric is used. Loss tangent 0.0012, and thickness 0.25mm
- 5) By the variation of the distance l , we can observe in the changes in the S11-Return loss parameter can be varied.

L = 13.5	W = 13.5	l = 11.5	m = 11.5	n = 10.9	o = 6.6
p = 2.35	fw = 1	q = 6.1	r = 2.0	S = 1.3	t = 1.85

To improve the radiation characteristics, stubs are used in the radiating patch. Stubs placed symmetrically. The electrical length of stubs is utilized for radiating at different frequencies 2.45 GHz and 5.9 GHz. The geometry of the designed antenna is shown in Fig. 1

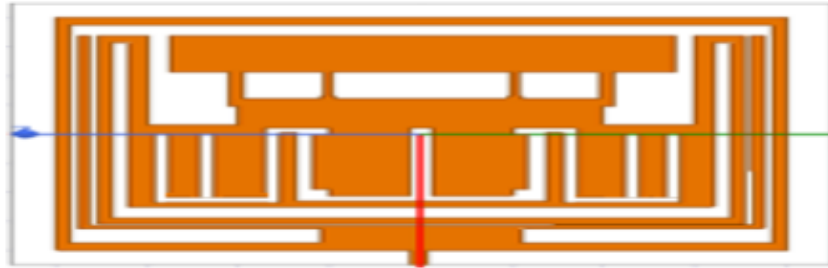


Figure. 2. Design antenna with feed line

6) Antenna Designed stages are shown below image and Rogers material is used for Antenna Design. S11 values are shown for the stages in the figures

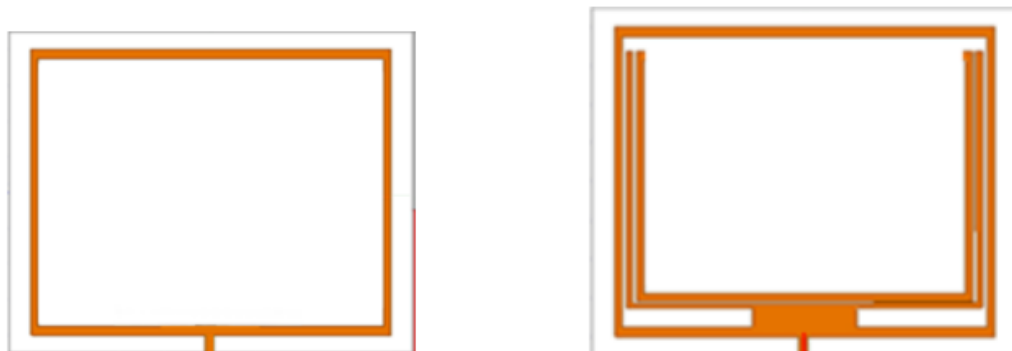


Figure. 3. Antenna Design Evolution Stages stage 1, Stage 2

Antenna Design evolution stages are shown and modifications are done by adjusting the stubs and shapes of the structure. There are one U shaped for 2.45 GHz frequency generation and stubs are formed. In another stages triple w shape is used for another frequency band. The electrical length of the patch is increased for higher efficiency. The feedline input is shown for the excitation to the antenna (Uwaechia and Mahyuddin (2020)).

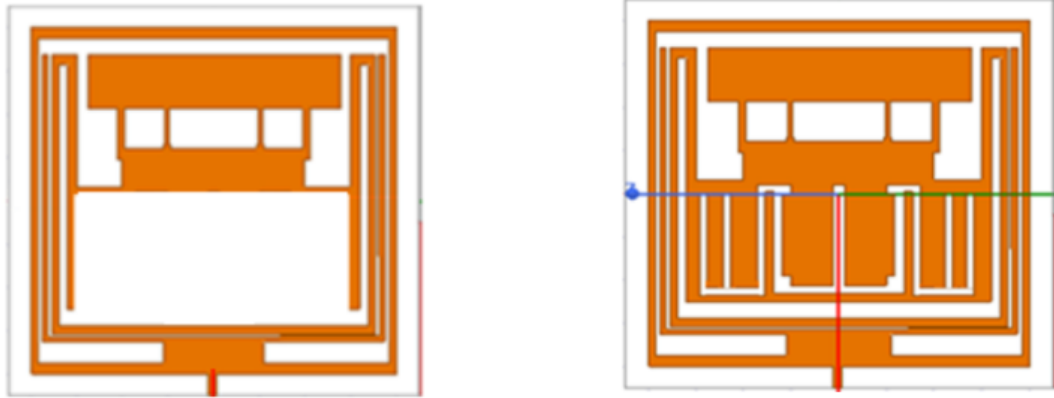


Figure. 4. Antenna Design Stage 3 and Stage4

3. SIMULATION RESULTS AND ANALYSIS

Connected cars domain is getting attraction for researchers. Due to the growth of the connected cars automotive domain has lot of chances of research in the field of antenna communication (Wang et al.,2018). This domain deals with the vehicle-to-vehicle communication, in vehicle communication, vehicle to pedestrian communication and pedestrian to vehicle communication. So, for all these communications there is need of efficient antennas design, which can work in real time data handling. So, the through put should be high for connected cars domain.

The role of antenna designed for V2V communication plays an important role for Software defined Vehicles (SDV) and Autonomous cars (Roque-Cilia et al., 2019). The Important factor for such communication is Latency and Throughput and Antenna design in the research is solution for the Throughput.

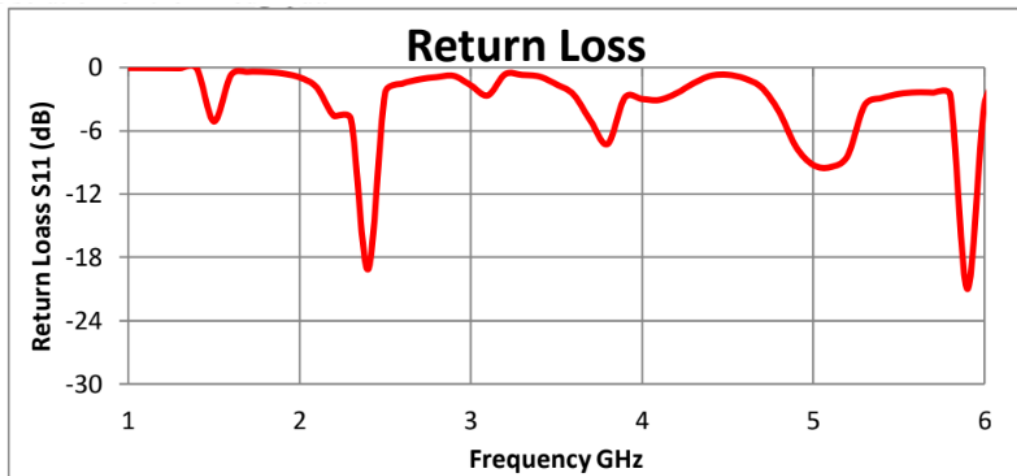


Figure. 6. Return Loss at frequency 5.8 GHz.

In the connected cars domain, interference between vehicles on the road must be considered, especially when using 802.11 WLAN systems. Strong interference significantly impacts throughput, necessitating the measurement of interference levels and path loss between the 2.4 GHz and 5.9 GHz bands. Due to the lower path loss, interference is quite high in this domain, and analyzing data rates in relation to interference or attenuation is essential for designing efficient antenna systems for connected car communication.

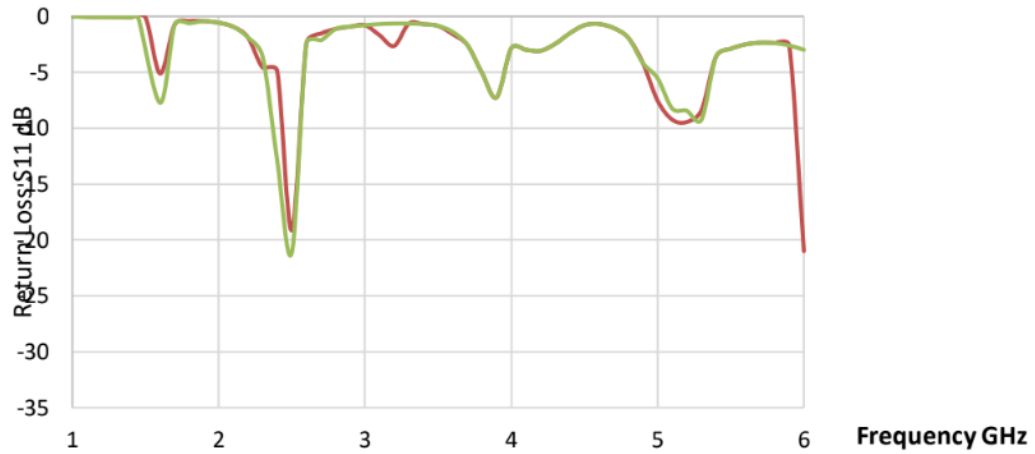


Figure. 7. Variation in S11 value with E shaped length 1 mm and 2 mm

Antenna Gain

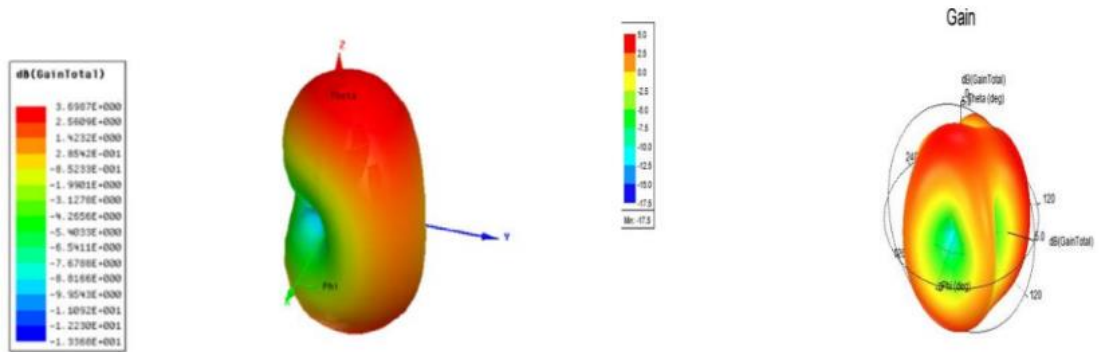


Figure. 8. Polar Plot Antenna Gain at frequency 2.45 GHz and 5.9 GHz.

SN	Frequency GHz	Gain dB achieved
1	5.9	5.0
3	2.45	3.6

VSWR value for 5.9 Frequency is 1.4 and at frequency 2.45 GHz VSWR 1.32 is which is good for antenna designed.

Antenna Electric Field

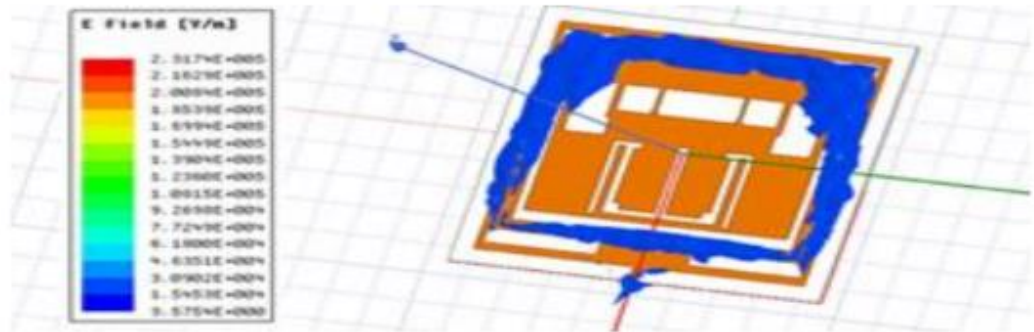


Figure. 9. Electric field Distribution

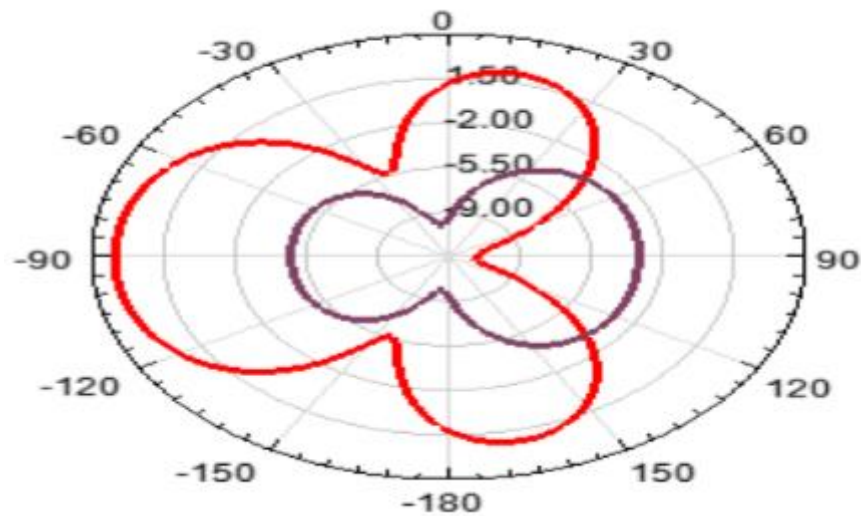
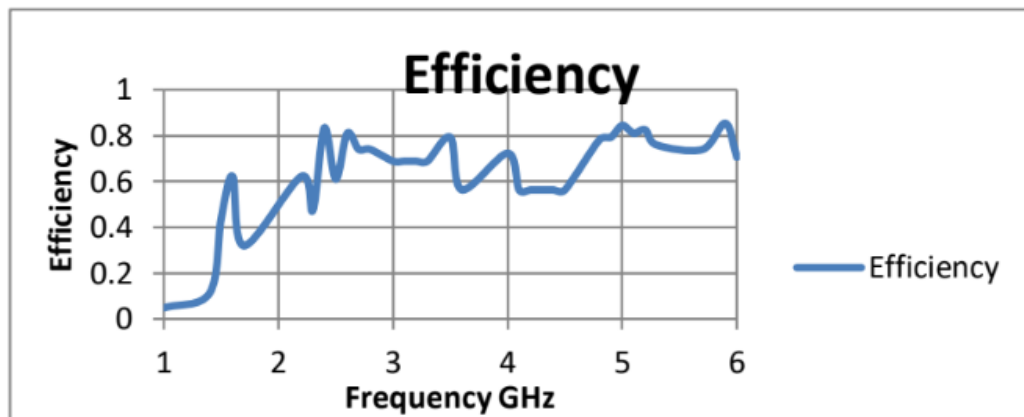


Figure. 11. Antenna Radiation Pattern

Antenna Efficiency

Antenna efficiency at frequencies 2.45 GHz and 5.9 GHz is found 83% and 85% as shown in the figure. Which is required for the V2V communication vehicular communication. The Efficiency is very crucial factor for antenna design for v2v communication as the data rate for v2v communication will be reliable and fast with higher value of spectral efficiency. So, all the use cases for v2v communication in modern era based on autonomous cars or infotainment systems are basically data hungry. So large amount of data needs to be transmitted in the channel without low losses is essential.



4. Conclusion

Antenna is designed for Vehicular to vehicular for Vehicular communication. The antenna size is compact and gain value is 3.db. Antenna efficiency is 83% and 85% at frequencies 2.45 GHz and 5.9 GHz. for Vehicular communication. The antenna is best suited for V2V communication for Intelligent Transportation system. The Spectral efficiency shows promising results for the proposed antenna design for v2v communication.

The proposed antenna is suitable and utilized for v2V communication For Future work the antenna gain can be improved for higher frequency ranges for far distance communication.

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FACTORS INFLUENCING THE CONSUMPTION BEHAVIOR OF COLLEGE STUDENTS: A CASE
STUDY OF QUANZHOU COLLEGE OF TECHNOLOGY

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ABSTRACT

This study examines how intrinsic motivations, extrinsic influences, and demographic factors shape consumption behavior at Quanzhou College of Technology. A structured, self-administered questionnaire was used to collect data from 400 students, which were then analyzed using multiple regression techniques. Results show that personal values (e.g., ethics, sustainability) and technological convenience are the strongest predictors of consumption behavior, with gender and income also playing significant roles. Technological convenience emerged as a crucial extrinsic factor, highlighting the increasing reliance on digital platforms in student purchasing decisions. Demographic factors such as gender and monthly income influenced consumption patterns, whereas age and academic major were less impactful. This study contributes to the existing literature by demonstrating that intrinsic motivations and technological factors play a more decisive role within a homogenous student population than traditional demographic variables. The findings underscore the need for marketers to leverage ethical branding and seamless digital experiences, while educators should prioritize sustainability education and digital literacy. These strategies align with evolving student values and technological trends (Al-Jubari, 2019; Al-Falasi, 2024). However, limitations include the cross-sectional design and single-institution focus, warranting longitudinal and multi-site studies.

Keywords: Consumption Behavior, Intrinsic Motivation, Extrinsic Motivation, Demographic Variables, College Students, Quanzhou College of Technology

1. Introduction

The consumption behavior of college students is an area of growing interest due to its significant impact on economic trends and social dynamics. As a key demographic with increasing purchasing power, college students exhibit unique consumer habits influenced by demographic factors, intrinsic motivations, and extrinsic influences. Understanding these behaviors informs strategies for education, marketing, and policy-making.

Research has identified several factors that shape consumption choices, including the Theory of Planned Behavior (TPB; Ajzen, 1991) and Self-Determination Theory (SDT; Deci & Ryan, 2000). Recent studies integrate these frameworks to analyze how intrinsic values and extrinsic technological factors interact (Al-Jubari, 2019), providing a robust foundation for understanding consumption behavior in digital contexts.

In China, the rapid growth of digital technology has dramatically altered the landscape of consumer behavior among college students. The "2023-2024 China College Student Consumption Insight White Paper" reports that by mid-2023, China had 884 million online shoppers, with college students forming a substantial part of this group. The paper also notes that 76.5% of college students shop online at least once a week, showing how deeply e-commerce and mobile payments are embedded in their daily lives. This trend underscores the increasing importance of technology in shaping consumer behavior, especially in fast-growing regions (Margulies, 2024).

Smith and Anderson (2020) highlighted the strong impact of mobile technology on student consumption habits, aligning with broader trends in digital consumerism. However, few studies explore consumption behavior in vocational colleges, limiting insights into this specialized student population. Unlike students at traditional universities, vocational college students may have different spending priorities, influenced by their focus on practical skills and the economic environment.

This study explores students' consumption behavior at Quanzhou College of Technology, a vocational institution in one of China's economically dynamic regions. By focusing on how demographic factors, intrinsic motivations, and extrinsic influences interact in this unique setting, the study seeks to provide insights that are particularly relevant for understanding consumer behavior in vocational education contexts.

The findings from this research will contribute to the broader literature on student consumer behavior and offer practical insights for educators, marketers, and policymakers. These insights are expected to help craft strategies that encourage responsible and effective consumption among students in an increasingly digital world.

2. Literature Reviews

Understanding the factors influencing consumer behavior among college students, particularly at Quanzhou College of Technology, requires a multifaceted approach. This study uses the Theory of Planned Behavior (TPB) and Self-Determination Theory (SDT) to analyze consumption behavior, complemented by the Black Box Model for contextualizing external stimuli. These frameworks offer a comprehensive lens to analyze how internal and external factors shape

students' purchasing decisions, especially in a rapidly digitalizing and economically vibrant environment.

Theoretical Frameworks

Theory of Planned Behavior (TPB)

Ajzen's (1991) Theory of Planned Behavior has long been a foundational model for predicting consumer behavior. This theory posits that behavior is driven by behavioral intentions, which are shaped by three core components: attitudes, subjective norms, and perceived behavioral control. For college students, TPB helps explain how their attitudes toward consumption—such as preferences for sustainability or brand loyalty—are influenced by social norms and their perceived ability to manage finances. Recent studies (e.g., Wang et al., 2020; Kim et al., 2021) reaffirm TPB's relevance in predicting student consumption, particularly within digital and peer-influenced environments. This framework is beneficial for understanding how Quanzhou College of Technology students might balance personal preferences with social expectations in their purchasing decisions (Thepa, 2024).

Self-Determination Theory (SDT)

Deci and Ryan's Self-Determination Theory (SDT; 2000) distinguishes between intrinsic motivations (e.g., personal values) and extrinsic motivations (e.g., social approval). This theory, combined with TPB, explains how internal desires and external pressures interact to influence consumption decisions (Al-Jubari, 2019). SDT distinguishes between intrinsic motivations (such as personal values and ethical beliefs) and extrinsic motivations (such as social approval and rewards). For college students, intrinsic motivations might drive behaviors like choosing sustainable products, as supported by recent studies (Huang et al., 2017; Kim et al., 2021). On the other hand, extrinsic motivations, including social influences and technological convenience, often guide consumer choices in a more immediate, externally driven context. This theory remains crucial for explaining the interplay between internal desires and external pressures, particularly in a setting like Quanzhou College of Technology, where academic and social environments are highly influential.

Black Box Model

The Black Box Model, introduced by Kotler and Keller (2012), conceptualizes consumer behavior as a process where external stimuli—such as marketing efforts and cultural influences—are processed internally, leading to specific purchasing decisions. Despite its long history, this model continues to be relevant, particularly in the context of modern digital marketing. Recent research by Chen and Zhao (2019) highlights how digital marketing strategies interact with students' internal processing mechanisms, influencing their consumption choices. Within Quanzhou College of Technology, this model helps explain how students process environmental cues and marketing messages, ultimately shaping their purchasing behaviors in a technologically driven marketplace.

Factors Influencing Consumption Behavior

Demographic Variables

Demographic factors, including gender, age, academic major, and income, significantly shape consumption behavior among college students. Smith and Anderson (2020) found that gender differences influence spending priorities, with male students often focusing on technology, while female students prioritize fashion and personal care products. Similarly, Zhang (2019) underscored the impact of income levels on consumption, noting that higher-income students are more likely to engage in discretionary spending. These findings highlight how demographic variables are fundamental to understanding the diverse consumption patterns among students, particularly in a region as economically dynamic as Quanzhou.

Intrinsic Motivations

Intrinsic motivations, such as personal values, lifestyle choices, and attitudes, are key drivers of consumer behavior. Deci and Ryan (2000) emphasized that intrinsic motivations often lead individuals to engage in behaviors that align with their values and beliefs. For instance, students prioritizing sustainability are more likely to purchase eco-friendly products, a trend supported by recent research (Huang et al., 2017). Furthermore, lifestyle choices, particularly those related to health and wellness, significantly influence spending on related products and services (Liu & Chen, 2021). These intrinsic motivations are crucial for understanding how students at Quanzhou College of Technology make value-driven purchasing decisions in an increasingly competitive and value-conscious market.

Extrinsic Motivations

Extrinsic factors, such as economic conditions, technological advancements, and social influences, significantly impact students' consumption choices. Li et al. (2021) noted that the rise of mobile payments and e-commerce platforms has made convenience a central factor in students' purchasing decisions. Additionally, Zhang (2019) and Inayati and Azizah (2019) highlighted the strong influence of social media and peer pressure, demonstrating how external rewards and societal expectations drive consumer behavior among college students. These extrinsic motivations are particularly relevant in Quanzhou College of Technology, where technological integration and social networks play a prominent role in shaping student lifestyles and consumption habits.

3. Research Methodology

This study was designed to identify and analyze the key factors influencing consumption behavior among Quanzhou College of Technology students. A quantitative research approach was employed, utilizing a structured, self-administered questionnaire as the primary data collection tool. The questionnaire was adapted from three well-established theoretical frameworks: Ajzen's (1991) Theory of Planned Behavior, Deci and Ryan's (2000) Self-Determination Theory, and Kotler and Keller's (2012) Black Box Model. These frameworks provided a solid foundation for exploring the relationships between demographic variables, intrinsic motivations, and extrinsic influences on students' purchasing decisions.

The questionnaire included four sections: demographic information, consumption behavior, intrinsic motivations, and extrinsic motivations. The latter three sections utilized a Likert scale to gauge the degree of agreement or disagreement with various statements, allowing for a nuanced analysis of the factors influencing consumption behavior.

Stratified random sampling ensured proportional representation (Creswell, 2014). Data analysis followed Hair et al.'s (2010) recommendations for multivariate regression, using SPSS to test hypotheses.

Data collection took place over four weeks, with the questionnaire distributed exclusively through "Questionnaire Star." This online platform allowed for efficient data collection, leveraging the university's internal communication networks and social media platforms to maximize participation. Before full-scale distribution, the questionnaire was pre-tested with a small group of students to assess its clarity, reliability, and validity. Feedback from the pre-test informed minor revisions, ensuring the final instrument was well-suited to capturing accurate and meaningful data (Pallant, 2020).

The data were analyzed using SPSS (Statistical Package for the Social Sciences), a standard tool for statistical analysis in social science research (Pallant, 2020). Descriptive statistics, such as means, frequencies, and standard deviations, were calculated to comprehensively overview the sample's demographic characteristics and general consumption trends. Multiple regression analysis was then employed to examine the relationships between the independent variables (demographic factors, intrinsic motivations, extrinsic motivations) and the dependent variable (consumption behavior). This approach allowed the study to identify significant predictors of consumption behavior and understand how these factors interact within the Quanzhou College of Technology student population.

Ethical considerations were rigorously adhered to throughout the research process. Participants were fully informed of the study's purpose, and their consent was obtained before participating. They were assured of the confidentiality and anonymity of their responses, with all data securely stored and coded to protect their identities. These ethical practices were crucial for protecting participant rights and ensuring the credibility and integrity of the study's findings. The study was approved by the ethics committee of Quanzhou College of Technology, ensuring that all research activities complied with ethical standards and guidelines (Creswell, 2014).

4. Summary of Findings

This study aimed to explore the factors influencing the consumption behavior of students at Quanzhou College of Technology by examining the impact of demographic variables and intrinsic and extrinsic motivations. The findings, summarized in the tables below, provide detailed insights into how these factors shape college students' consumption patterns.

Impact of Demographic Variables

In this study, Gender ($t = -2.188$, $p = 0.029$) and monthly income ($F = 6.933$, $p = 0.000$) significantly influenced consumption behavior, corroborating previous findings on demographic segmentation (Smith & Anderson, 2020; Zhang, 2019). Female students (61.7%) reported more

diverse consumption methods than males (38.3%), as detailed in Table 1. Additionally, students with higher monthly incomes exhibited more varied consumption behaviors, with those earning above a certain threshold showing a greater propensity for luxury and non-essential purchases. Age, grade level, and academic major did not significantly influence consumption behavior, likely due to the relatively homogeneous nature of the sample.

Table 1. Summary of Demographic Variables and The Impact on Consumption Behavior

Demographic Factors	Consumption Behavior	Results
Gender	$t(398) = -2.188, p = 0.029$	✓
Age	$F(2, 397) = 1.552, p = 0.213$	-
Grade Level	$F(2, 397) = 1.747, p = 0.176$	-
Major	$F(5, 394) = 0.325, p = 0.898$	-
Monthly Income	$F(4, 395) = 6.933, p = 0.000$	✓

Notes: ✓ Accept the hypothesis at the significant value of 0.050.

- Reject hypothesis at the significant value of 0.050.

Influence of Intrinsic Motivation Factors

The study further examined the role of intrinsic motivation factors—personal attitude, lifestyle, and values—on consumption behavior. As presented in Table 2, Personal values were the strongest predictor of consumption purposes ($R^2 = 0.544$). Personal attitudes also significantly influence overall consumption behavior, particularly in guiding ethical purchasing decisions. The forecasting equations shown in Table 3 detail the predictive relationships, underscoring the critical role of personal values in shaping student consumption.

Table2. Summary of Intrinsic Motivation Factors and Their Influence on Consumption Behavior

Intrinsic Motivation Factors	R	R Square	Adjusted R Square	Std. Error of the Estimate
Consumption Methods	0.567	0.322	0.318	0.62461
Consumption Purposes	0.738	0.544	0.541	0.49997
Consumption Behavior	0.633	0.401	0.398	0.57760

Predictors: (Constant), Personal Attitude, Personal Values, Personal Lifestyle

Dependent Variable: Consumption Methods, Consumption Purposes, Overall Consumption Behavior

Table 3. Forecasting Equations for Consumption Behavior Based on Intrinsic Motivation Factors

Dependent Variable	Forecasting Equations
Consumption Methods Y_1	$Y_1 = 1.590 + 0.391X_1 + 0.154X_3$
Consumption Purposes Y_2	$Y_2 = 0.839 + 0.388X_1 + 0.153X_2 + 0.182X_3$
Consumption Behavior Y_T	$Y_T = 1.459 + 0.408X_1 + 0.199X_2$

X_1 = Personal Attitude X_2 = Personal Lifestyle X_3 = Personal Values

Influence of Extrinsic Motivation Factors

Extrinsic motivations, including economic, social, and technological factors, were also significant determinants of consumption behavior. Table 4 summarizes the statistical impact of these factors, with technological advancements being the most influential ($R = 0.716$ for consumption purposes). The forecasting equations provided in Table 5 illustrate how these external factors drive complex and diverse consumption patterns among students, particularly in a highly digitalized environment.

Table 4. Summary of Extrinsic Motivation Factors and Their Influence on Consumption Behavior

Extrinsic Motivation Factors	R	R Square	Adjusted R Square	Std. Error of the Estimate
Consumption Methods	0.612	0.374	0.369	0.60081
Consumption Purposes	0.716	0.513	0.509	0.51680
Consumption Behavior	0.666	0.444	0.439	0.55722

Predictors: (Constant) Economic Factors, Social and Cultural Factors, Technological Factors

Dependent Variable: Consumption Methods, Consumption Purposes, Overall Consumption Behavior

Table 5. Forecasting Equations for Consumption Behavior Based on Extrinsic Motivation Factors

Dependent Variable	Forecasting Equations
Consumption Methods Y_1	$Y_1 = 1.212 + 0.215X_1 + 0.212X_2 + 0.251X_3$
Consumption Purposes Y_2	$Y_2 = 0.686 + 0.355X_1 + 0.234X_2 + 0.197X_3$
Consumption Behavior Y_T	$Y_T = 1.120 + 0.248X_1 + 0.191X_2 + 0.286X_3$

X_1 =Economic Factor X_2 =Social and Cultural Factors X_3 =Technological Factors

The findings from this study underscore the importance of intrinsic and extrinsic motivations in shaping consumption behavior among college students. Personal values, in particular, play a crucial role in guiding ethical consumption choices, while technological convenience is a dominant factor in influencing how students make purchases. These results contribute to a deeper understanding of consumer behavior in a digital context, emphasizing the need to consider a combination of internal and external factors when analyzing purchasing decisions.

5. Conclusion

This study successfully addressed its objectives by exploring the factors influencing consumption behavior among Quanzhou College of Technology students. Findings highlight personal values as the key driver of ethical consumption, supported by technological convenience and demographic factors. This focus on personal ethics aligns with global trends toward sustainability, highlighting a significant shift in student consumption priorities. Additionally, technological convenience emerged as a dominant extrinsic motivator, reflecting the deep integration of digital platforms into everyday life and their impact on purchasing behavior. Contrary to studies highlighting age and significant effects (Li & Wang, 2018), this study found no significant impact, likely due to sample homogeneity. However, female students (61.7%) and higher-income

groups showed distinct preferences, aligning with Generation Z consumption rationalization trends (华东师范大学 · 2024).

The study's results contribute to existing theoretical frameworks by providing empirical support for applying Ajzen's Theory of Planned Behavior in a digital consumer context. The dominance of technological convenience ($R = 0.716$) aligns with SDT's emphasis on extrinsic motivation, where digital accessibility enhances perceived behavioral control (Ajzen, 1991; Al-Jubari, 2019). This finding mirrors national trends, with 76.5% of Chinese students shopping online weekly (Al-Falasi, 2024). These insights are crucial for marketers seeking to engage this demographic, as they indicate that appeals to values and leveraging digital platforms may be more effective than traditional demographic-based strategies. In a broader societal context, this study highlights the shifting priorities of young consumers toward ethical consumption and digital efficiency, suggesting that future policies and business strategies should align with these evolving consumer values.

However, the study's limitations, such as its cross-sectional design and the focus on a single institution, suggest that the findings should be interpreted cautiously. While the research provides valuable insights into current consumption behaviors, it may not fully capture how they evolve over time or across different cultural contexts. Future research should use longitudinal designs with diverse samples to explore dynamic consumption patterns. Furthermore, the unexpected minimal influence of certain demographic factors warrants further investigation to determine whether this is a broader trend or unique to the specific population studied. Expanding the research to include behavioral data and applying the findings in different cultural contexts could provide a more comprehensive understanding of student consumption behavior in the digital age.

Recommendation

Recommendations for Marketers

Marketers should focus on leveraging ethical branding, as this study demonstrates the importance of personal values, particularly ethics and sustainability, in influencing student consumption behavior. Businesses can resonate with a growing segment of ethically-conscious student consumers by emphasizing social responsibility, environmental sustainability, or fair labor practices. Marketing campaigns highlighting these values are likely to build trust and long-term loyalty among students who are increasingly focused on the societal impact of their purchasing decisions.

Given the significant role of technology in shaping consumption patterns, businesses should prioritize enhancing their digital engagement. Students are increasingly making purchasing decisions based on the ease and convenience of digital platforms. Therefore, companies should invest in developing user-friendly, mobile-optimized websites, offering secure and seamless payment options, and personalizing the shopping experience. As found in this study, over 60% of students cited technological convenience as a key factor influencing their purchasing decisions, underscoring the need for streamlined digital interactions. This will enable businesses to capture the attention of digitally savvy students who expect efficiency in their online interactions, mainly when using mobile devices.

Furthermore, marketing strategies should be segmented based on demographic factors such as gender and income. The study found that female students and higher-income students exhibit different consumption behaviors, suggesting the need for more targeted marketing approaches. Campaigns that speak to the preferences of female students, such as those focused on fashion and lifestyle, may be more effective for this demographic. Similarly, higher-income students are likelier to engage with premium or luxury products, while lower-income students may prioritize affordability and practicality. Tailoring marketing strategies to these specific segments will allow businesses to meet the diverse needs of the student market more effectively.

Recommendations for Educators

Educators should integrate digital literacy programs to enhance students' ability to navigate e-commerce risks, echoing calls for financial responsibility in digital-native populations (华东师范大学 · 2024). This includes teaching students how to evaluate online information critically, navigate digital transactions securely, and make informed decisions in the digital marketplace. For instance, digital literacy workshops could be introduced during student orientations or as part of professional development programs. By fostering these skills, educators can help students become more responsible consumers, prepared to handle the risks and challenges of digital commerce in their personal and professional lives.

Additionally, universities should promote responsible consumption by integrating discussions about ethics, sustainability, and social responsibility into relevant courses. This can be achieved through case studies and real-world examples that encourage students to reflect on the broader implications of their consumption decisions. By instilling a sense of responsibility regarding environmental sustainability and social justice, educational institutions can cultivate students who are aware of their purchasing power and the broader impact of their consumption choices on society and the environment.

Recommendations for Future Research

For future research, it is essential to explore how cultural and regional differences influence consumption behavior. This study was conducted at a single institution in China, and the findings may not be generalizable to other settings. Cross-cultural studies that examine how consumer motivations differ across regions would provide a deeper understanding of how intrinsic and extrinsic factors operate in diverse contexts. Such research would enrich the field by offering comprehensive insights into global student consumption behavior.

Longitudinal studies are also recommended to track how consumption patterns evolve. The cross-sectional nature of this study captured behavior at a single point in time, but consumption behavior may shift as students transition from university to the workforce. Understanding how intrinsic motivations, such as personal values, and extrinsic factors, such as technological changes, influence long-term consumer behavior would offer a more dynamic perspective on how students' consumption evolves. Future research could also examine the role of emerging technologies, such as artificial intelligence and blockchain, in shaping the consumption behaviors of digitally connected students.

Finally, future research should investigate the interaction between intrinsic and extrinsic motivations further. While both motivations significantly influence consumption behavior, the interplay between personal values and external influences, such as peer pressure and technological convenience, remains underexplored. A deeper understanding of how these factors interact could provide more nuanced insights into student decision-making and help marketers develop strategies that address the complexities of these motivational drivers.

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**FACTORS INFLUENCING JOB SATISFACTION OF EDUCATORS IN YUNNAN ECONOMICS TRADE
AND FOREIGN AFFAIRS COLLEGE**

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ABSTRACT

This study aims to 1) analyze the impact of demographic factors on job satisfaction among educators and 2) explore the influence of work environment on job satisfaction. The research framework is based on Herzberg's two-factor theory. The sample size is 300 educators from Yunnan University of Economics, Trade and Diplomacy, China. The data analysis statistics were descriptive, including frequency, mean, and standard deviation. The inferential statistics were independent sample t-test, one-way ANOVA, LSD, and multiple linear regression. The results of the study found that differences in gender and marital status had a significant impact on job satisfaction differently, especially since female educators had higher job satisfaction than male educators. In addition, educators with longer work experience also show higher job satisfaction. Organizational identity and environmental facilities Workplace environment in the workplace environment significantly influence the overview of job satisfaction. In contrast, organizational identity and friendly welfare policies significantly influence intrinsic satisfaction. Organizational identity, environmental facilities, and interpersonal relationships significantly influence extrinsic satisfaction. The details of job satisfaction are discussed.

Keywords: job satisfaction, vocational education, workplace environment, organizational identification

1. Introduction

With the upgrading of the global economy and industrial structure and the increasing demand for skilled personnel, vocational education is crucial to national competitiveness and sustainable development. According to the National Implementation Plan for Vocational Education Reform No.4 for 2019, vocational education provides important human and intellectual support for national development, reflecting the irreplaceability of vocational education in talent training. The vocational education system encounters many challenges, such as insufficient teachers, uneven student quality, low social recognition, and unclear career path development, which affect educators' job satisfaction. Education reform has changed the content and methods of work, and how to maintain high satisfaction has become a focus of attention.

The job satisfaction concept is defined as the overall satisfaction of employees with the job, emphasizing the impact of the external environment (Hoppock, 1935). In the education world, quality educators must produce quality students. Educators' job satisfaction is extremely important because they require hard work and demanding quality. Great efforts must be implemented to produce happy, motivated, satisfied, and productive educators (Hee et al., 2019). It is important to study the job satisfaction of vocational school educators to improve the quality of education, promote teacher development, and optimize management.

In addition, the development of related disciplines such as educational psychology and organizational behavior indicates that more and more studies have begun to focus on the multidimensional influencing factors of job satisfaction. Sun and Zhou (2020) found that demographic variables such as age, gender, and educational background will impact job satisfaction. Li & Zeng (2020) show that the factors influencing employees' job satisfaction in enterprises can be roughly divided into work, interpersonal relationships, promotion space, and welfare treatment. These studies provide a theoretical basis and practical guidance for improving the job satisfaction of vocational education workers. Examining the factors influencing educators' job satisfaction helps boost their motivation and teaching quality. It carries significant implications for advancing the sustainable development of vocational colleges and enhancing the country's overall educational standards.

RESEARCH QUESTIONS

RQ1: How do the demographic factors affect educators' job satisfaction at Yunnan Economics Trade and Foreign Affairs College?

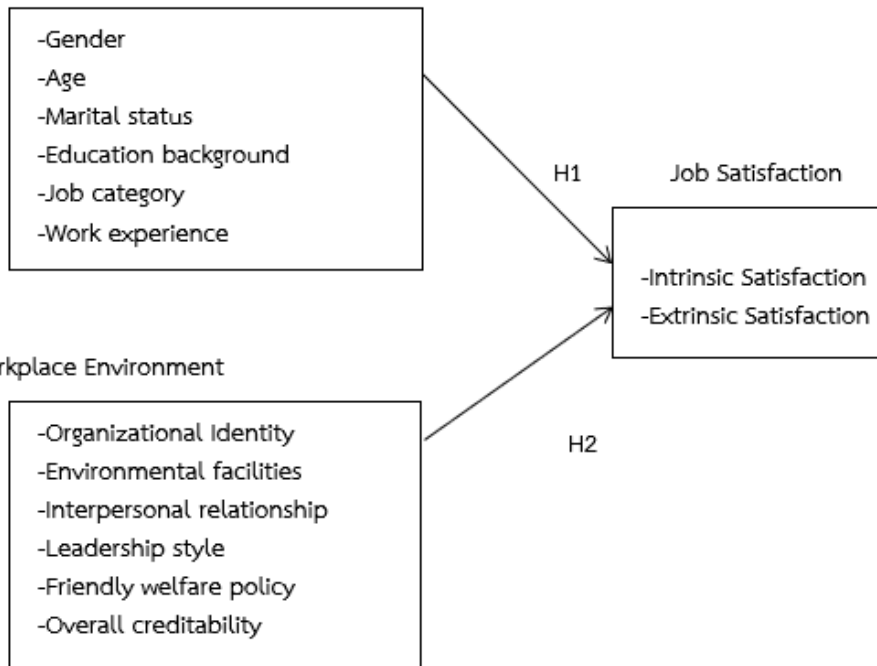
RQ2: How does the workplace environment influence educators' job satisfaction at Yunnan Economics Trade and Foreign Affairs College?

RESEARCH OBJECTIVES

- (1) To explore the impact of educators' demographic factors on their job satisfaction.
- (2) To examine the influence of workplace environment on job satisfaction.

RESEARCH FRAMEWORK

Demographic factors



Research Hypothesis

H1: The difference in demographic factors, including gender, age, marital status, educational background, job category, years of experience, and department, affect job satisfaction differently

H2: Workplace environment has influenced job satisfaction. Yunnan Economics Trade and Foreign Affairs College.

2. Literature Reviews

Herzberg's Two-Factor Theory

Herzberg's two-factor theory suggests that job satisfaction or dissatisfaction is influenced by two key factors: hygiene and motivation. Hygiene factors are extrinsic conditions related to avoiding unpleasantness that determine employee satisfaction. These include company policies, working conditions, salary, personal life, and job security. In contrast, motivation factors are intrinsic elements related to an employee's performance and job engagement. These factors encompass achievements, recognition, the nature of the work, responsibility, opportunities for advancement, and growth potential (Lee et al., 2022).

Research on job satisfaction has been conducted in various areas, especially jobs under pressure, such as work itself, leaders, colleagues, and workplace environment. Xu et al. (2013) pointed out that job satisfaction was divided into internal and external dimensions, which affect employees' emotional responses. Management skills, communication relationships, and growth incentives positively impact job satisfaction. Chhetri's (2025) research on job satisfaction

and performance of microfinance institutions reveals that reward and benefit structures significantly influence job satisfaction, followed by workplace relations and career development opportunities. Li et al. (2018) found that job satisfaction of early-career employees negatively predicted turnover intention, and affective commitment fully mediated the relationship between the two. This has important implications for enterprises when formulating human resource policies. Wang et al. (2019) showed that there is an "inverted U-shaped" curve relationship between salary level, job satisfaction, and overall perceived pay, in which overall perceived pay plays a mediating role.

Tang (2020) found that emotional support and monetary incentives had a negative impact on social workers' intention to leave, with monetary incentives having a more significant impact and being moderated by gender and age. Yin (2021) analyzed the impact of employee benefits on job satisfaction and organizational commitment from the perspective of Herzberg's two-factor theory and believed that a sound employee benefits system can improve job performance satisfaction and motivate employees to adhere to their organizational commitment. An & Tong (2020) showed that work stress of rural teachers negatively predicted job satisfaction, and low personal sense of accomplishment partially mediates between work stress and job satisfaction and is the main factor affecting job satisfaction.

Emotional Event Theory

Weiss and Cropanzano (1996) proposed the Emotional Event Theory (AET), which elaborated on how emotional events in the work environment affect employees' emotional reactions, work attitudes, and behaviors. The theory believes that emotional events at work, such as praise and conflict, will trigger positive or negative emotional reactions, affecting job satisfaction and performance.

First, job satisfaction is closely related to emotional events. Positive emotional events such as receiving rewards and achieving goals will enhance employees' positive emotions and improve job satisfaction. In contrast, adverse emotional events such as frustration and conflict lead to negative emotions and reduce job satisfaction.

Second, emotional events directly affect job satisfaction and indirectly affect employee behavior through emotional states. Continuous positive events will make employees more emotional, improve job satisfaction and performance, and reduce their willingness to leave. In contrast, long-term negative emotional states may reduce satisfaction, poor performance, and increased turnover rates.

In addition, employees' individual differences and emotion regulation abilities also affect their responses to emotional events. Employees with high emotional intelligence can better regulate negative emotions and maintain high satisfaction; employees with poor emotion regulation ability are more easily affected by negative events, and their satisfaction decreases significantly.

Social Identity Theory

Tajfel and Turner (1979) proposed social identity theory (SIT), which attempts to explain intergroup conflict as a function of group-based self-definitions. SIT emphasizes that individuals identify with their groups through social classification, forming internal group preferences and

external group biases. Organizational identification is divided into internal identification, which identifies organizational culture and values. External identification is an identification of an organization's image and status. Both internal and external identification significantly affect job satisfaction.

Social identity theory states that employees' sense of group belonging and self-concept building are crucial to job satisfaction. Team unity and motivation can enhance employees' sense of belonging and collective identity, thereby improving job satisfaction. Employees also tend to compare their team to other teams, and a sense of team success and competence can increase job satisfaction. In addition, the consistency between employees and organizational goals can enhance work motivation and satisfaction, and a strong sense of identification with organizational culture and values can stimulate work enthusiasm and make work more meaningful (Thepa, 2024).

Job Demand-Resource Model

Bakker et al. (2007) proposed the Job Demand-Resource Model (JD-R Model), a theoretical framework explaining the relationship between job demands, resources, and employee outcomes. The model suggests that every job has specific demands and resources that impact employees' well-being and performance. Job demands require sustained effort and can lead to strain or burnout if excessive, e.g., high workload, emotional strain, or time pressure—the impact of work environment factors on employee satisfaction, stress, and performance. Job demands are the psychological or physical efforts employees need to invest in, such as workload and time pressure; job resources are supportive factors, such as support, feedback, and autonomy. The model emphasizes the impact of the balance between job demands and resources on job satisfaction and stress levels: under the pressure mechanism, high demands and low resources lead to high stress, burnout, and decreased satisfaction; under the incentive mechanism, sufficient resources can relieve stress and improve motivation and satisfaction.

Career Adaptation Theory

The career adaptation theory focuses on how individuals adapt to changes and challenges during their career development (Savickas, 2013). The theory emphasizes the interaction between individuals and the work environment, arguing that needs and job requirements will change over time and economic conditions, and individuals need to seek consistency with the environment actively. When the work environment meets the needs and individuals can complete the work requirements, adaptability is enhanced, and job satisfaction and persistence will also increase (Thepa, 2024).

Individuals need adaptability, such as self-efficacy, career exploration ability, and flexibility to cope with workplace changes and challenges. Good career adaptability enables individuals to set goals and choose paths more autonomously, enhancing their sense of control and accomplishment and thus improving their job satisfaction. In addition, career adaptability can help individuals cope with workplace uncertainty and pressure and reduce frustration and dissatisfaction. Studies have shown that individuals with strong career adaptability usually have higher job satisfaction.

Person-Environment Fit

The person-environment fit emphasizes that individuals and their environment jointly shape their behaviors and attitudes. The theory holds that individuals will be more motivated when they work in a place that matches their skills, interests, values, and other characteristics. The essence of person-environment fit is that an individual's attitudes, behaviors, and other individual-level variables are not determined solely by the individual or his or her environment but by the relationship between the two.

When personal interests and professional values are highly aligned with the requirements and culture of the work environment, employees tend to feel a greater sense of accomplishment and satisfaction. When faced with work challenges and pressures, one can use one's strengths and skills to reduce stress and frustration. A friendly work environment can provide support and resources to help employees better complete tasks, thereby increasing job satisfaction. When employees feel recognized and supported in their work environment, they are likelier to show higher commitment and loyalty to their work.

Workplace Environment

"Workplace friendliness" is a key competitive advantage for organizational success in the era of globalization. Governments and businesses worldwide are committed to creating a welcoming work environment and emphasizing family-friendly policies. These policies should provide equal treatment for all employees and avoid discrimination. A friendly workplace should respect employees, alleviate concerns, meet various needs, and promote positive energy and circulation.

A friendly workplace is defined as an environment where employees are supported and helped to respect employees and create a supportive work environment. Du et al. (2013) proposed seven indicators of a friendly environment: workplace trust, supportive leadership, team collaboration, employee recognition, open communication, work-life balance, and fairness and justice, among which environmental indicators are crucial to determining friendliness. Xu and Wu (2015) explored a friendly workplace from perspectives on employee welfare, corporate welfare, and national social welfare. Jian (2018) defined five dimensions of a friendly work environment: environmental facilities and equipment, supervisor leadership style, imparting professional knowledge and skills, friendly welfare policies, and interpersonal relationships. Ye (2019) used a friendly workplace as a moderating variable, and Guo, Hu, and Xu (2016) identified four aspects of a friendly workplace.

3. Methodology

This study examines how demographic factors and the workplace environment affect job satisfaction among educators at Yunnan Economics Trade and Foreign Affairs College, China. The conceptual framework includes intrinsic and extrinsic satisfaction, with the work environment focusing on organizational identity, facilities, interpersonal relationships, leadership, welfare policies, and reputation. Demographic factors include gender, age, marital status, education, job category, experience, and department. The target population comprises full-time educators in the

academic year 2024, including teachers, administrative staff, and counselors. With a sample of 300 participants determined using Yamane's formula, data were collected via an online platform using a stratified random sampling method. The content validity was ensured through Item-Object Consistency (IOC) with input from three experts in the field with acceptable values to determine valid questions. Reliability, measured with Cronbach's alpha, ranged from 0.797 to 0.967 for various factors. Statistics used to analyze data were independent sample t-tests, one-way ANOVA, and multiple linear regression, which were statistically significant at 0.05.

4. Finding

Descriptive Statistics

The analysis revealed that 55.3% of the respondents are female, while 44.7% are male. The age distribution skews towards middle-aged groups, with 25.0% aged 36-40 and 23.0% aged 41-45, suggesting that most educators are middle-aged. A majority, 56.3%, of respondents are married. Regarding education, the respondents have relatively high qualifications, with 31.0% holding a master's degree and 23.3% holding a Ph.D. The job categories are fairly evenly distributed among teachers (30.3%), administrative staff (36.7%), and counselors (33.0%). Additionally, most respondents have over 10 years of work experience, with 46.3% having 11-20 years of experience and 14.3% having more than 20 years.

The descriptive results of the workplace environment, which include six aspects: organizational identity, environmental facilities, interpersonal relationships, leadership style, friendly welfare policies, and overall credibility, are shown in Table 1. The respondents rated all aspects of the workplace environment above 3, indicating general satisfaction. However, organizational identity, which refers to a strong sense of belonging to the school, had the highest mean value at 3.39. Satisfaction with environmental facilities and friendly welfare policies were closely aligned, with mean values of 3.19 and 3.18, respectively, suggesting that respondents are generally satisfied with these aspects. Additionally, the mean for leadership style was the lowest at 3.09, indicating that some respondents feel school leaders could improve in providing humanistic care.

From the perspective of overall job satisfaction, the average is 3.65, indicating that the respondents' job satisfaction is at a medium to high level. From the perspective of extrinsic satisfaction, its average is 3.53, indicating that the respondents' satisfaction is at a medium to high level, and overall satisfaction is higher than intrinsic and extrinsic satisfaction.

Table 1 Descriptive Results of Workplace Environment and Job Satisfaction

	Opinion Level					Mean	SD
	1	2	3	4	5		
Workplace Environment							
Organizational identity	2	54	95	122	27	3.39	.906
Environmental facilities	5	63	118	99	15	3.19	.880
Interpersonal Relationship	-	74	114	104	8	3.15	.824
Leadership Style	-	76	129	88	7	3.09	.797
Friendly Welfare Policy	4	60	130	91	15	3.18	.853
Overall Creditability	6	67	125	88	14	3.12	.878
Job Satisfaction							
Intrinsic satisfaction	3	66	71	131	29	3.39	.967
Extrinsic Satisfaction	-	44	82	144	30	3.53	.863
Overall Job Satisfaction	-	29	87	143	41	3.65	.834

Inferential Statistics

Table 2 presents the summary results of the differences in demographic factors that affect the job satisfaction of full-time educators who work in 11 departments at Yunnan Economics and Trade and Foreign Affairs College differently. The results indicate that the differences in age, educational background, job category, and work department have no significant effect on the job satisfaction of full-time educators working at Yunnan Economics and Trade and Foreign Affairs College. However, gender and marital status have significantly different effects on job satisfaction. In contrast, the difference in work experience has a significantly different effect on the extrinsic satisfaction of full-time educators who work at Yunnan Economics and Trade and Foreign Affairs College in this study at the statistically significant of 0.05.

Table 3 demonstrates the summary results of the influence of workplace environment on the job satisfaction of full-time educators who work at Yunnan Economics and Trade and Foreign Affairs College. For the educators at Yunnan Economics Trade and Foreign Affairs College, the organizational identity and environmental facilities in the workplace environment significantly influence the overview of job satisfaction. Organizational identity has a higher influence than environmental facilities.

Organizational identity and friendly welfare policies in the workplace significantly influence intrinsic satisfaction. Organizational identity has a higher influence than the friendly welfare policy.

Organizational identity, environmental facilities, and interpersonal relationships in the workplace significantly influence extrinsic satisfaction. The organizational identity has shown the most influence, followed by environmental facilities and welfare policy in the workplace.

These analysis results indicate that to improve the educators' job satisfaction, Yunnan Economics Trade and Foreign Affairs College should enhance organizational identity, improve environmental facilities, and implement friendly welfare policies.

Table 2 Analysis Results on The Effects of Demographic Factors

Demographic factors	Intrinsic satisfaction	Extrinsic satisfaction	Job satisfaction
Gender	t(298) = -9.562, p = 0.000*	t(298) = -9.417, p = 0.000*	t(298) = -10.263, p = 0.000*
Age	F(5,294) = 1.026, p = 0.402	F(5,294) = 0.645, p = 0.665	F(5,294) = 0.584, p = 0.524
Marital Status	F(3,296) = 19.130, p = 0.000*	F(3,296) = 25.243, p = 0.000*	F(3,296) = 21.465, p = 0.000*
Educational Background	F(3, 296) = 0.737, p = 0.531	F(3, 296) = 0.699, p = 0.553	F(3, 296) = 0.721, p = 0.540
Job Category	F(2,297) = 0.113, p = 0.894	F(2,297) = 0.186, p = 0.830	F(2,297) = 0.076, p = 0.927
Work Experience	F(3, 296) = 0.904, p = 0. 439	F(3, 296) = 3.123, p = 0. 026*	F(3, 296) = 2.153, p = 0. 094
Work Department	F(10,289) = 0.598, p = 0.815	F(10,289) = 1.714, p = 0.077	F(10,289) = 0.952, p = 0.486

*p<0.05

Table 3 Summary of Workplace Environment Influence Job Satisfaction

Hypotheses	Forecasting Equations
H2: The workplace environment influence job satisfaction.	
\hat{Y}_1 = Intrinsic satisfaction	$\hat{Y}_1 = 1.366 + .392X_1 + .219X_5$ (.000*) (.000*)
\hat{Y}_2 = Extrinsic Satisfaction	
\hat{Y}_T = Overall Job Satisfaction	$\hat{Y}_2 = 1.179 + .376X_1 + .162X_2 + .178X_3$ (.000*) (.041*) (.028*)
X_1 = Organizational Identity	
X_2 = Environmental Facilities	$Y_T = 1.597 + .357X_1 + .265X_2$ (.000*) (.000*)
X_3 = Interpersonal relationship	
X_5 = Friendly Welfare Policy	

5. Conclusion

This research aimed to explore the impact of educators' demographic factors on their job satisfaction and examine the influence of workplace environment on job satisfaction. The research framework was developed from Herzberg's two-factor theory (Herzberg, 1966), which divides job factors into "hygiene factors" (extrinsic) and "motivators" (intrinsic), and the Job Demands Resources Model (JD-R model) developed by Bakker & Demerouti (2007) which explains the relationship between job demands, resources, and their impact on employee well-being and performance. The research framework consists of two independent variables, including demographic factors (*gender, age, marital status, educational background, job category, year of work experience, and work department*) and workplace environment factors (*organizational identity, environmental facilities, interpersonal relationship, leadership style, friendly welfare policy, and overall creditability*).

Gender and marital status affect job satisfaction, as well as both intrinsic and extrinsic satisfaction, in different ways. However, work experience only affects extrinsic satisfaction, while other demographic factors do not significantly affect job satisfaction or intrinsic or extrinsic satisfaction.

For the educators at Yunnan Economics Trade and Foreign Affairs College, organizational identity and environmental facilities in the workplace significantly influence job satisfaction, and organizational identity has a higher influence than environmental facilities. Regarding intrinsic satisfaction, the organizational identity and friendly welfare policy in the workplace have a significant impact. Organizational identity has been found to have a stronger influence than the friendly welfare policy. For extrinsic satisfaction, organizational identity, environmental facilities, and interpersonal relationships within the workplace environment also play a key role. Organizational identity has the greatest impact, followed by environmental facilities and workplace welfare policies.

These results demonstrate that Yunnan Economics Trade and Foreign Affairs College should concentrate on enhancing organizational identity, improving environmental facilities, and implementing friendly welfare policies to improve educators' job satisfaction.

Discussion

How do the demographic factors affect educators' job satisfaction at Yunnan Economics Trade and Foreign Affairs College?

The study found significant gender differences in job satisfaction, with female educators reporting higher satisfaction across all dimensions than males. This may be due to societal expectations and pressures on men, who focus more on salary and career advancement. At the same time, women are more likely to value the work environment and interpersonal relationships. Marital status also influenced job satisfaction, with divorced and "other" marital status groups reporting higher satisfaction than single or married educators, possibly due to differences in life circumstances and work expectations. Additionally, years of experience significantly impacted extrinsic satisfaction, particularly for those with over 20 years of experience, as they may be more

stable in their careers. Other factors like age, education, job category, and department had no significant effect, suggesting that personal traits and work environment are more influential than background factors. The impact of work environment on job satisfaction

How does the workplace environment influence educators' job satisfaction at Yunnan Economics Trade and Foreign Affairs College?

The workplace environment encompasses organizational identity, facilities, interpersonal relationships, leadership style, employee welfare policies, and overall credibility. Organizational identity refers to the distinct characteristics of an organization, including how its members perceive and understand it and how it aims to be viewed by external stakeholders. Organizational identity has influenced both intrinsic and extrinsic aspects of job satisfaction. Educators are more likely to feel satisfied when they identify with their college's mission, values, and culture. To increase job satisfaction, Yunnan Economics Trade and Foreign Affairs College can strengthen its cultural initiatives and ensure alignment between educators and the college's goals.

The study also highlighted the importance of environmental facilities influencing extrinsic and overall job satisfaction. Environmental facilities refer to the physical resources and spaces within the workplace that support employees' well-being and productivity, which include office design, workspaces, equipment, technology, lighting, climate control, and cleanliness. Investing in these environmental aspects, organizations can help foster a positive and supportive atmosphere, enhancing overall job satisfaction.

Interpersonal relationships, which refer to the connections and interactions between individuals within a social or work environment, have influenced extrinsic satisfaction. Strong interpersonal relationships will lead to happiness working, and teamwork contributes to greater job satisfaction. Colleges can foster these relationships through team-building activities and open communication. While leadership style has a smaller impact, it still contributes to job satisfaction by creating a positive and supportive atmosphere that enhances educators' motivation and sense of belonging. Finally, the study found that educators were more satisfied with external rewards, such as salary, than with intrinsic aspects like work challenges and career development. This suggests colleges should focus on increasing career development opportunities to improve intrinsic satisfaction. These findings align with previous studies by Jiang et al. (2016), Zheng & Qiu (2010), and others, emphasizing the importance of organizational culture, environmental facilities, welfare policies, and interpersonal relationships in enhancing job satisfaction.

Recommendation

Several strategies should be implemented to enhance faculty and staff job satisfaction and loyalty. First, strengthen campus culture by organizing cultural events and establishing an honor system to recognize outstanding faculty, fostering a sense of identity and pride. Clarify development goals with medium- and long-term plans and involve faculty in management through congresses and seminars.

Optimize the campus environment by beautifying the campus and improving office conditions to enhance work efficiency. To strengthen cooperation and trust, foster a positive interpersonal environment by promoting team-building activities and professional ethics education.

Improve leadership by promoting democratic management, cultivating communication skills, and supporting staff well-being, including mental health initiatives and financial assistance. Establish a fair salary system based on performance, offering incentives and robust welfare benefits to improve motivation.

Publicize the school's achievements and maintain transparency to enhance its reputation. Encourage staff participation in decision-making and social welfare activities to boost the institution's image and improve job satisfaction.

Suggestions for Future Research

Future research should expand to include vocational colleges in different regions and types beyond the focus on Yunnan Vocational College of Economics, Trade, and Foreign Languages to draw broader conclusions.

It should also explore the relationship between job satisfaction, teaching quality, and student satisfaction, as job satisfaction likely impacts both teaching and student outcomes.

Additionally, studying the long-term factors and dynamic changes in job satisfaction over time will provide valuable insights for improving vocational college management.

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The Model of Automated Scoring System for Thai Boxing Skills Practicing

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ABSTRACT

Thai Boxing Skills Practicing requires observing the use of different parts of the body to strike targets at critical points. The purpose of this study is to develop an automatic scoring system for Thai Boxing Skills Practicing, where punches, elbows, and knees are used to hit targets classified as upper, middle, and lower body parts. Trainees can manually check the accuracy and scores achieved. The sample used in this research consisted of five experts selected by purposive sampling. An Automated Scoring System for Thai Boxing Skills Practice consists of an Input device, a Press sensor, a Microcontroller board (Arduino), and an Output display. The score of the proposed model has an IOC (Index of Item Objective Congruence) value of 1. The significance of this study lies in the development of the model for an automatic scoring system for Thai Boxing Skills Practicing, which will contribute to improved teaching and assessment practices in sports education.

Keywords: Automated Scoring System; Model of Automated Scoring System; Thai Boxing Skills Practicing; Muay Thai skills

1. Introduction

Boxing is not only a popular combat sport with a long tradition, but it has recently become a popular fitness trend as well (Dan Omcirik, et al., 2021). Study of Khasanshin, I. (2021) classified the type of punch such as jab, cross, hook, or uppercut, and the type of activity including shadow boxing, single punch, or series of punches. Muay Thai or Thai boxing is well-known throughout the world and esteemed for its lethal style and furious combat. Muay Thai requires different fitness and training regimens than other combat sports because of its unique style. Study of Natthaphol Phewkham (2024) the test was conducted for 3 sets with the 3 forms of punches, namely, the left punch, the right punch, and the double punch.

Compared to other combat sports, Muay Thai creates eight points of contact using the hands, elbows, knees, and feet, allowing for a variety of fighting maneuvers such as punches, knee strikes, elbow strikes, kicks, and grappling (Myers et al., cited in Bhumipol, 2022). To innovate in scoring Muay Thai skills this time, it is important to have standards and be accepted, which must have the following qualifications: 1. Validity, which means measuring what you want accurately; 2. Reliability, which means that the effect can be the same or similar as many times as you need by test-retest.

The proposed of the study, researcher saw the significance of the Automated Scoring System, so they were interested in creating an Automated Scoring System for Thai Boxing Skills Practicing with accuracy and reliability.

2. Literature Reviews

In the study on developing the Model of Automated Scoring System for Thai Boxing Skills Practice, the researcher has reviewed the relevant concept Theories and research as follows.

Kobchai Nithiwattanakul (2003: 7-10) said that Thai boxing is a martial art that uses all organs of the body to combine movements with rhythms in harmony with the force or as a weapon to attack the opponent and defend himself. Therefore, practicing Thai boxing. Learners should learn deeply about the use of body organs, such as punches, feet, knees, and elbows. The use of body organs can be divided into many subcategories so that it can be said that the skillful use of those organs is the origin of the term "Muay Thai Art".

Robo-Boxing Trainer consisted of four targets. Each punching target has eight sensors and eight LED lights. Operating software can set the punching series and alarm signals. It could record the response time since starting signal until touching target and to calculate for precision percentage. This software could be set and recorded maximal 40 series and maximal 100 punches in each punching series (Tossaphon Jaysrichai, et al., 2018). Robo-Boxing Trainer machine was a new way to evaluate continuously the response time (in seconds) and the precision of punches (in percentage). It could be used for enhancing a boxer's punching skills; such as the series of punch. This machine can aid the coach in assessing and aiding boxers in training and also apply it for other related sports (Tossaphon Jaysrichai, et al., 2019).

3. Methodology

In the study on developing the Model of Automated Scoring System for Thai Boxing Skills Practice, the researchers conduct the study as follows.

1. Literature Review: The researchers conducted a comprehensive study of relevant theories, textbooks, documents, and research related to Thai Boxing Skills Practicing.
2. Design and Development: The Model of Automated Scoring System for Thai Boxing Skills Practicing was designed and developed.
3. Conduct the IOC assessment form for experts to measure the Index of Item Objective Congruence (IOC) of the proposed model. The sample used in this research consisted of five experts selected by purposive sampling
4. The IOC assessment form for experts was examined using a panel of five experts who reviewed the proposed model to ensure they aligned with the objectives of the study.
5. Refinement: The model of an Automated Scoring System for Thai Boxing Skills Practicing was refined based on the feedback received from the assessment of the experts.

4. Results

4.1 Model of Automated Scoring System for Thai Boxing Skills Practicing.

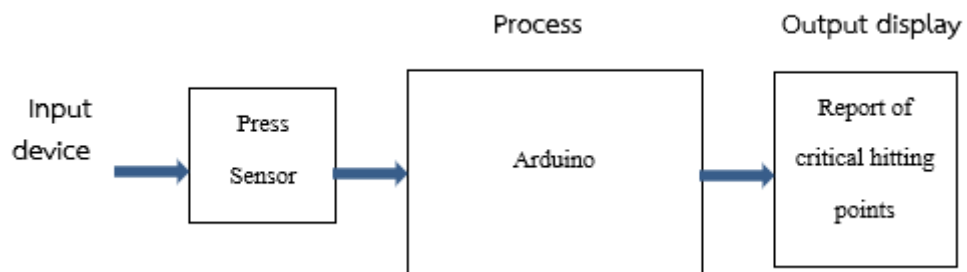


Figure 1. Model of Automated Scoring System for Thai Boxing Skills Practicing.

The working process of the model of an Automated Scoring System for Thai Boxing Skills Practicing, as shown in figure 1, is as follows.

- 1) An Automated Scoring System for Thai Boxing Skills Practice consists of an Input device, a Press sensor, a Microcontroller board (Arduino), and an Output display.
- 2) The test subject stands at a distance of 1 stationary arm from the target.
- 3) The test participant must wear gloves (weapons used including fists, feet, knees, and elbows) to meet the size that follows the rules and regulations in the Thai Boxing tournament which allows participants to practice punching with the target.
- 4) The target of the fight is 8 points: 3 points are the upper part of the neck upwards including the temples on both sides and the tip of the chin, 3 points are the middle part of the body including the ribs and tongue, and 2 points are the lower part of the body, namely the right thigh and left thigh.

5) The input device will detect the weapons used including punches, feet, knees, and elbows through the Press Sensor.

6) The press detection device then converts the value into an analog signal. Next, send it for processing by the microcontroller board, which will only screen the value with a punch weight of not less than 1 kilogram by the rules and regulations of the Thai Boxing sports competition.

7) The punch must be completed at all 8 points within the specified time of 1 minute, and then the score obtained from the punch with the target will be reported accurately and with a weight of not less than 1 kilogram.

4.2 The IOC assessment of the Model of Automated Scoring System for Thai Boxing Skills Practicing issues are as follows.

Table 1, the validity index for assessment of the Model of Automated Scoring System for Thai Boxing Skills Practicing.

Evaluation list	expert person					IOC value	tote	translate
	1	2	3	4	5			
Does the proposed model have a perfect functional element?	1	1	1	1	1	5	1	available
Does the proposed model have an appropriate and consistent workflow?	1	1	1	1	1	5	1	available
Can the proposed model support to build understanding and develop to use it further?	1	1	1	1	1	5	1	available
Does the proposed model consistent with the nature of the sports education?	1	1	1	1	1	5	1	available
Is the overall value of the proposed model satisfactory?	1	1	1	1	1	5	1	available

Table 1, the validity index for assessment of the Model of Automated Scoring System for Thai Boxing Skills Practicing, as evaluated by five experts, it can be concluded that the scoring of the proposed model has an IOC (Index of Item Objective Congruence) value of 1. This falls into the "excellent" range according to Kirkendall (1980).

5. Conclusion and Recommendation

The Model of Automated Scoring System for Thai Boxing Skills Practicing is construct based on the nature of the physical education. The proposed model submits to the experts for IOC assessment with five issues. The score of the proposed model has an IOC (Index of Item Objective Congruence) value of 1. The significance of the study lies in the development of the model for an automatic scoring system for Thai Boxing Skills Practicing, which will contribute to improved teaching and assessment practices in sports education.

For further study, the implementation of the proposed model will be conduct. Then testing with the experienced boxers, as the experts.

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